

Scanning - Shortwave - Ham Radio
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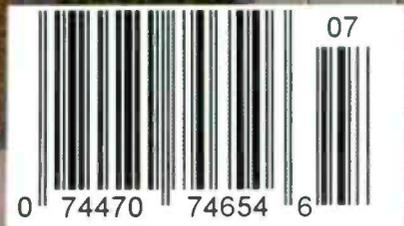
Monitoring Times

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July 2005

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Patrolling the Palmetto 800 Statewide Trunk System



Uniden's New BCD396T Raises the Bar
- New Life for Marine HF Morse
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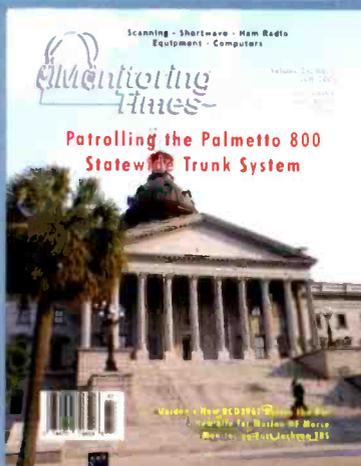


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Cover Story

Patrolling the Palmetto 800 Trunk System

By Gayle Van Horn

South Carolina's Highway Patrol may have had a slow start in the early 1930s, but it has a lot to brag about today. In addition to a 90 percent court conviction rate, the SCHP now belongs to the largest statewide emergency communications radio system in the nation. Tuning in the Palmetto Motorola SmartZone trunk system is made relatively simple by using the control-channel feature available in newer scanners.

Story starts on page 10. (One our cover: The South Carolina State Capitol in Columbia with the state tree – a Palmetto – in the foreground. The State Bureau of Protective Services provides security at the Capitol. Photo by Larry Van Horn).

C O N T E N T S

Baudwalking: News Feeds 14 By Tom Sundstrom

Make the Internet work for you instead of wasting your precious time. With minimal set-up, your computer can work in the background, bringing up headlines for stories of interest to you. At your leisure, you click on the articles you want to read in full.

Blogs are another new source for radio-related news and opinion pieces. International broadcasters and hobbyists are just beginning to discover these new media formats, but they have great potential, and could catch on quickly.

Harvester: Signal Intelligence 17 By John Catalano

Modern computer power is putting tools in the hands of hobbyists that used to be reserved for the deep pockets of government agencies. One such product is Harvester – a signal intelligence (sigint) program that uses every piece of information you can glean about a radio signal to help analyze its possible identity and location.

Reviews:

Only its blue display prevents the Uniden BCD396T from being awarded a perfect 5 stars by reviewer Larry Van Horn. Even so, this new handheld outshines any other scanner in the marketplace, he says (see page 70).

With 25-3000 MHz continuous frequency coverage, a 10-MHz span spectrum display, and scanning ability, the **AOR SR2000 FFT Fre-**

quency Monitor is a comprehensive monitoring and analysis tool for the professional user (see page 68).

John Catalano takes his second look at some “oldies but goodies” – radio-related programs that are more than 12 years old but still perform well under Windows 98. John reviews five radio-control and digital programs that still hold their value in today's world. (Page 72.)



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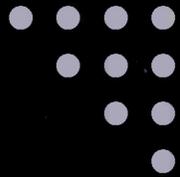
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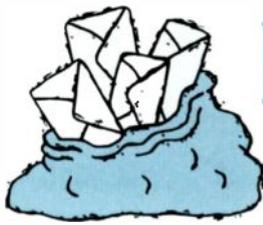
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LETTERS TO THE EDITOR

Mystery Antenna

We received letters from David Marx of Apex Embedded Systems, and from Jesse Wadsworth. Both had found a copy of the book *Antennas* by John D. Kraus which included a photo of what obviously was the same type of antenna photographed by Jesse in 1968 near Roswell, New Mexico (and shown in our October 200 issue).

Jesse says, "See attached photo. Looks like it may have been built by Electro-Physics Laboratory. This looks like an identical antenna but at a different location. The book does not say what it was used for. However, the lab was doing some HF propagation studies for the government and maybe these antennas were used in the study. The photo states that it operated at frequencies around 10 MHz."

Kraus was director of the Radio Observatory at Ohio State University. Here's what he says about the helical antenna design: "The helix immediately found wide application. I employed it in an array of 96 11-turn helices in a radio telescope I designed and built with my students in 1951 ... Others employed the helix over a wide range of frequencies, some at frequencies as low as 10 MHz (Fig. 7-5)." (J D Kraus, *Antennas*, Second Edition, McGraw-Hill Book Company, p. 268.)

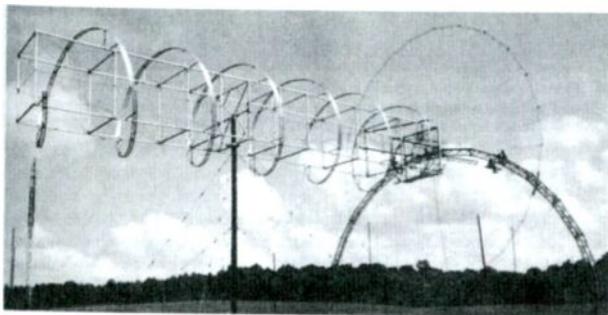


Figure 7-5 Rotatable (in azimuth) 6-turn helical antenna about 45 m long for operation at frequencies around 10 MHz ($\lambda = 30$ m). Note workmen on arch at far end for scale. (Courtesy: Electro-Physics Laboratory.)

Super Shuttle List

To Larry Van Horn, Hugh Stegman, and *Monitoring Times*,

"You have done another terrific job with your May issue. As NASA prepares to launch its first post-Columbia shuttle, you have done tremendous work to compile the most extensive database I've seen on NASA and related frequencies and talkgroups. Scanner hobbyists and news organizations will make very good use of this fine research when *Discovery* launches this spring.

"I program the scanners for the TV station (WESH, channel 2, the NBC affiliate)

where I work in Central Florida, and your May issue has been a big help. I don't live close enough to the Space Coast to monitor the radio systems there. I can monitor them only when I drive to or near Brevard County, or fly there in our news helicopter. I'm always glad to get new information on radio channels and systems in the region, where we might be covering a breaking major story at any time with no advance warning.

"Here are [a couple of] observations on the articles you published:

The first paragraph incorrectly states that *Columbia* broke up in January. The tragedy actually occurred Saturday Feb. 1, 2003. I was working the news desk the morning this occurred.

Table 1 lists talkgroup 14256. Table 2 lists this talkgroup as 14526. It appears that the talkgroup number 14256 is correct and 14526 is incorrect. Can you advise on this? (Yes, you are correct; 14526 was a typo on our part - ed)

I can't wait to see your revised list after the shuttle launch and landing. I'm sure there will be more unknown talkgroups identified, and there will be new talkgroups that we have not heard yet.

Thanks again for the great job you have done not only on this article, but month after month, and year after year in *MT*.

- Tom Hirsch

Thanks, Tom. Yes, we will continue to update the online web page (see below) as information comes in.

Apparently our "NASA Returns to Space" feature got some attention from "local Commanders, Frequency Managers, and Land Mobile Radio Managers." According to a source who shall remain anonymous, "Your ... article divulged the majority of talk group information on our trunk system here. I purchased both of the only two copies available locally and one of them is already 'dog eared' in a day from being passed from person to person. Statements were made from utter disbelief, to 'aren't these sensitive'?"

"Being ... an Amateur Radio operator I am very political on the side of 'It was bought and paid for with taxpayer's money and the taxpayers have the right to listen and always know what's going on.'"

"Keep up the good work; for the first time ever I see book stores clamoring for at

least this issue and unprepared for the rush of people looking for your product on the bookshelf."

As author Larry Van Horn pointed out in the article, all the information in the article was gleaned over-the-air by local monitors in the field. Those who feel such information is sensitive should realize what's possible by any experienced radio hobbyist. On the other hand, readers will note how many entries say "unknown user/unknown usage." Just knowing a talk group exists doesn't mean hobbyists will ever be able to hear anything on it. For those folks still looking for the NASA article, the information is on-line at <http://www.monitoringtimes.com/nasa.html>

Thanks, But ...

"As a long time subscriber to *Monitoring Times* please let me say 'Thank you' for what I consider the best magazine on the market catering to all radio related interests. No genre is missed and the columns are so professional.

"As a very brief introduction, I am the current editor for NASWA's Electronic Flashsheet, a weekly on-line loggings newsletter. As such I can truly appreciate the value of current listening information.

"Which brings me to the crux of my memo. I've relied on the 'Shortwave Guide' for years and also relied upon the 'Extended Program Guide' which ended each monthly column. This no longer is included and I am requesting that you please consider re-inserting this into your monthly format. It was a terrific complement to the 'Guide'.

"Please continue your wonderful job producing *Monitoring Times*. Great job!"

- Ray Bauernhuber

I can't help but agree with you on all the above points. However, making the cut was a matter of economics, and we are trying to compensate for it by semi-annual program listings and periodic updates in the *Programming Spotlight* column by John Figliozzi, who was the author of the selected programming guide. Check out his April/May listings for summer programming. If you missed those issues, the information is also on our website.

We welcome your ideas, opinions, corrections, and additions in this column. Please mail to **Letters to the Editor**, 7540 Highway 64 West, Brasstown, NC 28902, or email editor@monitoringtimes.com. Letters may be edited for length and clarity. Happy monitoring!

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BROADCASTING

Vatican Radio

Two Vatican Radio officials – Cardinal Roberto Tucci, who used to head the Vatican Radio's management committee, and the station's director general, Father Pasquale Borgomeo – were found guilty of polluting the atmosphere with powerful electromagnetic waves from a radio transmission station. The two were given 10-day suspended sentences and ordered to pay damages in the case, court officials said.

A medical report released in 2001 found unusually high numbers of people living near a Vatican Radio transmission site contracted or died from leukemia. An initial trial was halted in 2002, when a judge ruled that, since the Vatican is a separate entity, Italian laws could not be applied to Vatican Radio. However, that decision was later overturned. Following the guilty verdict in the second trial, the judge ruled that a civil arbitration body should set the level of the damages.

Both men have denied the charges and defense lawyers said they would appeal the ruling, maintaining that Vatican Radio transmissions meet international transmission standards, and that the verdict is "clearly unjustifiable."

We also received a fax from Italia Zero Radio Bravo Alfa with a signature which looked like "Anidrio Randaccio," headed: "Finally!" He goes on to say, "Vatican Radio uses obsolete equipment at extremely high power levels generating all kinds of interference to all radio services and when asked to fix their equipment or refrain or reduce their activity always had an 'in your face' attitude. Since one year their hundred kilowatt (DRM) transmitter at 1511 was occupying frequencies between 1000 and 4000 kHz."

The ITU and the Internet

The International Telecommunications Union plans to take a closer look at its potential role in the Internet. "Countering spam is just one of many elements of protecting the Internet that include availability during emergencies and supporting public safety and law enforcement officials," Houlin Zhao, director of the ITU's Telecommunication Standardization Bureau, wrote in December. He also said the ITU "would take care of other work, such as work on Internet exchange points, Internet interconnection charging regimes, and methods to provide authenticated directories that meet national privacy regimes."

Increased ITU involvement could lead to a power struggle between ITU, ICANN (Internet Corporation for Assigned Names and Numbers), and perhaps even the U.S. government, which retains some oversight authority over ICANN.

SCANNING

Michigan House Passes Bill

House Bill 4544 just passed the Michigan House of Representatives at presstime. This bill makes it a felony to use a radio which can receive police, fire or emergency communications in committing or attempting to commit a crime, and removes the requirement for scanner and NASCAR hobbyists to obtain a permit to carry a scanner. If passed by the Senate, this will remove a huge source of paperwork for the Michigan State Police and relieve anxiety and uncertainty for radio hobbyists and tourists passing through the state.

Doing the Texas Two-Step

Public safety agencies are still trying to decide whether they should treat the public as their allies or as potential enemies.

Two Steps Forward

A year ago, when San Antonio, Texas, put in its new EDACS digital system, they encrypted the control channel, which means that scanners will not properly track the system trunking. (See Dec 2004 *MT* feature story.) However, the police not only allowed the media to listen to their communications, they even offered to program their radios for them. Their website also provides real-time location information for emergency services.

Sgt. Gabe Trevino told Darrell Franklin of KFDX-TV, "We work for the public. You know, they pay the taxes, they pay our salaries, and they demand to know what's going on in our community, and rightly so."

Two Steps Back

While Michigan and San Antonio move forward in their partnership with the public, the attitude in Wichita Falls, Texas, is a definite step away from openness. The attitude toward civilians by Police Chief Dennis Bachman, as reflected in newspaper reports, has been very regressive.

Bachman says all police traffic on its new 800 MHz digital radio system will be encrypted to protect the safety of the city's officers and residents. Even the news media will be shut out from the real-time information access they've had in the past.

"The problem with that is we still have a civilian listening to our radio," Bachman said. That means information can still cross the wrong ears, he said. Media access to police information will have to go through the department's public information office.

"We feel that the public is not well served when police and fire channels are put beyond the reach of any public scrutiny," KFDX News Director Chris Huston said. He said he did not yet know how to react to the decision and hoped it could be resolved without litigation.

Seasoned Listeners

Meanwhile, in other communities expe-

rienced scanner listeners continue to provide information and breaking news to those who need it. John and Jan Wolmer make their living feeding tips to newspapers, radio stations, freelancers, and television stations in South Florida. "We are the front lines. We know more about what's going on than anybody," John Wolmer told the *Sun-Sentinel*.

News organizations are increasingly turning to experienced listeners who can translate radio jargon. "It's awfully hard to beat the combined expertise of several gonzo scanner listeners," said Steve Berman, the night photo editor at *The New York Times*, where he subscribes to the Breaking News Network, a company that monitors emergency radio calls from Connecticut to Maryland.

Michael Coppola (a freelance contributor to *MT*) is another one who coordinates 40 volunteers in First Responder Wireless News. Club members e-mail the details to reporters, insurance adjusters and others who have reason to be interested in emergency calls.

Bill Phillips, project manager for the Phoenix Regional Wireless Network, said that although many police operation channels are being digitally encrypted, police officials in Phoenix, Scottsdale and other local Arizona cities decided to leave open some channels for the public.

Off-duty officers and firefighters and their families are habitual scanner listeners as well, tuning in to public safety channels to feel more connected to friends and loved ones.

FCC

Analog Satellites Obsolete?

As part of its on-going 2000 Biennial Regulatory Review, the FCC is examining all aspects of earth-satellite transmissions. *MT* reader Mike Reynolds of Tulsa, Oklahoma, says, "The FCC is considering outlawing all TV station remote news gathering trucks that use analog TV, the most common transmission method. Further, this proposed ruling could disenfranchise about a quarter million rural C band satellite TV customers along with hundreds of thousands of other back yard analog satellite dish owners including me."

The full document can be found at http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-05-62A1.pdf, but the following is the pertinent section:

87. ... The Commission has observed in the past that analog video transmissions are more susceptible to harmful interference from other transmissions and more likely to cause harmful interference to other transmissions. Thus, a prohibition on analog video transmissions may result in more efficient spectrum use. We also note that analog satellite transmissions are declining. Thus, technical rules for analog video may no longer be necessary.

88. Accordingly, we propose prohibiting analog video transmissions ... We also propose a transition period of no more than one year.

OLD TECH/NEW TECH

Morse Code – the Champion!

Who's the fastest? Powerhouse Museum in Sydney, Australia, pitted 13-year-old Brittany Devlin against 93-year-old telegraph operator Gordon Hill. Brittany used her cellphone to send the chosen text – "Hey, girlfriend, you can text all your best pals to tell them where you are going and what you are wearing" – using text messaging and liberal use of text slang. Mr Hill used Morse code and beat her soundly while sending the message verbatim.

Perhaps picking up on the Australian contest, Jay Leno's *Tonight Show* then pitted the most recent champion texter – 17-year-old Ben Cook and his friend Jason from Utah – against Chip Margelli, K7JA and Ken Miller, K6CTW. Once again, Morse code easily beat the text messagers with the phrase. "I just saved a bunch of money on my car insurance."

Of course, some letters are easier to send than others in both Morse and text messaging. The phrase used by the *Guinness Book of World Records* to test text messaging speed is "The razor-toothed piranhas of the genera *Serrasalmus* and *Pygocentrus* are the most ferocious freshwater fish in the world. In reality they seldom attack a human." In a contest sponsored by KUTV, Ben Cook typed the Guinness text in 57 seconds, besting the world record speed by 10 seconds – pretty close to the 30-word-per-minute speed achieved by expert Morse telegraphers – but not quite.

Earth Sounds Inspire Students

VLF receiver systems are little more than an antenna and an audio amplifier, which translate radio waves into acoustic oscillations we can hear. In 1990, space scientist Bill Taylor of NASA's Goddard Space Center in Greenbelt, Md., and Bill Pine, an enterprising science teacher at Chaffey High School in Ontario, Calif., founded the Interactive NASA Space Physics Ionosphere Radio Experiments program, or INSPIRE, which uses these receivers to bring the excitement of studying very-low-frequency radio waves into the classroom. To date, more than 1,500 receivers have been built at elementary schools and high schools across North America.

Dr. Curt Szuberla's students at North Pole, Alaska, joined the project to record the low-frequency music of the aurora borealis and stream it via the Internet. To construct the VLF system itself, they traveled to the University of Alaska in nearby Fairbanks to learn how to solder resistors and other miniature components to build the receiver.

"Assembling the receiver really helped me understand some of the work in our classes," said one student. "It definitely reinforced my interest in working with computers."

Szuberla enjoyed their enthusiasm. "Right now, they're primarily interested in what goes into the box," he said. "In the spring, they'll learn what comes out of it."

In the fall of 2005, the Marshall Center's Space Science branch at the National Space Science and Technology Center in Huntsville will initiate a Web-based "Earthsounds Scavenger Hunt" program. The three-year education initiative, based on INSPIRE and made possible by a grant in 2004 from NASA's Science Mission Directorate, will challenge students nationwide to use VLFs to "hunt" for natural Earthsounds – sparking their interest in science and space.

During the 2005-2006 school year, NASA and North Pole High School will stream real-time audio via the Internet. Schools around the country will be invited to join a pilot program to fine-tune the project, but the site will be accessible for all interested users. NASA will open the "Scavenger Hunt" program to high schools nationwide in 2006.

IN MEMORIAM

Art Blick, VE3AHU

One of the driving forces behind Canadian Amateur radio passed away on March 2, 2005. Arthur Edwin "Art" Blick, VE3AHU, was the founder of the Canadian Amateur Radio Federation (CARF) now part of the Radio Amateurs of Canada. He also established the Canadian QSL Bureau system, helped change the radio regulations and fought tirelessly to maintain the privileges for Canadian amateurs.

Art was also a Forman of Signals for the Canadian Military. Art was in Signals during World War II and was part of Patton's Phantom Army in England. He was in Egypt during the 1950's Suez crisis and arranged communication from the Gaza Strip. He started the tradition of using amateur radio for phone patches back home to Canada. VE3AHU/SU brought some of home to many a soldier. He became an antenna expert and wrote many texts and articles. It is hard to look at a G5RV and not think of Art.

Art was the Amateur of the Year and Past President of the Radio Society of Ontario, Amateur of the Year and Past President of CARF, and finally a member of the Canadian Amateur Radio Hall of Fame. I had the privilege of working with him to help reform the amateur exams and regulations. I know how hard he worked on our behalf. He will be missed by many!

– Ron Walsh, VE3GO

"Communications" is compiled by editor Rachel Baughn from news and clippings sent in by our readers. A round of thanks goes to this month's team of fine reporters: Anonymous, Azizul Alam Al-Amin, Mark Bajek, Bill Grove, Bob Grove, Norm Hill, Rick Kissel, Sterling Marcher, John Mayson, Stephen Newlyn, Jerry None, Anidrio Randaccio, Michael Reynolds, Doug Robertson, Brian Rogers, Gayle and Larry Van Horn, Ron Walsh, Brian Webb, Ed Yeary, and George Zeller.

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Patrolling the Palmetto 800 Trunk System

By Gayle Van Horn

After a long, horrendous winter – at least by southern standards – the thought of a warm sun on our faces, and cool breezes stirring from fan-shaped leaves in the trees was enticing enough to send us packing.

Yes, we packed our bags for a week's getaway to South Carolina – the Palmetto State.

In case you don't know what a Palmetto is, it is a charming coastal tree that grows in the low country and it's the official state tree of South Carolina. It is the pretty tree that bears fan-shaped leaves ... And it is also the name of one of the largest and most sophisticated trunk systems in the United States – the Palmetto 800. Traveling in South Carolina offered us an opportunity to monitor this extensive 800 MHz trunk system using the new Uniden BCD396T scanner.

But, before we talk about the present, we are going to take a brief look back at some of the state's rich history and major events in state law enforcement.

A Bit of State History

South Carolina is a state rich in history and historic places, and it's a great place to vacation and to explore.

At the end of the 15th century, South Carolina was the home territory for a wide variety of distinct tribal cultures. The influence of these "first" Carolinians survives in their many names for rivers and geographical features which have been absorbed into our present-day English.

In April 1670, the English arrived at Albemarle Point and ten years later moved across the Ashley River to the present city of Charleston. By the mid 1700s, new townships were developing inland from German, Scotch-Irish and Welsh immigrants.

The initial, overt skirmish of the American Revolution occurred in South Carolina at Fort Charlotte in McCormick County on July 12, 1775. In 1788, South Carolina was the eighth state to ratify the Constitution of the new United States. South Carolina was also the first state to secede from the Union prior to the onset of the Civil War. The federally garrisoned Fort Sumter in Charleston Harbor remained in the hands of the Confederacy after its capture until the evacuation of Charleston in 1865.

Post-war South Carolina was in a ruinous

condition and was occupied by Federal troops until 1876. The ensuing years brought decades of economic suffering from the physical damages of the war throughout the state. By the 1900s, the textile industry began to flourish; however, it was not until after World War II that South Carolina began to pull out of the economic depths to which it had sunk.

Today, South Carolina is a leader in the textile and tourism industries and has a diversified economy. Numerous industrial giants, both foreign and domestic, have plants in the Palmetto State, and it has regained the place of prominence it formerly held in the nation.

A part of the state's recent history has been made by the men and women of the South Carolina Highway Patrol, a division of the Department of Public Safety.

South Carolina Highway Patrol History

The South Carolina Highway Patrol (SCHP) was originally organized in 1930 as a division of the South Carolina Highway Department. During the first year, there were 69 men of the highway patrol, including a captain, assistant to the captain, seven lieutenants, 49 officers and 11 license inspectors.

Every trooper was issued a badge, uniform, gun, summons book and a motorcycle to patrol the 5,991 miles of South Carolina highways at the time. Training was not an issue in the early years, except for a few verbal instructions from the captain.

In 1932, a formal three-month training course began at Fort Jackson Army Base in Columbia. Within two years, a traffic engineer and

a fingerprint expert were appointed. In 1937, the patrol had over 90 members, 70 of whom were patrolmen.

Motorcycles gradually were replaced by automobiles, and by the end of 1937 no motorcycles were used on the force. Police motorcycles weren't put into service again for another 57 years.

Despite rapid expansion in the patrol's duties, World War II forced a change of focus. Many patrolmen were called for duty, and gas rationing brought most motor vehicle traffic to an abrupt stop. The patrol was much less active during the next four years as emphasis was placed on national defense and the war effort.

The close of World War II brought phenomenal vehicle registration growth as well as increased highway travel. This growth brought the need for expanded traffic enforcement to the forefront. Patrol cars were equipped with two-way radios in 1947, followed by extending the Patrol Training School to eight weeks.

Initially, the patrol was a part of the Motor Vehicle Division under the South Carolina Highway Department. As the patrol grew in responsibility and size, it became clear that the patrol could function more efficiently as a separate division, which it did in 1953.

The South Carolina Criminal Justice Academy, located in Columbia, opened in 1972 and continues to train all recruits from this facility. The first eight women applied and attended the academy in 1977. Seven graduated and were assigned to patrol duty throughout the state. The next year brought another change – a uniform and patrol car paint scheme to be used exclusively by the patrol. Typically, of over 1,500 applicants, a trooper basic class consists of only 50 men and women. All of the trainees at the Academy undergo a rigorous 20 week training program living under military-type discipline and are taught subjects ranging from narcotics investigation, traffic law, communication and human relations.

Only a select group of men and women are chosen to join the ranks of South Carolina's finest, to retain a motto of "Courtesy, Efficiency, Service." Because of this uncompromising selection and training, the South Carolina Highway Patrol has better than a 90 percent court conviction rate, one of the highest in the nation.



State Department of Public Safety

In 1993, due to government restructuring, the highway patrol became part of the newly formed Department of Public Safety (DPS) for cost effectiveness and to promote efficiency. Since then, the mission of the highway patrol has not changed, and it provides professional traffic safety through an impartial and fair enforcement of South Carolina's traffic laws. Their mission is to provide equitable service and protection, and uphold the laws of the constitution of the United States and the State of South Carolina in order to promote a safe and secure environment for the public.

The State DPS is headquartered in Blytheville, South Carolina. There are several divisions, in addition to the highway patrol, that fall under the management and leadership of the Director of the Department of Public Safety Director, James K. Schweitzer.

DPS Divisions

In addition to the South Carolina Highway patrol, there are two other main law enforcement divisions under the Department of Public Safety, both of which use the statewide trunk system.

The mission of the Bureau of Protective Services (BPS) is to provide and maintain security for the Governor's Mansion Compound, the State Capitol and grounds, South Carolina Supreme Court and Court of Appeals, and other designated state facilities. Through the use of physical patrolling and state of the art technology, the Bureau of Protective Services maintains a safe environment for the Governor; First Family; visiting dignitaries; the state's constitutionally elected, appointed and employed personnel; and all citizens who enter designated state government facilities.

The State Transport Police (STP) is primarily responsible for enforcing state and federal laws governing commercial motor vehicles. The division is charged with protecting the motoring public by preventing accidents, removing unsafe drivers and vehicles from state roads, protecting the environment from hazardous materials being transported on roadways, and preventing the premature deterioration of roads and bridges through the STP Size and Weight Enforcement Program. There are seven STP districts with offices in Columbia, Edgefield, Greenville, Rock Hill, Florence, Dorchester, and Bamberg, South Carolina.

SCHP Troops

The state highway patrol is divided up into ten troops, seven of which cover various geographic areas of the state. Each county within a troop is called a "post." The headquarters for the SCHP is collocated in Blythewood with the state DPS headquarters.

There are more than 900 commissioned State Troopers assigned to the Highway Patrol Division to patrol 64,750 miles of state highways. The SCHP uses motorcycles and high performance vehicles such as Camaros in daily traffic enforcement.

The breakdown of the seven SCHP patrol troops/post follows.



Patrol Troop One Headquarters: Columbia
Post/Counties: Clarendon, Kershaw, Lexington, Richland, and Sumter

Patrol Troop Two Headquarters: Greenwood
Post/Counties: Abbeville, Edgefield, Greenwood, Laurens, McCormick, Newberry, and Saluda

Patrol Troop Three Headquarters: Greenville
Post/Counties: Anderson, Greenville, Oconee, Pickens, and Spartanburg

Patrol Troop Four Headquarters: Chester
Post/Counties: Cherokee, Chester, Chesterfield, Fairfield, Lancaster, Union and York

Patrol Troop Five Headquarters: Florence
Post/Counties: Darlington, Dillon, Florence, Georgetown, Horry, Marion, Marlboro and Williamsburg

Patrol Troop Six Headquarters: North Charleston
Post/Counties: Beaufort, Berkeley, Charleston, Colleton, Dorchester and Jasper

Patrol Troop Seven Headquarters: Orangeburg
Post/Counties: Aiken, Allendale, Bamberg, Barnwell, Calhoun, Hampton and Orangeburg

Troop eight (the Aggressive Criminal Enforcement, ACE, Team) uses the latest technology and equipment to carry out its duties of drug interdiction, and felony apprehension and arrest.

Troop nine, the Multi-disciplinary Accident Investigation Team (MAIT), conducts accident reconstruction and investigation. Patrolmen specialize in forensics and vehicle dynamics as well as highway engineering and design to help analyze the most complicated collisions.

Troop ten is based out of SCHP headquarters and is the Insurance Enforcement troop.

Palmetto 800 Trunk System

In 1989, the State of South Carolina was devastated by Hurricane Hugo. Communications infrastructures collapsed, and those that survived were, in many cases, incompatible with each other. Assistance from the unaffected areas of South Carolina poured in to help clear roads and restore basic services. The arriving assistant units were equipped with two-way radios, but they were outside their local coverage areas and/or their equipment was incompatible with the agencies they were assisting.

Hugo brought to light South Carolina's need for a more robust radio communications system that would provide agency interoperability and statewide coverage. In addition to interoperability and coverage issues, many of the state and local government radio systems were 15 to 25 years old.

Historically, each public safety agency has

maintained its own unique radio system, a situation that has resulted in difficulty communicating between agencies. In 1999, at the direction of the South Carolina General Assembly, the Public Safety Coordinating Council completed a study of public safety communications. The resulting report recommended the use of a statewide 800 MHz radio system as the technology of choice for public safety communications.

Thus, the Palmetto 800 was "born" as a result of Hurricane Hugo and the pressing need for interoperability. It is the first public safety system in South Carolina to offer multi-agency interoperability, linking state, local and federal agencies with major utilities and health care providers. It is the largest statewide emergency communications radio system in the nation.

Owned and operated by Motorola, the Palmetto 800 provides statewide 800 MHz Smart Zone® Trunking communications for entities throughout South Carolina on a fee for service basis.

South Carolina's coastal counties, population centers, evacuation routes, Interstate corridors, and ports have been project priorities. Phases one and two of the project, during which 18 county law enforcement agencies and 58 municipal police departments in the coastal and midland regions of South Carolina received funding assistance, have been completed. Phase three, nearing completion, has moved the project westward to the Upstate Region of South Carolina, where 22 county law enforcement agencies and 34 municipal police departments have received assistance.

Phase four of the State Interoperability Project commenced this year. Fifty municipal police agencies have been identified for assistance in this phase. Upon completion of phase four, all sheriffs' offices and municipal police departments in South Carolina formerly without statewide 800 MHz capability will have been offered the opportunity for interoperable voice communications on the Palmetto 800.

Growth and Expansion

In 2000, the system faced a major hurdle. It had reached its capacity for transmitter sites. They were faced with the decision of how to expand the system without significant cost to system users. Forty-four sites and over 9,000 radios were utilizing the system. To expand beyond the 44 radio sites required an investment of several million dollars into a larger zone controller. South Carolina also needed at least sixteen more sites to complete a statewide mobile cover plan.

Their utility partner, SCANA Communications, Inc (formerly MPX) and the State looked at a number of solutions to accommodate expansion. In July 2001, an agreement was reached between SCANA, Motorola, and the State of South Carolina to transfer the management and ownership of the system to Motorola, Inc. As part of that agreement, Motorola agreed to the existing user rates, provided a new 64-port zone controller, and agreed to construct sixteen additional radio transmitter sites.

The completion of the statewide voice network in 2003 allowed South Carolina to begin focusing on adding statewide mobile data to the system. South Carolina now has 70% of a mobile

data system already in place by re-using the connectivity and infrastructure already in place with the voice system.

Today and the Future

Today, the statewide system is growing at an annual rate of over 2,000 new users each year, driven in large part by the events of September 11, 2001, the traffic jams from the Hurricane Floyd evacuations in 1999, and the multitude of federal grant funds that are available to local and state governments. The 14,800 current system users represent 23 State government agencies, 85 county government agencies, 86 municipal agencies, eight power utilities, five federal agencies and 33 agencies in neighboring Augusta-Richmond County, Georgia. Seventy percent of South Carolina's Sheriffs' offices today have 800 MHz radios with access to the statewide system. Grant funding has already been secured to provide funding to the remaining 13 County Sheriffs Offices.

While state government cannot dictate the type of radio system any agency utilizes, by July 1, 2005, every governmental law enforcement agency, EMS provider, and County EOC in South Carolina will have been offered 800 MHz radio equipment on the statewide system for interoperability. The state is currently working on securing funds to provide every fire department in the State with 800 MHz radios on the statewide system.

South Carolina has a goal to have 25,000 system users, a completely redundant conventional 800 MHz system, and to have converted from a mobile to a handheld coverage system by 2007.

Monitoring the Palmetto 800

While some may think that monitoring a state wide trunk system would be a major challenge for the radio hobbyist, nothing could be further from the truth. Modern scanner technology has made this concern a thing of the past.

New control-channel-only trunk functions built into recent scanners allow the user to program only a handful of frequencies in order to monitor an entire statewide system. Table One is the list of control channels we used during our recent visit to monitor this statewide 800 MHz trunk system.

As mentioned previously, there are a lot of users/talkgroups using this statewide trunk system. A complete list is not possible due to page restraints. We have included some of the highway patrol and state agency talkgroups in Table Two. You can find additional detailed talkgroup information on the Radio Reference website run by Lindsay Blanton at <http://www.radioreference.com>.

Each troop is served by one or more "radio

rooms" or dispatch centers. Troopers use callsigns composed of a single letter plus a number; the letter signifies the troop and the number indicates the trooper. The lower the number, the higher the rank. Radio rooms are identified by the city in which they are located.

In addition to troopers, you will hear SLED agents, ABC agents, Transport Police Officers (X), Motorcycle (M), the ACE Team (R), Accident Reconstruction units (MAIT) (S), Memorandum units (I), Size and Weight units (W) and other special designations on this radio system (see Table One).

Conclusion

So, the next time you feel the need to get warm after a long hard winter, while seeing some great historical sites, and enjoying a great all-around vacation, consider a trip to the Palmetto State. But remember, don't leave home without that scanner, so you can stay in touch as current events unfold by monitoring the Palmetto 800.

Table One: Palmetto 800 Trunk System Control

Channels			
Site	Site Name	County	Known Control Channels
1	Palmetto Center	Richland	860.3375 860.8125
2	Camden	Kershaw	868.1000 868.3625
3	Gaston	Lexington	859.3625 860.3625
4	Little Mountain	Newberry	859.9875 860.7625
5	Augusta, GA	Richmond	860.7625
6	North Augusta	Aiken	859.7625 860.7375
7	Blythe, GA	Richmond	860.4625 860.9875
8	Aiken	Aiken	868.4000 868.7375
9	Hagood	Charleston	858.8375 859.8375
10	Canadys	Colleton	859.3875 860.3875
11	Holly Hill	Orangeburg	867.9250 868.7875
12	Summerville	Dorchester	858.7625 860.4625
13	Plum Branch	McCormick	859.9125 860.9125
14	Batesburg	Lexington	860.8875 868.8750
15	Salley	Orangeburg	858.8375 859.8375
16	Laurens	Laurens	859.8625 860.8125
17	Hogback	Greenville	867.4625 868.6250
18	Thicketty	Cherokee	867.9250 868.4250
19	Fairforest	Spartanburg	859.9375 860.9375
20	Lexington	Lexington	859.2625 859.9625 860.2625
21	Joanna	Laurens	868.2875 868.9000
22	Bamberg	Bamberg	868.8125
23	Orangeburg	Orangeburg	868.4250 868.9250
24	Pelion	Lexington	867.8750 868.1500
25	McBean, GA	Richmond	860.2375 860.9375
26	Awendaw	Charleston	859.3125 860.3125
27	Ravenel	Charleston	859.3625 860.3625
28	Allendale	Allendale	858.8625
29	Port Royal	Beaufort	860.8375
30	Killian	Richland	868.0375 868.5375
31	Eastover	Richland	860.2375 860.8625
32	Johnston	Edgefield	858.8875 859.8875
33	Yemassee	Hampton	856.8625 868.7500
34	Due West	Abbeville	855.5125
35	Greenville	Greenville	859.2625 859.9625
36	Stone Station	Spartanburg	868.0500 868.7000
37	Bluffton	Beaufort	868.0500 868.2375
38	Conway	Horry	868.5250 868.8625
39	Georgetown	Georgetown	868.0750 868.6875
40	Marion	Marion	858.4875 859.4875
41	Kingstree	Williamsburg	868.2125 868.8375
42	Anderson	Anderson	860.9625
43	Greenwood	Greenwood	867.6250 868.1250

44	Harbison	Richland	860.4375 860.4875
45	Chesterfield	Chesterfield	868.9500
46	Chester	Chester	866.4250 867.5750 867.8625
47	Newport	York	858.2875 860.7875
48	Lancaster	Lancaster	858.9625 868.9875
49	Barnwell	Barnwell	868.2500 868.6875
50	Seneca	Oconee	868.1000 868.9625
51	Jasper	Jasper	868.2750 868.8625
52	Monks Corner	Berkeley	868.1250
53	Manning	Clarendon	867.9500 868.7125
54	Lynchburg	Lee	867.9000 868.6125
55	Effingham	Florence	868.4625 868.9625
56	Darlington	Darlington	868.2750 868.8000
57	Sumter	Sumter	866.6125 868.3000
58	Union	Union	868.0750 868.4500
59	Winnsboro	Fairfield	868.2375 868.6625
60	Bennettsville	Marlboro	867.1750 867.6750
61	N Myrtle Beach	Horry	868.7125

Table Two: SCHP Palmetto 800 Talkgroups

Legend

ACESCHP Aggressive Criminal Enforcement
 BPSBureau of Protective Services
 DMHDepartment of Mental Health
 DPSDepartment of Public Safety
 ESCEmployment Security Commission
 HQHeadquarters
 MAITSCHP Multi-Disciplinary Accident Investigation Team
 OpsOperations
 PPPState Probation, Pardon and Parole
 SCETVSouth Carolina Educational Television
 SCHPSouth Carolina Highway Patrol
 SHEPState Highway Emergency Patrol
 SLEDSouth Carolina Law Enforcement Division
 STPState Transport Police

SCHP Troop 1

Talkgroup	User	<State Channel>
7280	SCHP Troop 1A	Sumter/Clarendon Post Dispatch <Channel 1>
21488	SCHP TAC 1	(Talk Channel 1) <Channel 2>
7152	SCHP Troop 1B	Kershaw/Lee Post Dispatch <Channel 3>
7024	SCHP Troop 1C	Lexington Post Dispatch <Channel 4>
52048	SCHP TAC 2	(Talk Channel 2) <Channel 5>
6896	SCHP Troop 1D	Richland Post Dispatch <Channel 6>
31888	STP 1	State Transport Police Special Ops <Channel 7>
20848	DPS 1	Department of Public Safety (SHEP, ESC, etc) <Channel 8>
30608	OPS 1	Special Operations <Channel 9>
7088	Law Enforcement	Common 1 <Channel 10>
6960	Law Enforcement	Common Calling (Statewide) <Channel 11>
21456	Mutual Aid 1	<Channel 12>
31280	Regional Government 1	<Channel 13>
61056	ACE 1	SCHP Patrol Troop 8 ACETeam <Channel 14>
3888	Life Reach Helicopter	<Channel 15>
3920	Careforce Helicopter	<Channel 16>

SCHP Troop 2

7536	SCHP Troop 2A	Newberry/Laurens Post Dispatch <Channel 17>
29104	SCHP TAC 3	(Talk Channel 3) <Channel 18>
52176	SCHP Troop 2B	Abbeville/Greenwood Post Dispatch <Channel 19>
7664	SCHP Troop 2C	Edgefield/Saluda/McCormick Post Dispatch <Channel 20>
7056	SCHP TAC 4	(Talk Channel 4) <Channel 21>
n/a	SCHP No Troop 2D	Dispatch <Channel 22>
41296	STP 2	State Transport Police Special Ops <Channel 23>
20976	DPS 2	Department of Public Safety (SHEP, ESC) <Channel 24>
30736	OPS 2	Special Operations <Channel 25>
7216	Law Enforcement	Common 2 <Channel 26>
6960	Law Enforcement	Common Calling (Statewide) <Channel 27>
Unk	Mutual Aid 2	<Channel 28>
Unk	Regional Government 2	<Channel 29>
Unk	ACE 2	SCHP Patrol Troop 8 ACETeam <Channel 30>
3888	Life Reach Helicopter	<Channel 31>



3920	Careforce Helicopter <Channel 32>	29392	Mutual Aid 5 <Channel 76>	55072	SLED Piedmont (P16 encrypted) <Channel 118>
SCHP Troop 3		31536	Regional Government 5 <Channel 77>	Unk	SLED PeeDee <Channel 118>
21136	SCHP Troop 3A Anderson Post Dispatch <Channel 33>	Unk	ACE 5 SCHP Patrol Troop 8 ACETeam <Channel 78>	Unk	SLED Low Country <Channel 119>
29232	SCHP TAC 5 (Talk Channel 5) <Channel 34>	3888	Life Reach Helicopter <Channel 79>	11344	SLED Special Ops <Channel 120>
Unk	SCHP Troop 3B Pickney/Oconee Post Dispatch <Channel 35>	3920	Careforce Helicopter <Channel 80>	6512	SC Law Enforcement Common 8 <Channel 122>
20880	SCHP Troop 3C Greenville Post Dispatch <Channel 36>	SCHP Troop 6		6960	Law Enforcement Common Calling (Statewide) <Channel 123>
52304	SCHP TAC 6 (Talk Channel 6) <Channel 37>	29712	SCHP Troop 6A Charleston/Berkeley Post Dispatch <Channel 81>	Unk	Mutual Aid 8 <Channel 124>
21008	SCHP Troop 3D Spartanburg Post Dispatch <Channel 38>	29616	SCHP TAC 11 (Talk Channel 11) <Channel 82>	31792	Regional Government 8 <Channel 125>
41424	STP 3 State Transport Police Special Ops <Channel 39>	29968	SCHP Troop 6B Dorchester/Colleton Post Dispatch <Channel 83>	31152	Emergency Call (Statewide) <Channel 126>
31504	DPS 3 Department of Public Safety (SHEP, ESC) <Channel 40>	30096	SCHP Troop 6C Beaufort/Jasper Post Dispatch <Channel 84>	11280	SLED Statewide <Channel 127>
30864	OPS 3 Special Operations <Channel 41>	6928	SCHP TAC 12 (Talk Channel 12) <Channel 85>	34544	PPP Room Statewide <Channel 128>
Unk	Law Enforcement Common 3 <Channel 42>	n/a	SCHP No Troop 6D Dispatch <Channel 86>	Miscellaneous Services	
6960	Law Enforcement Common Calling (Statewide) <Channel 43>	30512	STP 6 State Transport Police Special Ops <Channel 87>	7184	BPS: Executive Protection (Statewide) <Channel 129>
Unk	Mutual Aid 3 <Channel 44>	21648	DPS 6 Department of Public Safety (SHEP, ESC) <Channel 88>	Unk	SC OPR (Statewide) <Channel 130>
Unk	Regional Government 3 <Channel 45>	31248	OPS 6 Special Operations <Channel 89>	Unk	SCHP MAIT Patrol Troop 9 (Statewide) <Channel 131>
61072	ACE 3 SCHP Patrol Troop 8 ACETeam <Channel 46>	20816	Law Enforcement Common 6 <Channel 90>	21328	DPS Operations (Statewide) <Channel 132>
3888	Life Reach Helicopter <Channel 47>	6960	Law Enforcement Common Calling (Statewide) <Channel 91>	Unk	SCHP HQ Blythewood Operations <Channel 133>
3920	Careforce Helicopter <Channel 48>	29520	Mutual Aid 6 <Channel 92>	Unk	SCETV Telecommunications Center (TCC) (Statewide) <Channel 134>
SCHP Troop 4		31600	Regional Government 6 <Channel 93>	Unk	SC Chief Information Officer (Statewide) <Channel 135>
21520	SCHP Troop 4A Cherokee/Union Post Dispatch <Channel 49>	Unk	ACE 6 SCHP Patrol Troop 8 ACETeam <Channel 94>	57952	SC Public Service Commission (P16) <Channel 136>
29360	SCHP TAC 7 (Talk Channel 7) <Channel 50>	3888	Life Reach Helicopter <Channel 95>	13008	Motorola Net Statewide <Channel 137>
29072	SCHP Troop 4B York Post Dispatch <Channel 51>	3920	Careforce Helicopter <Channel 96>	7472	Law Enforcement Common 9 <Channel 138>
21392	SCHP Troop 4C Chester/Fairfield Post Dispatch <Channel 52>	SCHP Troop 7		6960	Law Enforcement Common Calling (Statewide) <Channel 139>
29744	SCHP TAC 8 (Talk Channel 8) <Channel 53>	30480	SCHP Troop 7A Bamberg/Allendale/Hampton Post Dispatch <Channel 97>	Unk	Mutual Aid 9 <Channel 140>
Unk	SCHP Troop 4D Chesterfield/Lancaster Post Dispatch <Channel 54>	7568	SCHP TAC 13 (Talk Channel 13) <Channel 98>	52208	Regional Government 9 <Channel 141>
41552	STP 4 State Transport Police Special Ops <Channel 55>	30352	SCHP Troop 7B Calhoun/Orangeburg Post Dispatch <Channel 99>	30832	Emergency Management Division Command Common <Channel 142>
30224	DPS 4 Department of Public Safety (SHEP, ESC) <Channel 56>	30480	SCHP Troop 7C Barnwell/Aiken Post Dispatch <Channel 100>	30896	Emergency Management Division Command OPS 1 <Channel 143>
32336	OPS 4 Special Operations <Channel 57>	7440	SCHP TAC 14 (Talk Channel 14) <Channel 101>	44912	Emergency Management Division Emergency Shelters <Channel 144>
Unk	Law Enforcement Common 4 <Channel 58>	n/a	SCHP No Troop 6D Dispatch <Channel 102>	Hurricane Preparedness/Assistance Talkgroups	
6960	Law Enforcement Common Calling (Statewide) <Channel 59>	30576	STP 7 State Transport Police Special Ops <Channel 103>	3856	SCHP Air-to-Ground (Statewide) <Channel 145>
29264	Mutual Aid 4 <Channel 60>	21680	DPS 7 Department of Public Safety (SHEP, ESC) <Channel 104>	30128	Department of Public Safety/Department of Transportation (Statewide) <Channel 146>
31472	Regional Government 4 <Channel 61>	31376	OPS 7 Special Operations <Channel 105>	Unk	Mutual Aid Command (Statewide) <Channel 147>
Unk	ACE 4 SCHP Patrol Troop 8 ACETeam <Channel 62>	20944	Law Enforcement Common 7 <Channel 106>	61008	SCHP Captain SECURE (Statewide) <Channel 148>
3888	Life Reach Helicopter <Channel 63>	6960	Law Enforcement Common Calling (Statewide) <Channel 107>	7600	Law Enforcement Common 5 <Channel 149>
3920	Careforce Helicopter <Channel 64>	Unk	Mutual Aid 7 <Channel 108>	20816	Law Enforcement Common 6 <Channel 150>
SCHP Troop 5		31728	Regional Government 7 <Channel 109>	20944	Law Enforcement Common 7 <Channel 151>
29584	SCHP Troop 5A Darlington/Marlboro Post Dispatch <Channel 65>	Unk	ACE 7 SCHP Patrol Troop 8 ACETeam <Channel 110>	6512	Law Enforcement Common 8 <Channel 152>
29488	SCHP TAC 9 (Talk Channel 9) <Channel 66>	3888	Life Reach Helicopter <Channel 111>	7472	Law Enforcement Common 9 <Channel 153>
29200	SCHP Troop 5B Florence/Marion/Dillon Post Dispatch <Channel 67>	3920	Careforce Helicopter <Channel 112>	Unk	Law Enforcement Common 10 <Channel 154>
29456	SCHP Troop 5C Williamsburg/Georgetown Post Dispatch <Channel 68>	Bureau of Protective Services/SC Law Enforcement Division/State Probation, Pardon and Parole		6960	Law Enforcement Common Calling (Statewide) <Channel 155>
52432	SCHP TAC 10 (Talk Channel 10) <Channel 69>	41936	BPS 1 Bureau of Protective Services <Channel 114>	30032	Mutual Aid 10 <Channel 156>
29328	SCHP Troop 5D Horry Post Dispatch <Channel 70>	41808	BPS 2 Bureau of Protective Services <Channel 115>	52272	Regional Government 10 <Channel 157>
41680	STP 5 State Transport Police Special Ops <Channel 71>	Unk	BPS 3 Bureau of Protective Services (Statewide) <Channel 116>	Unk	Command Secure (Statewide) <Channel 158>
21616	DPS 5 Department of Public Safety (SHEP, ESC) <Channel 72>	55040	SLED Midlands (P16 encrypted) <Channel 117>	Unk	HQ Secure (Statewide) <Channel 159>
31120	OPS 5 Special Operations <Channel 73>			Unk	ESF-2 <Channel 160>
7600	Law Enforcement Common 5 <Channel 74>				
6960	Law Enforcement Common Calling (Statewide) <Channel 75>				



The first patrol in 1931

Baudwalking: News Feeds

By Tom Sundstrom, W2XQ

Welcome to another chapter in the ongoing saga of electrons crossing the wires to the servers and black boxes that make up the Internet. *Baudwalking* is a new occasional column that takes a wide look at what's new on the Internet as it pertains to radio, media and communications.

In January, I discussed two-way communications methodologies – instant messaging and Internet Relay Chat – as an alternative to using e-mail. After looking at the feedback to the first column, we'll continue in the theme, but this time we'll focus on systems that distribute information: blogs and news feeds.

Rewind, please

MT reader Dan Farmer, Kansas, wrote to ask about "the next step" to get into the IRC channels after adding the Chatzilla plug-in extension to the Firefox browser. Dan connected within minutes of receiving our e-mail reply. The answer? Enter the command `irc://<chathost>/#<roomname>` (for example, `irc://irc.zirc.org/#milcom`), into the browser's address line at the top of the screen. Chatzilla launches a window and makes the connection.

Digging through the list of channels on the Starchat IRC network, I found additional radio-related chat rooms. Check out `#mwdx` (`irc.starchat.org/#mwdx`) if you are interested in long-distance MW (530-1700 kHz) reception. Collectors of old radios may be interested in checking `#otradio` (`irc.starchat.org/#otradio`) and chatting with other collectors of yesterday's radios.

And Brad McConahay wrote to tell me of six amateur radio channels on IRC. Drop these into your browser address line:
`irc://irc.choopa.net/#hamradio`
`irc://irc.choopa.net/#hamradio2`
`irc://irc.choopa.net/#skywarn`
`irc://irc.superhosts.net/#HamRadio`
`irc://irc.superhosts.net/#Marac`
`irc://irc.superhosts.net/#MaracBoard`

Note that "skywarn" is part of the storm tracking system the National Weather Service has set up for radio amateurs to participate in. Marac and MaracBoard is the county-hunting organization that deals with the verification of two-way communications with stations in all 3,076 USA counties. (At least it was 3,076 in

May 1983 when I collected USA-CA plaque #421.) (Skip Arce says 3077 in "On the Ham Bands" on page 60-ed.)

RSS-XML News Feeds

If you have been active on the Internet in recent months, no doubt you have noticed the little orange XML and RSS tags that are popping up all on many large and small Web sites, including the largest USA-based sites Yahoo, CNN and MSNBC. RSS stands for "Really Simple Syndication" and it is a form of XML (an acronym for extensible markup language).

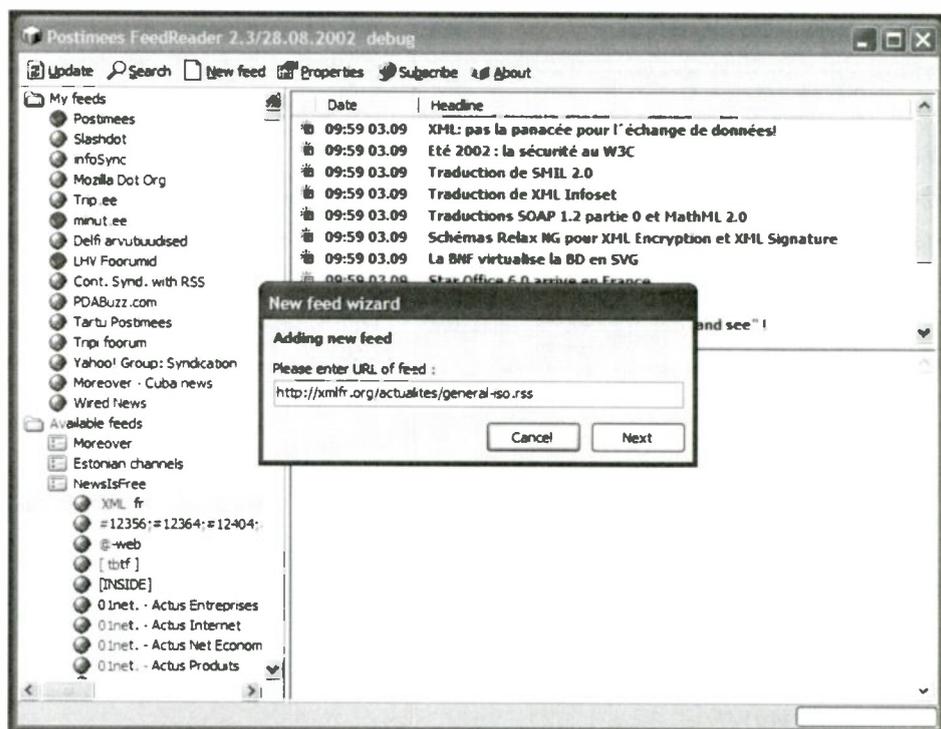
In lay terms, the tags indicate a type of programming that delivers information to your news reader software, should you add the Web site's special news feed address to your reader software.

The concept is somewhat akin to a popular information service of the mid-to-late 1990s. From 1996 (<http://www.tnl.net/who/bibliography/pointcast/>) to 2000 (<http://news.com.com/2100-1023-237059.html>), Pointcast

ruled the office and home desktop. Network administrators and IT management often issued directives to remove this popular screensaver application from office networks. Pointcast "pushed" current news, weather, sports, ads, and other information to the desktop and displayed it whenever the screensaver became active. Its multimedia graphical presentation consumed a lot of bandwidth.

This time around, the XML delivery mechanism is more efficient and does not require any additional bandwidth. Unlike Pointcast, where all information came from one source, news feed sources and corresponding addresses are found all over the Internet. RSS is text, and the news reader software retrieves ("pulls") only headlines at time intervals from addresses the user specifies in the program setup. A click of the mouse on a headline retrieves a desired story for display.

Although RSS has been around since the late 1990s, it is only in the last year or so that





it seems to have struck a chord with Web site owners and designers. The number of software reader applications and the number of Web sites

offering RSS files are both multiplying faster than Johnny's rabbits in the backyard cage.

For more reading, entering "RSS" or "RSS history" into a search engine of your choice will turn up thousands of links. Try Radio Userland's introduction (<http://radio.userland.com/allaboutrss>) for a brief history and perspective on RSS/XML. If you would like to have a look into the workings of an RSS-coded page, have a peek into XML.com's "What is RSS?" (<http://www.xml.com/pub/a/2002/12/18/dive-into-xml.html>).

It is not necessary to understand all that you read at XML.com to make use of the news feeds. Consider it akin to lifting the cover off the top of an old radio to view all the tubes, coils and circuitry that makes the sound come out the speaker.

Why RSS?

Why should *Monitoring Times* readers get involved with RSS/XML news feeds? In a word: information.

As ye scribe sends this column to the editor, only four international broadcasters offer RSS XML feeds. The BBC, Deutsche Welle, and Radio Free Asia have world and regional news in their RSS news feeds, but tell nothing about the station from an engineering perspective.

WWCR, Nashville, Tennessee, uses a news feed to advise listeners of changes to Web site updates, transmitter schedules and frequencies, and program changes. Add <http://wwcr.com/rss.xml> into your news reader of choice.

If the Board of Governors in Washington

would reestablish the Voice of America to solely speak for America as one "voice," instead of the resource-wasting "it must be a new problem area, so we'll have a new voice" syndrome (e.g., Radio Free Iraq, Radio Free Europe, Radio Free fill-in-the-blank), I believe VOA RSS/XML news feeds would quickly appear. In the present fractured state, there are no resources to produce the feeds.

The Webmaster of the Web site of the USA-based Winter SWL Festival - perhaps the largest convention gathering of long-, medium- and shortwave listeners and scanner enthusiasts in the world - discontinued sending the occasional e-mail. Rather, update notices are now included in an RSS/XML - <http://trsc.com/rss.xml> - news feed. Benefits include no lost e-mail due to changed recipient addresses, spam e-mail traps or full mailboxes. I fully expect an outright explosion of RSS news feeds appearing on vendors, SWL, scanner and amateur, and international broadcaster Web sites in the coming year.

The News Reader

There are a number of ways to get the RSS feed.

If you are a member of Yahoo, go to their RSS entry page - <http://e.my.yahoo.com/config/xcontent> - and then copy and paste the above URLs into the "add new sources" field near the top of the page.

If you use the Mozilla or Firefox - <http://mozilla.org/> - browser on OS X or Windows, download and install the Sage - <http://sage.mozdev.org/> - extension, then add the above

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URLs as new feeds. It's a bookmark; I suggest creating a new folder, e.g. "RSS/XML Feeds."

If you use an Apple microcomputer and have not yet upgraded to the latest OS X 10.4 system that hit the streets on May 3, go get the new package and look at the greatly expanded RSS-smart Safari browser.

If you use the Microsoft Internet Explorer browser in Windows, try the Pluck – <http://www.pluck.com/> – browser add-in.

Standalone programs: for Windows, FeedReader – <http://www.feedreader.com/> – and for Mac, NetNewsWire or NetNewsWireLite – <http://ranchero.com/netnews-wire/>

There are many free or commercial news aggregator or reader programs available for download. Other services are web-based and allow you to subscribe to RSS feeds and display the content inside your browser.

Open Directory Project List of Readers :

http://dmoz.org/Reference/Libraries/Library_and_Information_Science/Technical_Services/Cataloguing/Metadata/RDF/Applications/RSS/News_Readers/

Google List of Readers :

http://directory.google.com/Top/Reference/Libraries/Library_and_Information_Science/Technical_Services/Cataloguing/Metadata/RDF/Applications/RSS/News_Readers/

2RSS List of Readers :

<http://2rss.com/readers.php>

Yahoo! List of Readers :

http://dir.yahoo.com/Computers_and_Internet/Data_Formats/XML_eXtensible_Markup_Language/RSS/News_Aggregators/

In case you asked, our personal preference is the Firefox browser with the Sage add-in. That may or may not be the best choice for you, but we are pressed into using a Windows "box" when away from the house. The bookmarks file is easily swapped between the two operating systems.

News Reader Data Files

You already know that some Web browsers allow the user to manage and export bookmarks to an external file for backup purposes or sharing with another browser on another computer. In a similar way, news reader software exports its entries to an external file using a standardized format. These formatted data files should be interchangeable between news reader programs, akin to RTF files for word processing programs. It is my experience that, so far, this is not always the case. I have created a set of data files I used in testing Feedreader, Newsnetlite and Sage. My choices won't be your choices, but I have some of the larger news services and the broadcasters included in these three files. If you would like these files as a starting point, drop me an e-mail at tomsundstrom@monitoringtimes.com and ask for a set.

The Flip Side

RSS is a useful tool when used properly,

but it is not all peaches and cream. If you are aware of the possible difficulties, then so much the better. For example, in the fourth quarter of 2004, there were several different RSS versions, requiring one to seek out the proper reader software; there were moves afoot to embed advertising in some RSS feeds; and "podcasting" – the embedding of audio in the RSS feed – was just beginning to be experimented with. Things happen fast in this business!

An industry publication offered an interesting perspective on the RSS news feed business as of the third quarter 2004. When you read this, remember that the author is in a business environment dealing with microcomputers: *Don't Believe RSS Hype* (Jim Rapoza, Ziff-Davis' eWeek, 2004-09-20) : <http://www.eweek.com/article2/0,1759,1645599,00.asp>

Keeping Up with the Joneses

I found a technology resource Web site – Lockergnome – <http://lockergnome.com/> – that offers a host of different topical subjects dealing with the "tools" we use for work, communications and the Internet. Advertising supports the Web site's existence, but no matter. In our opinion it is worth your time to visit and inspect its contents.

In particular, look at the "RSS & Atom Tips" and add the news feed to your RSS newsreader. The writers seem to be on the cutting edge of the fast moving industry developments and trends. I find it an interesting and helpful read as standards are shifting, advertisers attempt to make inroads, and "podcasting" embeds media files.

Blogs

A "blog" – the contraction of the word "weblog" – is basically a journal that is kept on the Web. The activity of updating the blog is called "blogging," and the author doing the work is called a "blogger."

Blogs are typically updated daily, or at least very frequently (several times a week). Blogging software simplifies the tasks of writing and transferring the blog to a Web site, thus allowing an author with little or no technical background to update and maintain his or her blog.

Blog content is typically oriented by date, with the most recent material being most prominently featured.

"Wait just a minute," you say. "I saw something about this on television last year..." Blogs stepped out from behind the curtains and into the spotlights of the political arenas at the Republican and Democratic National Conventions. The niche reporting and political comments found on the blogs attracted the attention of the candidates' staff, and the national television news channels ran a number of stories on the bloggers working at news desks at the convention.

Are you a would-be blogger?

There are numerous Web hosting sites that provide blogging software for those who would write, and a search in the engines of your choice will yield countless resources on

"how to" and "where to post." Do your own research, as hosting features vary. Some sites are free, but (in my opinion) you do get what you pay for.

A few media blogs we read

Jonathan Marks' *Critical Distance* BV: <http://criticaldistance.blogspot.com/>
Lou Josephs' *Medianetwork*: <http://www.myjamby.com/medianetwork/>
Medianetwork by RNW's Andy Sennitt: <http://medianetwork.blogspot.com/>

(Full disclosure statement. These blogs are written by past-and-present staff members of Radio Netherlands' Media Network; I continue to be a Contributing Editor to RNW's Media Network Web site.)

Why should *Monitoring Times* readers be interested in exploring the blog offerings? Unusual media and communication blogs can be found. For example, Radio Free Nepal's blog, found by Lou Josephs, had this to say:

"King Gyandendra of Nepal has issued a ban on independent news broadcasts and has threatened to punish newspapers for reports that run counter to the official monarchist line. Given that any person in Nepal publishing reports critical of 'the spirit of the royal proclamation' is subject to punishment and/or imprisonment, contributors to this blog will publish their reports from Nepal anonymously." Read the rest of the story at <http://freenepal.blog>, then search Google with "radio free nepal."

There were almost a dozen other blogs commenting on the situation, and a "Free Nepal" Web site (<http://freenepal.com/>) with audio and a lot of material.

In Closing

The purpose of these opening columns of *Baudwalking* was to review a few easy-to-use alternative means to communications on the Internet other than e-mail. E-mail continues to be plagued by spurious spam messages from persons and companies clogging bandwidth and wasting our time.

Sometimes there may be a better way to communicate:

- By controlling access to yourself, instant messaging can be a useful tool for the occasional short message to and from a friend.
- Somewhat akin to an amateur radio net, a controlled Internet Relay Chat channel is fun or useful for ongoing conversations 24/7 among a group of like-minded persons.
- Watch for the orange RSS and XML tags indicating a news feed from your favorite Web site, and add it to your newsreader to stay up-to-date with what's new.
- Blogs have taken up residence on the net, but some radio- and communications-related Web sites have already shown up as forums. Keep an eye out for change as new authoring software is developed.

Comments or questions or suggestions? Please e-mail tomsundstrom@monitoringtimes.com or drop into <irc://starchat.org/#Baudwalking> and say "hello."

Harvester: Signal Intelligence for the Common Man

By John Catalano

In the twelve or so years that I've been writing for *Monitoring Times*, I've tested lots of programs. I get an extra kick out of being the first to introduce new programs or trends. I have to smile when, sometimes years after a program is reviewed in the *Computers and Radio* column, it is "discovered" by others. I guess we humans have short memories. To be fair, the sophistication of software now available to the hobbyist is so extraordinary, it is difficult for the memory to absorb the full potential of some programs in one brief review.

Speaking of memory, the amount of computer memory now inexpensively available to PC users is one reason the everyday hobbyist can now dabble in what was formerly the domain of government agencies. As recently as the late 1990s, I paid \$150 for a 6 Gig hard drive and thought I had a steal. Now for that price you can have over 200 Gig! RAM has similarly come down: one Gig of 533 MHz RAM can be purchased for under \$130.

These huge and affordable memory components, and the fact that common microprocessor speeds are in the 1GHz range, opens new horizons to programmers of radio monitoring applications. One such application is the frequency or signal

database, notorious for being a memory hog.

Memories are Made of This

The amount of memory that a database uses is a function of the number of entries to be stored AND the number of elements in each entry. Simplistically, if we want each frequency entry to store just the frequency and time of intercept, that will take a given amount of memory "space" on the hard drive. If we want to add another frequency entry, it will increase the hard drive memory required. So, hard drive memory required is a function of the number of entries. RAM is used to run the program, display the data and temporarily hold the entry until it is sent to the hard drive.

But what if we want to store more than just the frequency and time in each entry? Let's add another ten parameters in each entry. And then allow each of these "fields" to store twenty characters. The required memory is really shooting up. What we have described is a database program. But, if we add to this, computational power for detailed comparison and analysis of multiple entries, the system's RAM, hard disk space, and processor speed quickly become operation limiting factors.

unique radio monitoring program. In SIGINT Systems' words, "Harvester is not just a frequency database: it is a full Signal Intelligence collection suite capable of storing every single piece of intelligence that you can glean from any intercepted ... signal between 0Hz to 100GHz."

What's a SIGINT?

SIGINT is a common term in the intelligence communities. It refers to information derived from SIGnal INTerception. With that background, you can now understand the company's name. Harvester allows the user to gather or harvest, store, update, compare, analyze and prepare customized reports for the entries, in a signal database. What caught my eye and imagination is that *each* Harvester frequency entry can have over *sixty* fields or parameters associated with it! Not six, but sixty.

Just consider the possible combinations of these sixty fields multiplied by thousands of entries and you can start to appreciate the need for system memory and speed. But it is not as much as I initially thought. Harvester is written for either Windows 2000 (SP4) or Windows XP. Its minimum requirements are 37 MB of hard drive space. The instruction manual has no mention of minimum RAM required. We are using a Pentium III, 733 MHz with 245 MB of RAM and XP Professional Edition. Our hard drive is a \$19.95, relatively tiny, 20 Gig drive. As you can see, the PC system is not 1995 vintage, but not exactly a state of the art PC.

Peeling the Onion

The structure of an onion is often used to describe that which appears simple, but has a complex underlying structure. Peeling one layer of the onion is a simple task. However, this action just reveals successive layers of similar but more detailed structure. So it is with Harvester.

A demo version Harvester program is available for downloading at <http://www.sigint.co.uk/index.html>. The demo program is functional but has some operational limitation. We used the full Harvester Version 1.0.16.

Weighing in at close to 15 MB, Harvester takes a bit of time to download using a dial-up connection to the Internet. Once downloaded, it

Utilizing the power of the 21st century PC, SIGINT Systems has produced a program that stores every conceivable monitoring parameter and then allows for some very fancy trend analysis and reports. This is significant because by analyzing all the information in the database it can help identify unknown signals. The program is called Harvester – an interesting name for a very interesting and

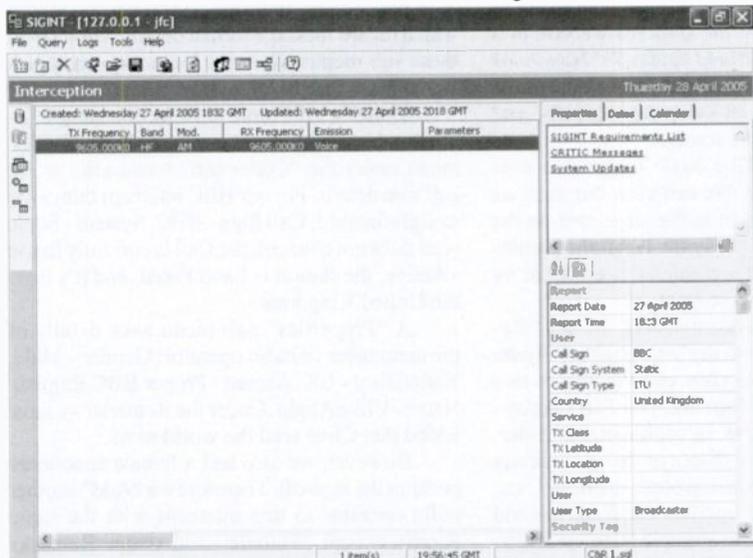


Figure 1 - Harvester's main interception screen



Details of Frequency Intercept

<input checked="" type="checkbox"/> Report Date:	27 April 2005
Report Location:	Concord, New Ham
TX Frequency:	9605.000K0
Frequency Type:	Simplex
RX Frequency:	

Figure 2 - Entering new station data in the "general" screen; one of four data screens.

installed quickly and easily without any problems. Once installed, a very comprehensive 59 page operating manual is available as a Adobe "pdf" file. However, no "How-To-Start" or step-by-step section exists. The Demo is easily unlocked to a full version for 35 pound sterling, which is currently about sixty-eight US dollars.

Start Gleaning

For simple illustration purposes, assume we have monitored the following (fictitious) broadcast:

BBC broadcast of world news in English, read by Clive Anglo, on 9605 kHz, in AM, and transmitting from the United Kingdom. Heard at 1823 GMT, on April 27 2005. Sign-off announcement made by female at 1900 GMT.

How many different intercept parameters can you pick out? Let's see how we can input this data into Harvester.

Harvester's main screen is the Interception screen shown in Figure 1. The first time the program is run, you must tell Harvester your monitoring site(s). This is done via the "File" menu on the upper left of the command line and then by choosing "Locations." Here you input the monitoring location's city, state, country, longitude and latitude. Entering the longitude and latitude in the "correct" format caused the

longest delay in getting operational.

Let's start by opening the "Logs" menu on the top command line and then selecting "Add New." This displays "General," Figure 2, which is one of five screens we will use to input various monitored-signal data parameters. Most data entry boxes, such as Receiver Mode, have pre-programmed drop-down menu choices. To give you idea of the level of detail that Harvester provides, a pre-programmed list of 169 "Emission" types is provided. For our first logging, "Voice" will do fine.

Here we have entered our frequency as 9605.000K0 to indicate 9605 kHz, and the "Band" box has been automatically filled in by Harvester based on our frequency showing "HF" for high frequency.

Now our monitored station's basic details are given to Harvester using the fairly self-explanatory "User" screen. User data can be recalled relative to many different parameters (for example, by country of origin), using the "Logs" command menu and then choosing "User List." Detailed user data is accessible for every entry in the database. But that's just the start.

Give Me Data!

The "Technical" screen, Figure 3, displays just half of the forty different transmission parameters that the user tracks for each frequency entry. For our simple case of BBC, we have just chosen two parameters: "Broadcast Style" and Antenna Polarization." Once we select "Broadcast Style" this menu digs deeper to another menu where we can select the exact style from: Burst, Frequency Hopping, Pulsed, Spread Spectrum, or (our choice) Continuous. See what I mean about peeling the onion?

At this point, it should be noted that Harvester can be used as a basic frequency database if you just wish to input the basic data as we have done above. The level of Harvester's data detail and, therefore, report generation is totally up to the user. However, Harvester's analyzing ability will then be limited. We will try to enter all the signal data that we know from our example.

Back to the technical screen. Selecting "Antenna Polarization" brings up fourteen choices. For our example, we can find much of this information from the station's website or a publication such as *World Radio TV Handbook* or *Passport to World Band Radio*. For our simple example let's skip the "Circuits" and "Comments" screens.

Our basic logging is now complete. We can view our entry as the first line in the large area on the left side of Figure 1. All the parameters that we entered are visible by scrolling line right.

Alternatively, in the "Report" box at the lower right of Figure 1, we can view our logging in two different formats. The first displays parameters in alphabetical order. The other displays the parameters in functional groups, such as User, (signal) Properties, etc. Keep in mind that this was a simple intercept and so far we have just logged the basics.

Why all the layers? For our

simple example, the station and all of its signal details were obvious. However, if we were attempting to identify an unknown utility station broadcasting in a encrypted digital mode, things would not be so simple. Short of breaking the encryption, our only hope of identification would be correlating common parameters of multiple intercepts to try to find common signal patterns.

Harvester claims to have the power to sift through all the parameters in the database and find patterns. From these patterns we may be able to logically deduce a list of "possible suspects." That's why they call it intelligence. World governments since the 1920s have performed this interception method to obtain intelligence, i.e., SIGINT. The difference is that their personnel did it by hand or by using super computers such as a Cray.

Look Again

I bet you thought we had squeezed all the data out of our single intercept. Wrong. So far we have entered data which defined the signal: frequency, modulation, etc. But we also have specific data concerning the content of the transmission.

On the extreme left side of Figure 1, under the word "Interception," is a symbol that looks like a stack of disks. Left clicking this symbol brings up the "Collection" menu. Let's go another level deeper into Harvester.

Accessing the "Collection" menu displays five more menus: Parametric Data, Broadcast Logs, Call Signs, Activity Logs and DF (direction finding) Logs. Each of these sub menus is displayed relative to the intercept date. A key element of Harvester's analyzing power is its ability to store current station data as well as historical intercept data.

The good news is that all the data we have already entered for this intercept went into the Parametric Data. So that is done. The bad news is we have a few more menus and layers to go.

Left click on Broadcast Logs and then on the "Add New" button. This screen asks us for reception data such as: Start/End Times, Broadcast State (what was being sent), Language and Readability. For more complex intercepts such as digital signals, there are additional sub menus which record message format details. We'll cover these sub menus when we log a more complex signal later. Ready for another menu?

There is still more info in our simple intercept that we have not used yet. The Call Sign menu under the "Collection" menu asks us for call sign details. For our BBC intercept things are straightforward: Call Sign - BBC, System - Static (call does not change), the Call is currently in use - Active, the station is Land Fixed, and it's from the United Kingdom.

A "Properties" sub menu asks details of the announcer or radio operator: Gender - Male, Nationality - UK, Accent - Proper BBC English, Name - Clive Anglo. Under the Remarks we have added that Clive read the world news.

However, we also had a female announcer perform the sign-off. Therefore we "Add" another radio operator to this intercept with the same details except "Female" and under Remarks "gave sign-off." This illustrates how Harvester can handle multiple data for each parameter of

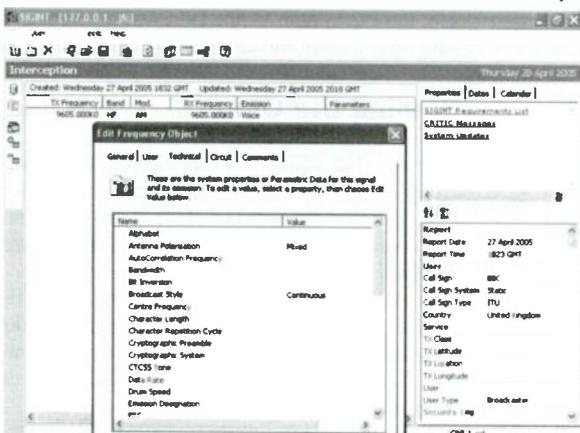


Figure 3 - Half of the 40 transmission parameters harvester can track for each entry.

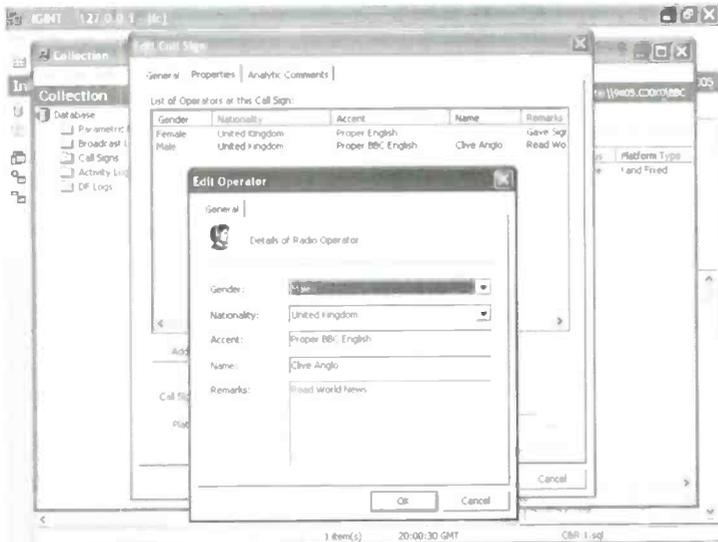


Figure 4 - Four levels deep of data. Shown is the "operator" menu, a sub, sub, sub menu of "logs"!

the same intercept. For our simple example the other menus are not relevant.

We are finally done squeezing data from our simple single monitoring intercept. Remember that we took this simple BBC example just to get familiar with Harvester's methods and structure. In the process, we bypassed parameters that would be key to the identification of encrypted digital signals intercepts.

Does Harvester Have the IQ?

Each signal parameter that we enter, and

intercepts in the database, leading to deductive identification.

We hope you have enjoyed our introduction to this amazing program. Space prohibited going into depth in one article, so next month we'll go a little deeper by logging an unknown utility station intercept into an already populated database. Then we'll really put Harvester to the test. We'll see exactly what trends, correlation and deductive reports Harvester can generate. Now the real SIGINT fun begins!

each layer of data that we define, makes our intercept increasingly unique and therefore more identifiable. As we noted, Harvester has the critically important ability to store current as well as historical intercept data. Harvester keeps track of all these parameters and levels of detail for each monitoring entry. Not only can it store the myriad of parameters and layers, it has the power to produce reports. These reports indicate commonalities and trends between the parameters entered for all signal

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Exploring the World of Satellite Radio

It's been nearly a year since I wrote about the subject of satellite radio (*MT Aug. 2004: Sirius vs XM: The Audio-Vox/SkyFi Faceoff*) but a recent e-mail from MT reader Morgan Little has prompted me to revisit this growing media presence.

The past year brought dramatic changes to satellite radio. Both XM and Sirius have added millions of subscribers; both have added dozens of new channels; prices on new equipment have dropped considerably; and the availability of used satellite radio equipment has reached flea market status in price and quantity. XM has been obliged to raise its monthly subscription rate to equal that of Sirius (\$12.95/month) while it remains to be seen whether Sirius can hold the line on its rates.

❖ Robust Satellite Radio Industry

The satellite radio industry has confounded the critics and even surprised its supporters with subscriber growth and shrinking subscriber acquisition costs (SAC). Sirius has raised its year end subscriber target to 2.7 million paying customers and expects a lowered SAC from \$190 per customer to \$145. Revenue grew from \$9.3 million for the first three



XM MyFI brings shirt pocket satellite radio into reality. A big plus for all sports fans. Listen to play-by-play of every Major League Baseball game at the stadium or your backyard hammock. (Courtesy Crutchfield)



Polk component stereo XM satellite receiver. Brings the best possible sound to your home stereo system. (Courtesy Polk Audio)

months last year to \$43.2 million for the same period this year. Meanwhile, big brother XM says it's on track to total 5.5 million customers by year's end, while their SAC fell from \$67 to \$52 per customer. By the end of 2005, more than 8 million Americans will shell out just under \$100 million per month for a service which didn't exist four years ago.

Now both companies are planning to make their services available north of the border. The signal for both services has been received by vacationing Americans several hundred miles north and south of the U.S. (as well as several hundred miles off each coast). But, legal reception by Canadian and Mexican citizens has thus far been in a gray area. Sirius has already joined with CBC/Radio Canada to bring the service to Canada. XM says it plans to do the same. Both are working with the Canadian Radio and Telecommunications Commission to bring the plan into effect. So far, Canada's two main radio channels Radio One (English) and La Premiere Chaîne (French) are slated for Sirius distribution. Information on fee schedules, retail sales, and other Canadian content were unavailable as of this writing.

❖ Programming Wars

Programming on satellite radio is following the satellite TV model. Before you sign up with either, take the time to look at the programming line-up on their web sites and compare. Where Sirius had the advantage last year, XM has countered very effectively. Not only did XM add a Public Radio channel, they scored a coup by signing up NPR veteran Bob Edwards for an hour long in-depth interview program each weekday. XM still holds the advantage with the BBC

World Service. While Sirius runs the hourly news update BBC World News Report, XM carries the full slate of BBC World Service programming most *MT* readers used to enjoy via shortwave. Sirius still holds the edge on shortwave programming via its retransmission of the World Radio Network schedule.

This past year both services have battled to gain momentum in the sports arena. Sirius took the pro-football crowd by signing with the National Football League (NFL), offering all NFL games live. XM scored a home run with its ten year contract with Major League Baseball to provide live coverage of every regular season game played in addition to the league championships and World Series. XM also scored last winter with college football and basketball fans when they added ACC and PAC 10 live action.

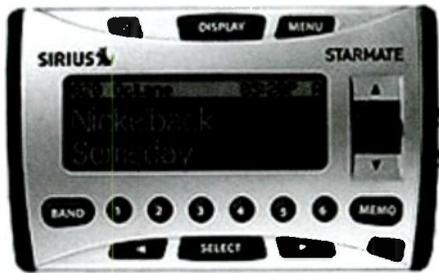


AudioVox XR-9 plug'n'play unit for XM features built-in wireless FM transmitter, scrolling sports scores and personalized stock ticker. Look for rebates on this unit. (Courtesy XM Store)

Sirius expects to enjoy further subscription increases with the much ballyhooed arrival of Howard Stern, king of talk radio's slimier side. They're hoping he'll bring his 11 million listeners with him in the move.

❖ Hardware Shopping

The worst deal in satellite radio is the built-in new car receiver. True, these systems don't have wires draped around the dashboard or trailing throughout the car, but the fun of having satellite radio is listening at home. Being able to swap out the "plug'n'play" module, moving from various vehicles and back to the house, is the best way to get your \$13/month's worth. Both XM and Sirius have benefited from next generation plug'n'play



Sirius Plug'n'Play Starmate receiver from Directed Electronics works in your car or home with separate docking stations. (Courtesy Tweeter)

receivers. Clock/timers have been added and various display improvements have been made. Some units have built-in FM transmitters called modulators which allow the satellite radio signal to be broadcast through the house or in your car. The problem is that the transmitters are fairly anemic and the selection of frequencies is quite limited.

There are a number of receivers to choose from for each satellite service. From the shirt pocket MyFI by Delphi to the Polk XRt12 component receiver and all the plug'n'play units in between, there are many from which to choose. Some even feature a "buy one get one free" promotion, but remember that you have to pay for a separate subscription for each unit with up to four subscriptions at half price. Both allow subscribers to stream the channels at their work computers. Sirius subscribers stream for free while XM subscribers pay.

It's possible to find used XM and Sirius receivers and associated gear, and the prices are very cheap. The problem is that there is no warranty and other parts such as extra home or car docking stations are no longer made or unavailable even on the used market. With available warranties and manufacturers rebates, the cost of new units is quite reasonable.

Your own experiences may differ, but I found the Sirius Kenwood plug'n'play unit a poor performer. I'm now on my third unit. The \$25 cost for an out-of-warranty replacement is not bad, but the \$23 shipping and handling charge should make you think more about buying a new unit of another brand. By contrast, the XM SkyFi has run

flawlessly for over two years. These units are also compatible with the newer SkyFill docking stations.

❖ Set-up and Installation

Because of the difference in satellites, it's easier to get a solid signal from XM in both home and mobile installations than Sirius. XM uses two geostationary satellites and the receiver is constantly tuning to the one with the best signal. Sirius receivers are also tuning around for the best of two signals, but their satellites are in a highly elliptical orbit. The result is occasional signal drop-outs when mobile or slight difficulty placing the antenna in a home installation.

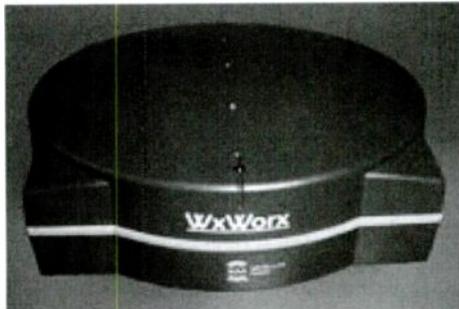
Connecting either system to your home stereo is easily done with a micro-to-RCA stereo patch cord which is included. Connecting in your car may be a trickier installation. Cassette adaptors are included with mobile docking stations, but most new cars have CD players instead. Some new car stereos have micro jacks in the front which are intended to be used for MP3 players and work well for satellite radio, but you'll still need to power the unit. All mobile docking units come with cigarette lighter adapters.

Placing the small magnetic antenna is easy. Route the wire along the floor under the mats and behind plastic trim. The RG/174 used for the antenna cable with either service is easily slipped under the rear windshield gasket from the trunk to the roof using a very small screw driver. Put a little clear silicone caulk at both entry points.

Placement of the mobile docking station is critical. Mount it so that you can easily reach the controls, unless you want to have to use the remote control. Avoid placing it directly over vents or in the way of the gear shift or other controls such as the radio or heater/AC. Don't mount it in front of any gauges. Using satellite radio should be no more distracting than the radio that came with the car. Avoid trying to read the constantly changing display or tuning through the categories and channel line-ups. Take the time to load your 10 favorite channels which are easily accessed by pressing a single button.

❖ Satellite Radio Future

It's not too difficult to imagine the future of satellite radio. It's partly already here. XM now offers XM WX satellite weather. The ground station package features a receiver capable of displaying high resolution NEXRAD weather radar and a host of other aviation and nautical graphics on your laptop or tablet PC via a small receiver. You get wind shear detection, lightning, county warnings, winds aloft, surface observations and analysis, NWS forecasts, hurricane tracking, surface, pressure, winds and temperatures and more. Some receivers also tune the XM music and talk channels as well. This service is expensive: \$100 activation fee and \$99.99/month for the WX service. But, it's proving to be popular as reception equipment is often backordered.



XM WX is here. XM now features a special satellite weather service for aviators, mariners and ground stations alike. Displays on your laptop or tablet PC. (Courtesy Baron Services, Inc.)

Satellite Radio Resources

<http://www.sirius.com>
<http://www.xmradio.com>

Hardware Reviews:

<http://radio.about.com/od/satelliteradi1>
<http://www.consumersearch.com/www/electronics/satellite-radio-reviews>

Hardware Retail:

Best Buy 888-237-8289 <http://www.bestbuy.com> Has complete line of XM and Sirius receivers, including the Delphi MyFI personal XM shirt-pocket receiver.

Circuit City 800-843-2489 <http://www.circuitcity.com>

Has full line of satellite radio gear. Offers discounts on some. Sells Polk stereo component XM receiver. Has 2 and 4 year "protection plan."

Crutchfield 888-955-6000 <http://www.crutchfield.com>

Has full line of satellite radio gear for both Sirius and XM. Has "scratch and dent" department with discounts on returned merchandise.

Tweeter 866-690-2370 <http://www.tweeter.com>

Has full line of satellite radio gear for both Sirius and XM including Directed Electronics Starmate Sirius receiver complete mobile unit for \$99.

WXWorx features the XM WX satellite receiver. 321-751-9202. <http://www.wxworx.com>

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Q. What are the "satellite telephones" we frequently see used by reporters on foreign assignments? (Ronald Blocker, K9JON, Glenwood, IL)

A. When reporters are dispatched to news-breaking foreign locations, they rarely have the luxury of dependable telephone communications. Direct contact with the U.S. through earth satellites is the answer. Several manufacturers of portable satellite telephones offer small, suitcase systems consisting of the telephone, transceiver, rechargeable battery pack and antenna. A choice of different satellites – INMARSAT, Iridium, SkyCom, VSAT, Anik, MSAT and others – depending upon the model, provide the link.

Q. A friend of mine says that digital photography will eventually replace film photography. What do you think? (Mark Burns, Terre Haute, IN)

A. Digital photography will continue to grow in popularity because, as its quality improves and its cost decreases, it has the advantages of instant results, enormous image memory, no film requirements, infinite lifetime with no degradation, enormous processing capabilities, immediate distribution, tiny camera size, and more. I suspect that digital photography will rapidly obsolete film photography except for a few old-time hold-outs, and that film photography will eventually become only a niche art.

Q. If I attach an oscilloscope to the IF output of a receiver, can I see anything interesting? (Gabe, Glen Ellyn, IL)

A. It's interesting, but you will soon grow tired of it. An oscilloscope samples the amplitude of the signal(s) present at a particular frequency. You will see the baseline broaden in synchronization with the modulation of the received signal, nothing more.

Q. Can you define what is meant by cable TV channels CATV1 through CATV6, or re-

fer me to a site that shows these?

A. Take a look at the chart on web page http://www.qsl.net/atn/library/Broadcast_freqs.htm, especially the columns under CABLE at the right. Of course, these allocations could also mean standard VHF-TV broadcasting channel frequencies as well, as they appear on your TV set, but TV channel 1 no longer exists. (It used to be 48-54 MHz, now part of land mobile low band and amateur radio's six-meter band.)

Q. I recently placed a wire across a magnetic compass and passed 10 amps of AC current through it; the needle barely budged. Then I passed 10 amps of DC current through it, and the needle swung in line with the wire. Why the difference? (Mark Burns, Terre Haute, IN)

A. When electrical current passes through a conductor, it produces a magnetic field. Just so long as the current is passing in one direction and remains constant, the magnetic field is uniform and attracts the magnetic needle of the compass. But AC fluctuates back and forth, reversing its polarity 60 times per second. The needle may vibrate, but can't deflect long enough in one direction before the field reverses, pulling it back in the other direction, so it appears to sit in one position. A rough analogy would be two people rapidly and alternately pushing, and then relaxing, on opposite ends of a car – it wouldn't ever get rolling!

Q. I enjoy monitoring airport comms from 30 miles away using my Yaesu VR5000 and a roof-top discone. But I'm experiencing intermod from local FM stations, and I'd like to hear the weaker air-band signals. Would a wideband preamplifier help? (Jerry Klatt, Timberlake, Ohio)

A. A wideband preamp will only aggravate the overload problem. Your best bet would be to install a directional antenna like the

Grove Scanner Beam facing the airport for greater gain, and insert a PAR FTR-FMDS filter in your antenna line to remove the FM stations.

Q. I have an ICOM R75 which goes up to 60 MHz. Will a shortwave dipole be effective that high in frequency? (Henry Moya, Las Vegas, NV)

A. Yes, but highly directional off the ends, especially for a long wire antenna. Much better would be to use the very popular and highly-effective H800 Skymatch active antenna which covers the entire range and has the capture efficiency of a 100 foot dipole!

If you want to "roll your own," you might try building a "fan dipole," consisting of two pairs of wire elements in parallel: a main shortwave dipole measuring roughly 60 feet (30' + 30' either side of the center insulator), and a shorter one for the higher range, measuring 12 feet (6' + 6'). The two dipoles (four elements) are connected to the center insulator like a giant "X," fanning out at the ends to about 2-3 feet apart. Thus, they require four suspension points at the far ends.

An easier approach, cheapest of all, and probably just as effective as the fan dipole, would be a single, center-fed dipole 36 feet long (18' + 18'); it would work very well through the shortwave range, and since it's cut for about 13 MHz, it will work well on and around its third harmonic which falls near the highway patrol part of VHF-FM low band.

The pattern of such an antenna is broadside to the wire for shortwave, and produces a four-leaf clover pattern on its third harmonic, making it more omni-directional there.

Finally, you could even combine a shortwave antenna and the VHF-FM low band dipole or vertical through a TV splitter into the single antenna jack on your radio.

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. (Please include your name and address.) The current Ask Bob is now online at our website:
<http://www.monitoringtimes.com>

In last month's column, I talked extensively about disaster drills and preparedness. Rather than reprint the list of contents for my own "Grab'n Go-Bags," I listed several good websites. I hope you took the time to visit those sites and compare their lists to your own.

Of course, everyone has their own idea of what is indispensable, and you can carry only so much. I still stick with my Kenwood TH-F6A as my hand held amateur transceiver. I have several extra batteries including an alkaline battery case. I also carry the headset, auto DC charger, etc. It has never failed me!

We finish this month with a couple of must-have items for your "Grab'n Go Bag." In fact, you should carry duplicates in your car.

38 I always carry some simple office supplies from the "dollar" store, such as a twelve pack of cheap pens for the "Can I borrow a pen" requests. I also carry a few of the more expensive pens (which actually work) for my own use. Other "dollar" items include a mini stapler, extra staples, mini Post-It Notes®, push pins, rubber bands, paper clips, and a large black permanent marker pen – all packed in a see-through reclosable baggie.

39 I carry a couple of large, well-stocked first aid kits in my vehicle for really big emergencies. But for my "Grab'n Go Bag," I bought a standard \$5 Red Cross mini first aid kit and added a few more goodies. Most of these are over the counter pain medications, cough drops, Bactine™ pads, tooth pain gel, 1% cortisone cream, aspirin, and Tylenol®. I find that I get into this kit almost daily.

Don't forget a few pairs of the heavy duty vinyl medical gloves. These can also be used for messy jobs like changing a tire and are absolutely indispensable. I keep them in a separate plastic reclosable baggie. If you're a member of a large group, you can usually go into your local Red Cross chapter and ask for a substantial discount for volume sales.

Occasionally, Red Cross stores will carry specials. I bought the aluminum emergency blankets for just 50 cents, and a Red Cross lanyard pocket ID for \$3 dollars. If you are an active Red Cross disaster volunteer, they might sell items for cost. If you do not live near a Red Cross Chapter, they also have an on-line store at <http://www.redcross.org/>

40 It seems that most radio hobbyists love gadgets. I found a nice new gadget: a credit sized card with eleven practical tools for about \$20. Do a site search for "Victorinox Swisscard" card or go to <http://www.quickknife.com/>. I love mine. Warning: the stick ball-point pen and knife would probably be a "no go" at a metal detector.

41 Need to learn about Incident Command System (ICS)? The Federal Emergency Management Agency offers many courses at <http://training.fema.gov/EMIWeb/IS/crslist.asp>. There are two ICS classes, IS-195 and IS-200. Also, take look at IS-203, a course I overlooked when I mentioned the site last May. However, there is a brand NEW course you must check out: IS-700, which covers the new National Incident Management System (NIMS).

42 Are you involved in amateur radio public service work? Check out this website: <http://acs.oes.ca.gov/> and click on the blue link in the middle of the page for a look at a state of the art Emergency Operations Center. Wow! No wonder California is broke. Then again, when you have as many disasters as California, can you afford a second class operation? I don't think so. The ham Auxiliary Communication Service (ACS) is an integral part of California's Governor's Office of Emergency Services. Yes, they report directly to Arnold!

43 For information on the FEMA sponsored Community Emergency Response Team (CERT), go to this website: <http://training.fema.gov/EMIWeb/CERT/>. Here are some web vendors that sell CERT equipment:

<http://www.galls.com>
<http://www.cert-kits.com/>
<http://www.tcr-online.com/>
<http://www.sentrysafety.com/>
<http://www.batterysavers.com/Emergency-Preparedness-CERT-Kits.htm>

44 I recently downloaded the FREE Google desktop search program. Wow, this a great product. I type in a word or two, and up comes every document, etc. with that key word or phrase. Another great FREE download is the latest version of Adobe Reader 7.01 at <http://www.adobe.com/products/acrobat/readstep2.html>

45 I get tons of email. Many ask me, what is the best radio? The answer, of course, depends on what you are looking for or your particular needs. Let me share some of my recent acquisitions.

For a scanner, I am delighted with the Pro 83 handheld from Radio Shack. It has only 200 channels and no trunking, but for plain old VHF,

aircraft, UHF, and 800-900 MHz conventional, it is great. The display is large with a *bright* orange backlight. Same for the keypad. Simple to operate. I bought the PC programming cord from RS and the software from <http://www.scancat.com>. The Scancat Lite Plus for \$30 works on several radios, including the new table top Pro 2051. With a similar orange display, the Pro 2051 model features trunking capabilities, and 1,000 channels. When I bought them in May, they were on sale for \$80 and \$149, respectively. They will be on sale again soon: Check 'em out.

If you are a ham, the Yaesu FT-60 handheld offers a 1,000 channels, wide band coverage 108-580 and 700-900 MHz. Free software is available on line at <http://www.kc8unj.com/> It uses the same cable as the VX-7R and other recent Yaesu HTs. For a mobile, I like the Yaesu 2800. This puts out 65 watts and has 200 channels. Commercial software and ADMS cables are available from <http://www.rtsars.com> or any major ham dealer. For those of us whose eyes are failing, all these radios have large orange backlit displays. When I placed the Pro 83 and FT 60 side by side for the photo, the Pro 83 is clearly the brightest and best display.

I am certain there are many other great radios out there; I am just sharing my current "duty use" radios.



46 I am in my second week of jury duty. We were provided a parking pass for the lot right next to the jail/public safety building/court complex. I noticed lots of people carry radios, so one day I left my Scout® Frequency finder hooked up to a rooftop triband scanner magmount. I was not disappointed. Between 8 and 5 o'clock, it logged 141 hits. I am doing the research on them now, and will provide a full report in a future issue.

47 Chris wrote in to challenge my advice about using Isopropyl Alcohol (70%). He suggested a swab from TEXWIPE. Chris also recommended "liquid plastic" for weather sealing coax. But I am not quite ready to endorse either product yet. Do you have a better idea for cleaning connectors and fittings? How about sealing coax? I think most of us just use the standard coax seal available at Radio Shack. We will continue to research this area, Chris: Thanks for the input.

Keep those cards and letters coming. Enjoy your vacation, and pack your scanner! See you next month.

Clueless in Wichita Falls

This 4th of July marks 229 years since the United States declared independence, proclaiming the principle that the government exists to serve the people. Part of this service requires that the people be informed as to the activities of the government. Of course, there are some government activities so sensitive that revealing details would jeopardize lives, property or privacy. This tension between open access and secrecy is being played out in Texas and directly affects scanner listeners.

Wichita Falls, Texas

Wichita Falls, Texas, is a town of about 100,000 residents located 120 or so miles northwest of the Dallas-Fort Worth Metroplex, near the Oklahoma border. On May 2 of this year, the city transitioned to a new 800 MHz radio system, which by all accounts appears to be working well – perhaps too well.

Unlike many other law enforcement agencies that encrypt only tactically sensitive transmissions, such as narcotics or undercover investigations, Wichita Falls Police Chief Bachman made the decision to encrypt all police radio transmissions, preventing anyone outside the department from monitoring the new system. This includes television, radio and print organizations, which had become accustomed to keeping up with the police through their scanners.

Claiming that using encryption to protect police transmissions is a matter of officer safety, Bachman pointed to scanners found during drug busts and burglary arrests as evidence that criminals are listening in. He also stated that personal information transmitted during traffic stops could be used to perpetrate identity theft.

The reaction of the local news media to this decision was swift but decidedly self-serving. They insisted that they are entitled access to those transmissions in order to provide the public with vital information, but agreed with Bachman that the general public should not be allowed to monitor police activity. Essentially, they want the city to make an exception just for them.

Without the ability to monitor, the media argues that they will not be able to perform their duty as “government watchdog” and will be at the mercy of a government spokesman to learn about events in the community. Such a situation, they argue, creates an environment where the city will be tempted to protect themselves from criticism at the expense of the truth. The media also argues that they are the best way to

get vital information to the public in a timely manner. Waiting for the city to eventually inform the public about dangerous events or hazardous conditions would put citizens at risk rather than protecting them.

The news media has made an “open records” request for access to unencrypted police transmissions. It has been referred to the Texas Attorney General’s office for an opinion. After that, the media expects to go to court over the issue. We’ll see how far they get.

In the meantime, the Federal Communications Commission (FCC) database lists four repeater sites for the Wichita Falls system:

1. Water tank near 6th Street and Denver Street
2. Tower to the northwest of the corner of Lawrence and Call Field Road
3. Water tank at the corner of N.W. Highway 287 and Wellington Road
4. Water tank off Puckett Road

Eight frequencies are in use in this EDACS (Enhanced Digital Access Communications System), listed below. Remember that EDACS uses Logical Channel Numbers (LCNs), so be sure to enter these frequencies in the proper order:

LCN	Frequency
01	857.4625
02	857.9625
03	858.4625
04	858.9625
05	859.4625
06	859.9625
07	860.4625
08	860.9625

The main police talkgroup appears to be 289 (02-041 in Agency-Fleet-Subfleet format), although it is entirely digital and is encrypted.

The Wichita Falls Fire Department uses the same 800 MHz system but operates in unencrypted analog mode, mainly on talkgroup 529 (AFS 04-021).

Wichita Falls lies within Wichita County, which operates on several low-band VHF radio frequencies for various county and local agencies:

Frequency	Description
154.310	Fire Departments
154.340	Fire Departments
155.100	Road Maintenance
155.235	Emergency Medical Service
155.520	Sheriff
155.790	Sheriff

Wichita Falls is also home to Sheppard Air Force Base (AFB), a training center for fighter pilots and aircraft maintenance crews. The base has been recommended for “realignment” by the Base Realignment and Closure Commission, creating a potential for the loss of about 2,600 jobs.

Sheppard AFB operates a digital APCO-25 trunked radio system on six frequencies: 406.550, 407.500, 407.950, 408.550, 409.750 and 410.025 MHz. When programming your scanner, use a base of 406.000 MHz, spacing of 12.5 kHz and an offset of 380. A few reported talkgroups in use are:

Decimal	Hex	Description
528	021	Aircraft Servicing
560	023	Aircraft Servicing
592	025	Aircraft Servicing
848	035	Air Police
1104	045	Fire/EMS

West Virginia

Three West Virginia counties in the northern part of the state have a new UHF trunked radio system. In May of this year, Motorola finished deployment of a fully digital APCO Project 25 system covering Harrison, Marion, and Monongalia Counties along the Interstate 79 corridor. These three counties are home to more than 200,000 residents, or nearly one-eighth of the state’s population. Prior to the new system,



West Virginia

numerous stretches of I-79 through this area had poor or no communication for police officers. Money for the system came from a federal Department of Homeland Security grant as well as the state and county governments.

Based in Nutter Fort just outside Clarksburg, the new system uses four repeater sites with the following frequency assignments:

1. Marion County Landfill in Idamay (Marion County)
453.1250, 453.2875, 453.4375, 453.6375, 460.1875 and 460.3875 MHz
2. 985 River Road in Morgantown (Monongalia County)
453.2500, 453.6125, 453.8500, 460.0250, 460.2625 and 460.4125 MHz.
3. Pinnicknick Hill in Clarksburg (Harrison County)
453.1875, 453.3375, 453.7375, 460.0375, 460.3000 and 460.4625 MHz.
4. North of 1150 Shafer Lane in Fairmont (Marion County)
453.3125, 453.5375, 453.8375, 460.1125, 460.3625 and 460.5250 MHz.

Because the system is so new, I don't have any talkgroup information. If you're local to the area, or even passing through on your way to somewhere else, and have the time to monitor the system, please send me an electronic mail message with whatever information you might gather.

In addition to the new trunked system, the following are a number of VHF and UHF frequencies to check when you're in the area:

Frequency	Description
37.94	Monongalia County School Buses
39.68	Harrison County Sheriff
46.14	Harrison County Fire (Dispatch)
46.20	Harrison County Fire
46.50	Monongalia County Fire (Dispatch)
46.24	Monongalia County Fire
153.890	Morgantown Fire (Fireground)
154.370	Morgantown Fire (Dispatch)
154.540	Monongalia County EMS (Tactical 1)
154.725	Monongalia County Sheriff
155.070	Monongalia County Sheriff
155.130	Westover Police
155.175	Monongalia County EMS (Med 1)
155.205	Monongalia County EMS (Tactical 5)
155.235	Monongalia County EMS (Dispatch)
155.340	Monongalia County EMS (Med 2)
155.370	Monongalia County Sheriff
155.520	Monongalia County Sheriff
155.685	Bridgeport Police
155.790	West Virginia University Police
156.000	Harrison County Emergency Medical Service
453.225	Morgantown Police (Special Events)
453.450	Morgantown Police
453.700	Clarksburg Police
460.450	Morgantown Police (Dispatch)
460.550	Clarksburg Fire

Parkersburg, West Virginia

Further to the west, between Interstate

77 and the Ohio River, lies Parkersburg, West Virginia.

The town has about 32,000 residents and is ranked as the eighth most affordable housing market in the country, where the cost of a 2,200 square-foot single family home averages \$144,000.

The Wood County Office of Emergency Services operates a Central Communications Center for Wood and Wirt Counties in Parkersburg. Together the two counties are home to nearly 100,000 residents and are now served by a new \$620,000 radio system. In May a new digital network, funded in part by a grant from the Department of Homeland Security, replaced the old analog system. Officials will keep the old equipment as a backup in case they encounter problems.

The new network provides *interoperability*, allowing all of the agencies on the system to communicate directly with each other. Unfortunately, it is not directly compatible with systems outside of Wood and Wirt Counties.

The county chose a Logic Trunked Radio (LTR) system from E.F. Johnson for each of their agencies. LTR is an older protocol, more popular with business and industrial users than public safety agencies.

LTR systems do not have a dedicated control channel. Most common trunking systems, including Motorola and EDACS, have one frequency set aside for use as a "control channel." This channel is used to communicate frequency assignments and coordinate requests for service, but is not used to carry voice conversations. In an LTR system, every channel is capable of carrying both voice and control traffic. Signaling information is carried in a "sub-audible" data stream continuously transmitted below the analog voice. This information is sent at an audio frequency of 150 Hz, which is below the normal voice frequency band of 300 Hz to 3000 Hz and is usually not heard on a scanner.

LTR talkgroups have a three-part identification number. The first part is a single-digit "area code" of either 0 or 1. This digit allows two different LTR systems to operate in close proximity to one another without either systems' radios



getting confused. One system is assigned an area code of '0' and the other system is assigned '1', providing a way for radios to distinguish talkgroups.

The second part is a "home repeater" number between 1 and 20, with 20 being the maximum number of repeaters allowed in an LTR system. Each radio is assigned to a home repeater channel, to which it tunes when not involved in a conversation.

The final part is an identification code which can be as high as 250. A system with five repeaters could have as many as 1,250 individual addresses. The largest LTR system, with 20 repeaters, could have up to 5,000 addresses.

These addresses can serve as a unique radio identifier or as a talkgroup identifier, depending on whether the address is programmed into one radio or several.

The new Parkersburg system operates on five frequencies. 856.9625 MHz is the "home channel" that radios are tuned to when they are not involved in a conversation. The other four frequencies are 856.4625, 857.7125, 860.7125 and 860.9625 MHz.

In order to scan LTR systems it is important to load frequencies in the correct order and in the correct location. For the Parkersburg system, like many five-repeater LTR systems, the common locations are 1, 5, 9, 13, and 17. So, you should load the frequencies as follows:

Location Frequency

01	860.9625
02	blank
03	blank
04	blank
05	856.4625
06	blank
07	blank
08	blank
09	859.7125
10	blank
11	blank
12	blank
13	856.9625
14	blank
15	blank
16	blank
17	860.7125

Here are a few talkgroups to get you



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started. As you can see, the second part of the identifier is the home repeater as listed in the frequency table.

Talkgroup	Description
0-13-011	City Services
0-13-013	City Services
0-13-015	City Services
0-13-016	City Services
0-13-051	Police (Dispatch)
0-13-052	Police (Detectives)
0-13-053	Police
0-13-054	Police
0-13-055	Police
0-13-061	Fire (Dispatch)
0-13-062	Fire
0-13-063	Fire
0-13-064	Fire
0-13-065	Fire

There are also a number of conventional frequencies that are active in the Wood and Wirt County area.

Frequency	Description
153.785	Wood County Fire
154.010	Wood County Fire
154.055	Mid-Ohio Valley Transit Authority
154.070	Wood County Fire
154.220	Wood County Fire (Dispatch)
154.325	Wood County Fire
154.920	Sheriff (Dispatch)
154.965	Sheriff
155.490	Parkersburg Police (Dispatch)
155.730	Vienna Police (Dispatch)
155.820	Williamstown Police
155.850	Vienna Police (Car to Car)
155.050	Vienna Fire (Dispatch)
158.745	Wood County Emergency Services
453.300	Wood County Fire
453.725	Wood County Airport Authority
453.775	Williamstown Fire

Aurora, Colorado

Police officers in Aurora, Colorado, a town of 276,000 residents just east of Denver, are complaining that their new digital radio system is not living up to expectations. The city replaced an analog Motorola radio system with a new EDACS network in 2004, but the city and the

EDACS vendor, M/A-Com, have not yet been able to correct all of the problems reported by officers. These problems include dropped transmissions, garbled messages and equipment failures.

The city defends the new system and claims the new system covers a larger geographic area and functions successfully almost all the time.

The system operates from four repeater sites, two in Adams County and two in Arapahoe County. The two in Adams County are on East 26th Avenue and Montview Boulevard. The two in Arapahoe County are on Old South Gun Club Road and on East Hampden Avenue. Each of these repeaters transmits on the following frequencies:

LCN	Frequency
01	856.7625
02	856.9375
03	856.9625
04	856.9875
05	857.7625
06	857.9375
07	857.9625
08	857.9875
09	858.7625
10	858.9375
11	858.9625
12	858.9875
13	859.7625
14	859.9375
15	859.9625
16	859.9875
17	860.7625
18	860.9375
19	860.9625
20	860.9875

Voice traffic is a mix of analog and digital, where the digital activity is in the "ProVoice" format – a proprietary technology that is incompatible with APCO Project 25 standards. There is no commercial scanner on the market today that can monitor ProVoice transmissions, so you'll only be able to hear the analog traffic.

The 600 or so officers in Aurora Police Department operate in three districts: North, Central, and South East. Each district operates as an independent department, fielding patrol

officers, detectives, traffic units, and so on. The following talkgroups are reported to be active on the Aurora system:

Decimal	AFS	Description
529	04-021	Fire (Dispatch)
530	04-022	Fire (Tactical 2)
531	04-023	Fire (Tactical 3)
532	04-024	Fire (Tactical 4)
533	04-025	Fire (Tactical 5)
534	04-026	Fire (Tactical 6)
545	04-041	Emergency Medical Services 1
546	04-042	Emergency Medical Services 2
609	04-121	Fire (Training 1)
610	04-122	Fire (Training 2)
611	04-123	Fire (Station Paging)
801	06-041	Snow Removal 1
802	06-042	Snow Removal 2
803	06-043	Snow Removal 3
804	06-044	Snow Removal 4
868	06-124	Animal Control
1809	14-021	Police (Dispatch 1)
1812	14-024	Police (Tactical 1-1)
1813	14-025	Police (Tactical 1-2)
1814	14-026	Police (Tactical 1-3)
1815	14-027	Police (Traffic 1)
1825	14-041	Police (Dispatch 2)
1828	14-044	Police (Tactical 2-1)
1829	14-045	Police (Tactical 2-2)
1830	14-046	Police Tactical 2-3)
1831	14-047	Police (Traffic 2)
1841	14-061	Police (Dispatch 3)
1844	14-064	Police (Tactical 3-1)
1845	14-065	Police (Tactical 3-2)
1846	14-066	Police (Tactical 3-3)
1847	14-067	Police (Traffic 3)
1857	14-081	SWAT

While you're programming your scanner for the city network, you might want to add three conventional frequencies for Arapahoe County search and rescue patrols. They can be heard on 155.160, 155.230 and 155.295 MHz.

Nearby Buckley Air Force Base is home to the 460th Space Wing, part of the Air Force Space Command. The base operates a Motorola trunked radio system that uses the APCO Project 25 standard for digital voice transmissions.

There are a number of UHF frequencies reported for this system: 406.500, 406.775, 406.975, 406.9875, 407.000, 407.125, 407.8125, 408.075, 408.275, 408.425, 408.450, 408.775, 409.025, 409.400, 409.925, 410.425, 410.550, and 410.650 MHz. When programming the system into your scanner you should use a base of 406.000 MHz, a spacing of 12.5 kHz and an offset of 380.

Decimal	Hex	Description
4400	113	Military Police
4448	116	Training
7584	1DA	Military Police
7600	1DB	Military Police
7808	1E8	Fire
7888	1ED	Ground Control (simulcast on 148.215 MHz)
8416	20E	Aircraft Servicing

That's all for this month. I welcome your comments, questions and scanner frequencies via electronic mail at danveeneman@monitoringtimes.com. I also have additional information, frequencies and photographs on my web site at <http://www.signalharbor.com>. Until next month, Happy Fourth of July!



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Bearcat 250D 1,000 ch. Trunktracker III handheld scanner.....	\$339.95
Bearcat 245XLT 300 ch. Trunktracker II handheld scanner.....	\$189.95
Bearcat 248CLT 50 ch. base AM/FM/weather alert scanner.....	\$84.95
Bearcat Sportcat 200 alpha handheld sports scanner.....	\$159.95
Bearcat Sportcat 180B handheld sports scanner.....	\$139.95
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Message Parsing: Finding the Information

A lot of what one sees on digital modes looks like noise or gibberish, but is actually a perfect copy of a message in a standard format. It is just a matter of recognizing the format, and parsing it into understandable English accordingly.

Our first gem came over a Malaysian Navy radio teletype (RTTY) circuit, as received by a listener in Denmark. Baud rate was 50, with an 850-hertz shift. Here we go:

```
fm skldm lumut to all ships at sea bt sic svc  
zui. int qrk 122 now rpt zui. int qrk 122  
now. bt nnnn.
```

A little examination shows a relatively standard, military message. "To all ships at sea" is a pretty good indicator that it's even in English.

So we start at the beginning. "Fm" is obviously "from." "Skldm" responds to Google searches, as do most of these weird acronyms. In this case it's a department of the Royal Malaysian Navy, the official abbreviation for which is "TLDM," for "Tentera Laut DiRaja Malaysia." "Lumut" also Googles. It's a Navy base at a Malaysian port city.

"BT" is the international "break" signal. When it follows an addressing block like this one, it means the message is next.

"Sic svc" is a "Service Identification Code" commonly encountered in military RTTY messages intended for the radio operator. Experienced listeners have probably already identified "ZUI" as a "Z-signal" meaning, "Your attention is invited to..." (the message which follows). Z-signals are similar to the much better known "Q-signals" used by hams and ships.

Now here's the message: "INT QRK 122 now." That's it. "Int," short for "interrogative," is the same as putting a question mark after the signal QRK, a request for a signal report. The operator is inquiring about reception of message or line 122.

Such terse codes are standard procedures

on short wave radio for a lot of reasons, including brevity and intelligibility. Consider it radio-speak, and remember that Google is your friend.

Now, let's get into some really serious geek stuff. The new Bern Radio, an e-mail service in Switzerland, has been repeatedly transmitting the following in slow PACTOR (Packet Teleprinting Over Radio):

```
ATQ0V1H0 +++ AT&F e0 *ap0 *to *fa1000  
*pa1000 *xm2 *myHEB02: S38=195 *xi-  
HEB02: *mccq.de.HEB02.
```

This is going to stump most people who didn't misspend their youth configuring old computer telephone modems. It's an initialization string. Today's software hides these away on advanced configuration screens most users will never see.

I admit that I had to think about this a bit. Why would one of the most advanced (and most expensive) setups going, namely PACTOR-III, be spitting out strings of commands originally devised for Hayes landline modems in the 1970s? Back to Google, where I found out that PACTOR modems do indeed optionally speak Hayes. It's for compatibility with Windows software which, as we have noted, still uses these arcane little codes for advanced modem programming.

The precise meaning of all the terse command strings in HEB's transmission can be looked up any number of places. Suffice it to say that "AT" ("Attention") is the standard command prefix.

The first "AT" string is pretty standard stuff, telling the modem how to communicate with the software, and then instructing it to hang up the phone. Consider the "+++" another way to hang up, if the modem missed the first part.

The next "AT" string puts the modem back to its default mode, turns off text echo, and then runs a series of starred (*) commands that are special to this company's PACTOR modems. These set the station callsign ("HEB02"), and do various things with the audio signal going to the transmitter.

So why is Bern sending its own modem initialization string over the radio? Now, that is something you can't look up online. Sometimes, stations just do odd things. Maybe somebody goofed.

❖ New York VOLMET Again

Ken Maltz, in New York State, has been keeping tabs on the continuing weirdness from New York Radio's aviation weather broadcast (VOLMET). Late last year, it unceremoniously came back on-air, after being gone for about a year while a new source of funding was found. However, the station still seems to come and go rather unpredictably.

On April 4, for example, it vanished. Then it came right back up on April 12, with the usual lack of indication that anyone knew what was going on. This seems to be almost a monthly occurrence. It's a rather odd way to deliver an essential weather service to airline pilots over the North Atlantic.

When it's transmitting, the VOLMET uses 3485, 6604, 10051, and 13270 kilohertz (kHz) upper sideband (USB). The 3 megahertz is only at night (local time), and the 13 meg is in the day. Signals are very strong from the high-power transmitters, meaning that if you have a good signal and suddenly don't hear it, it's probably off the air.

When New York VOLMET does broadcast, it is for a 20-minute period, beginning every hour and half hour. Gander Radio in Canada takes up the other 10. Gander has not had this on-again, off-again problem, since it is funded by a different government.

❖ Space Shuttle Audio Again

Got an e-mail from Mike, KA3JIZ, a former member of the Goddard Space Flight Center Amateur Radio Club. He notes that security issues at the NASA facility have greatly complicated the broadcast of real-time space shuttle communications by WA3NAN.

We mentioned these NASA communications rebroadcasts in a previous column. They were transmitted on several HF amateur bands, and also on the club's 2-meter repeater. However, most club members are contractors at Goddard, and can no longer easily get into the radio station after-hours.

By the time this column runs, the shuttle should have flown, and we will hopefully know the outcome of this matter. WA3NAN frequencies are 3840 and 7185 kHz LSB, plus 14295, 21395, and 28650 kHz USB.

See you next month.



A modem which was probably the hot setup in 1981.

ABBREVIATIONS USED IN THIS COLUMN

AFB.....	Air Force Base
ALE.....	Automatic Link Establishment
AM.....	Amplitude Modulation
ARQ.....	Automatic Repeat Request teleprinting system
AWACS.....	Airborne Warning And Control System
CAMSLANT.....	Communication Area Master Station, Atlantic
CW.....	Morse code telegraphy ("Continuous Wave")
DEA.....	US Drug Enforcement Administration
DSB.....	Double-Sideband suppressed-carrier telephony
DSC.....	Digital Selective Calling
E3.....	UK M16/SIS, musical callup, probably Cyprus
E10a.....	Israeli phonetic "numbers" voice, abnormal call
EAM.....	Emergency Action Message
FBI.....	US Federal Bureau of Investigation
FAX.....	Radiofacsimile
FEC.....	Forward Error Correction teleprinting system
FEMA.....	US Federal Emergency Management Agency
HF-GCS.....	High-Frequency Global Communications System
JSTARS.....	Joint Surveillance Target Attack Radar System
LORAN.....	LOng RArange Navigation
LSB.....	Lower Sideband
M8.....	Older format of M8a (see below)
M8a.....	Cuban CW "numbers" cut to ANDUWRIGMT
MARS.....	Military Affiliate Radio System
Meteo.....	Meteorological
MFA.....	Ministry of Foreign Affairs
RTTY.....	Radio Teletype
S32.....	Russian voice "numbers," formerly XSW
SHARES.....	US Federal SHARed RESources 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
V2a.....	Cuban Spanish female "Atencion" numbers
V2c.....	Like V2a, with a pause every 10th group
VOLMET.....	"Flying Weather" aviation broadcast
XSW.....	"Squeaky Wheel," marker for S32

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

2187.5	V7GD3-Vessel <i>Mistral</i> , DSC distress call at 0417. (Day Watson-UK)
3220.0	VLB 20A-Abnormal Israeli intelligence callup (E10a), also on 6370, at 1735. (Ary Boender-Netherlands)
3245.2	Cuban "Atencion" station (V2a), "numbers" in reduced-carrier AM, signing off at 0543. (Rick Larkin-TX)
3640.0	SYN 72-Abnormal Israeli intelligence callup (E10a), also on 4015 and 6930, at 1735. (Boender-Netherlands)
3828.9	The Squeaky Wheel-Strange Russian channel marker (S32), also on 6990.9, at 2032. (Boender-Netherlands)
3890.0	"Yosemite Sam"-Unknown New Mexico pirate, regularly repeating DSB buzz and garbled voice, at 0558. (Tom Severt-KS)
3926.1	Cuban CW cut number station, possibly the old format (M8), ended "AR AR AR SK SK SK," at 0435. (Larkin-TX)
4027.0	Cuban CW cut number station (M8a), 5-figure groups at 0320. (Severt-KS)
4165.0	CIO 25-Abnormal Israeli callup (E10a), also on 6912, at 1735. (Boender-Netherlands)
4213.0	WLO-Mobile Radio, AL, SITOR-B info and traffic list at 0354. (Severt-KS)
4232.0	RFLIE-French Navy, Pointe-a-Pitre, Guadeloupe, RTTY test loop at 0400. (Severt-KS)
4479.0	Cuban AM "Atencion" station (V2a), 5-figure groups at 0300. (Severt-KS)
4490.0	WGY9900-American Red Cross headquarters, VA, sounding on the SHARES net, also 5711, at 0121. NAV-Navy/Marine Corps

4583.0	MARS, VA, sounding, also 5711, at 0145. NCS015-National Communications System, sounding at 0211. (Ron Perron-MD)
4610.0	DDK2-Hamburg Meteo, RTTY weather codes for Norway, at 1820. (Watson-UK)
4610.0	GYA-UK Royal Navy, Northwood, FAX surface prognosis at 1017. (Watson-UK)
4724.0	Armament-US military, with an EAM simulcast on 8992, 11175, and 15016, then "Standing by for traffic" at 0010. (Jeff Haverlah-TX) Alleycat (E-8 JSTARS) tracking with ground station Tommy 01, at 0112. (Mark Cleary-SC)
4780.0	FC8FEM- FEMA Region 8, ALE sounding at 0949. (Severt-KS)
5035.0	ADA-Unknown agency, ALE sounding at 1649 (Watson-UK)
5058.5	LR1-FBI, Little Rock, AR, working AT1, Atlanta, GA, at 1713. (Severt-KS)
5091.0	JSR-Israeli Intelligence callup (E10), erroneously mixing with PCD at 2032, back to JSR only at 2034. (Boender-Netherlands)
5142.6	Coast Guard 47318-US Coast Guard, position for Group St. Petersburg, FL, at 2306. (Cleary-SC)
5505.0	Shannon VOLMET, Ireland, European aviation weather at 0239. (Jeff Seale-KY)
5696.0	Commsta Kodiak-US Coast Guard, AK, working Coast Guard 1711, at 0432. (Severt-KS) Shark 21, calling Coast Guard 1091, at 1236. (Cleary-SC)
5732.0	Coast Guard 1700-US Coast Guard, setting guard with CAMSLANT, VA, enroute to El Salvador, at 1400. (Cleary-SC)
5772.0	460FEMAUX-Probable Louisiana State EOC, Baton Rouge, calling RLD, ALE at 1954. (Perron-MD)
5800.0	Cuban AM "Atencion" station (V2a), at 0320. (Severt-KS)
5847.0	TWVP2-Spanish Guardia Civil, Palencia, calling TXX2, Valdemoro, in ALE, also on 5865, 5868, and 5892, at 1702. (Watson-UK)
5875.9	FDI8-French Air Force, Nice, CW marker at 1827. (Watson-UK)
6697.2	Blow Fuse-Off-frequency US military, EAM simulcast on 8776.0, at 1225. (Haverlah-TX)
6751.0	Sentry 51-US Air Force AWACS, patch to Raymond 24, Tinker AFB, for a long coded message, at 1903. (Severt-KS)
6761.0	Hoist 35-US Air Force tanker, calling Deuce 98, at 2359. (Cleary-SC)
6797.0	Cuban AM "Atencion" station (V2a), at 2212. (Severt-KS)
6911.5	WAROPS-US Army Warrior Ops, Soto Cano, Honduras, ALE sound at 1053. (Severt-KS)
6981.0	673DVA-KDQ 673, US Veterans Administration, VA, ALE sounding at 0040. (Perron-MD)
6985.0	USAIS1012-US Army Intelligence & Security Command, VA, calling USADA1010, US Department of the Army, at 2116. (Perron-MD)
7348.0	AF6-US Air Force C-20, sounding in ALE at 1303. (Perron-MD)
7611.0	FAAZOA-US Federal Aviation Administration, Oakland, CA, sounding on this plus 9914; 13457; 15851; and 19410, at 1150. (Perron-MD)
7617.0	Jaguar-Mexican Army, calling Camaleon3, also 7777, ALE at 0052. RM1-1st Military Region, Mexico City, calling Camaleon3, at 0207. (Perron-MD)
7657.0	Panther-DEA, Bahamas, working Coast Guard 6518, at 1733. (Cleary-SC)
7710.0	Unid-Probably Canadian Coast Guard, unscheduled FAX charts, frequency drifting badly, at 0900. (Watson-UK)
7720.0	Oro-Mexican military, calling Omega in ALE, at 0019. Delta, calling Omega at 0325. (Perron-MD) [A new Greek letter net? -Hugh]
7739.0	OHT30P-Sonatrach net #2, Ohanet, Algeria, sounding in LSB ALE at 0202. (Perron-MD)
7975.0	Cuban AM "Atencion" station (V2c format), at 1627. (Chris Smolinski-MD)
8045.0	Ciclon-Mexican Army, Hermosillo, calling Ciclon38, ALE at 0050. Relampago-Mexican military, calling Huracan, ALE at 0055. (Perron-MD) [Storm net: "Relampago" = "Lightning." -Hugh]
8050.0	WGY908-FEMA Region 8, Denver, CO, working WGY925, Wisconsin EOC, at 1432. (Severt-KS)
8056.0	814369-US military aircraft, calling HTR (Hooter Ops, Ft Campbell, KY), also 9145, ALE at 1929. (Perron-MD)
8097.0	Cuban AM "Atencion" station (V2a), at 1910. (Severt-KS)
8135.0	Cuban CW cut number station (M8a), at 2324. (Severt-KS)
8260.0	Sea Angeles-Tug working unknown shore station, enroute Grand

- 8337.6 Isle, LA, at 2153. (Cleary-SC)
Shark 02-US military, working Dolphin 20, at 0012. (Cleary-SC)
- 8776.0 Blow Fuse-US military, with several EAMs simulcast on 6697, at 1225. (Haverlah-TX)
- 8891.0 DLH 8384-Lufthansa Cargo MD-11 freighter (registration D-ALCA), working Iceland at 2100. (Clifford-UK)
- 8912.0 Coast Guard 1503-US Coast Guard, setting guard with CAMSLANT at 2205. (Cleary-SC)
- 8971.0 Wafer 22-US Navy P-3C working Fiddle, Jacksonville, FL, regarding ICE (US Immigration & Customs Enforcement) operation, at 2359. (Cleary-SC)
- 8983.0 Coast Guard 2141-US Coast Guard, working CAMSLANT enroute home with mechanical problem, at 1311. (Cleary-SC)
- 8992.0 Japan Navy 28, patch via Elmendorf HF-GCS, AK, at 0320. McClellan-US Air Force HF-GCS, CA, with a distinctive 140-character EAM at 0944. Stairway-US military, long patch via Offutt AFB to request units come up on 8776 kHz, at 1323. Offutt-US Air Force HF-GCS, NE, working Dry Cell, went to "311" (11220 kHz), then finally 11175, at 1424. (Haverlah-TX)
- 8992.2 Fish Hawk-Slightly off-frequency US military, trying to work McClellan HF-GCS, CA, who then unsuccessfully tried to move them to 13200, at 1934. (Haverlah-TX)
- 9022.0 Nightstar Alpha-US Air Force E-8 JSTARS, calling Nightstar Brovo, but raising Mustang South, at 1433. (Cleary-SC)
- 9050.0 SVSB-Mexican military, calling Secretat, ALE at 0118. (Perron-MD)
- 9106.0 NNN0ELA-SHARES Southeast Digital Coordination Station (DCS), Navy/Marine Corps MARS, SC, calling NCS009, National Communications System, also on 15094, ALE at 152B. (Perron-MD)
- 9108.0 CFH-Canadian Forces, Halifax, NS, giving schedule in FAX, at 0250. (Seale-KY)
- 9251.0 "Lincolnshire Poacher"-British numbers (E3), 5-figure groups, parallel 12603, 2203. (Sevart-KS)
- 10115.0 SCLC512-Venezuelan military, Ciudad Bolivar, calling CLC51, ALE at 2223. (Watson-UK)
- 10125.0 Cuban CW cut number station (M8a), at 0320. (Sevart-KS)
- 10125.0 Cuban CW cut number station (M8a), at 2324. (Sevart-KS)
- 10126.0 Cuban AM "Atencion" station (V2a), LSB voice mixing with CW M8a message on 10125, at 0323. (Sevart-KS) [Oops. Possibly same transmitter. - Hugh]
- 10162.0 046NHQCAP-US Civil Air Patrol headquarters, ALE sound at 0216. AED-US Air Force, Elmendorf AFB, AK, sounding at 0605. (Watson-UK)
- 10194.0 FC8FEM-FEMA Region 8, Denver, CO, ALE sounding at 0147. (Watson-UK)
- 10195.0 CIP68A-Canadian Forces, calling XJS244, at 0020. (Watson-UK)
- 10201.0 CA2-Chilean Navy, Talcahuano, calling BVG in ALE, at 0025. (Watson-UK)
- 10211.0 RNOUSLR1-Sonatrach (Algerian Oil/Gas) net #1, Rhoudé Nouss, LSB ALE sounding at 0123. (Watson-UK)
- 10235.0 Cuban CW cut number station (M8a), at 0359. (Sevart-KS)
- 10242.0 52A-US Joint Task Force, position for Panther, Bahamas, at 0017. (Cleary-SC)
- 10244.0 HR-Sonatrach net #2, Hassi R'mol, Algeria, ALE sound at 0016. (Watson-UK)
- 10275.0 RNOUSLR1-Sonatrach, Algeria, LSB ALE sounding at 0309. (Watson-UK)
- 10350.0 Oro-Mexican military, calling Omego in ALE, at 0029. (Watson-UK)
- 10400.0 CID-Rockwell-Collins, Cedar Rapids, IA, ALE sound at 2354. (Watson-UK)
- 10480.0 CENTR6-Romanian MFA, Bucharest, calling AND21, ALE at 0541. (Watson-UK)
- 11168.6 KMN94-US Dept of State, FL, calling embassy KRC81, also 13503.6, ALE at 1258. (Perron-MD)
- 11175.0 King 22-US Air Force Rescue C-130, patch to Rescue Ops via Offutt HF-GCS, status report on NJ floods, at 1702. (Cleary-SC)
- Skull 22-US Air Force, patch via Offutt HF-GCS, NE, to Blue Ops, attempting to schedule refueling at 1742. (Sevart-KS)
- Threesome-US military, with a 28-character EAM simulcast on 8992, then "Standing by for traffic," at 2340. (Haverlah-TX)
- 11226.0 OFF-US Air Force, Offutt AFB, working MCC, McClellan AFB, CA, ALE at 1910. (Sevart-KS)
- 11232.0 Canforce 4416-Canadian Forces, patch via Trenton Military to Wing Ops, at 0015. (Cleary-SC)
- Razor 33-US Air Force JSTARS, patches via Trenton to Lumberjack, at 1535 and 1551. (Sevart-KS)
- 11279.0 Gander-Atlantic air control, working Speedbird 177 (British Airways), at 1601. (Sevart-KS)
- 11285.0 SIA 324-Singapore Airlines Boeing 777 (9V-SVD), working Chennai Radio at 1818. UAE 349-Emirates Airlines B-777 (A6-EMP), working Colombo Radio at 1824. (Clifford-UK)
- 11494.0 Hammer-US Customs, CA, clear and secure with unknown aircraft at 0041. (Cleary-SC)
- 11566.0 Cuban AM "Atencion" station (V2a), at 1309. (Sevart-KS)
- 11628.5 V3C-Probable US military, ALE sounding at 1821. Also V3A, V3E, V3F, and WAROPS. (Sevart-KS)
- 12022.0 NARCO-US Joint Task Force, ALE sounding on Skywatch net, at 0817. (Cleary-SC)
- 12216.0 WGY911-FEMA, MA, raising WGY912, VA, on ALE, then no joy on voice, at 1423. (Sevart-KS)
- 12359.0 Southbound II-Herb Hilgenberg, weather net with many small vessels at 2104. (Sevart-KS)
- 12412.5 NOJ-US Coast Guard, AK, FAX weather charts at 1621. (Sevart-KS)
- 125B6.0 UDK2-Murmansk Radio, Russia, working unknown vessel in SITOR-A, at 0834. (Watson-UK)
- 12603.0 "Lincolnshire Poacher"-British numbers (E3), parallel 14487, at 1715. (Sevart-KS)
- 12935.0 HLG-Seoul Radio, Korea, CW marker at 170B. (Sevart-KS)
- 13089.0 NMN-US Coast Guard CAMSLANT, VA, voice synthesized weather at 1741. (Sevart-KS)
- 13101.0 WLO-Mobile Radio, AL, weather and traffic list, parallel 13110 and 13152, at 1714. (Sevart-KS)
- 13221.0 STP-US Coast Guard LORAN Station, St. Paul, AK, ALE sounding at 1917. (Perron-MD)
- 13242.0 MCCNPR-Non-secure Internet Protocol Router node, McClellan AFB, CA, ALE sounding at 1910. (Perron-MD)
- 13257.0 Rescue 342-Canadian Forces, patch via Trenton Military to Rescue Coordination Centre, at 2348. (Cleary-SC)
- 13927.0 Evac 623506-US Air Force KC-135R on a medical mission, patch via AFA1RE, US Air Force MARS, ME, at 2352. Goose 72, patch via AFA1RE to Sandcastle Ops regarding refueling, at 2357. (Cleary-SC)
- 14357.0 002NHQCAP-US Civil Air Patrol, calling 022NHQCAP, National Operations Center, AL, also 17412, ALE at 1655. (Perron-MD)
- 15016.0 Meredith-US military, with a 45-character EAM simulcast on 8992 and 11175, then "Standing by for traffic" at 1843. (Haverlah-TX)
- Ranger 71-US Marine Corps, patch via Ascension HF-GCS to Ft. Worth Base Ops, at 2124. (Cleary-SC)
- 15082.0 NOJ-US Coast Guard, Kodiak, AK, calling aircraft 708, also 13221, ALE at 2157. (Perron-MD)
- 15094.0 NCS009-National Communications System, ALE sounding at 1451. (Perron-MD)
- 15867.0 D70-US Customs, clear and secure with CNT at 1901. (Sevart-KS)
- 16144.5 PNR400-Panther 400, DEA, Bahamas, also on 8065, 12022; and 14761.5, ALE sounding at 2336. (Perron-MD)
- 16278.7 Unid-Algerian Embassy, Kuwait, Arabic traffic in Co8-8 at 1445. Algerian Embassy, Conakry, Ghana, working Algiers in Coq-8 at 1700. (Watson-UK)
- 16305.7 Unid-French Forces, N'djamena, Chad, ARQ idler at 1002. (Watson-UK)
- 16324.7 Unid-French Forces, Cayenne, French Guiana, ARQ idler at 1342. (Watson-UK)
- 16475.0 "Lincolnshire Poacher"-British numbers (E3), at 1702. (Sevart-KS)
- 16811.5 A9M-Bahrain Radio, SITOR-A marker at 1500. (Watson-UK)
- 16818.5 EKA-Yerevan Radio, Armenia, SITOR-B info and traffic list, at 1600. (Watson-UK)
- 17487.0 NIFCF51-National Interagency Fire Center, Boise, ID, ALE sounding at 1547. (Perron-MD)
- 18248.6 KWK95-US State Department, calling KWK96, also 20810, ALE at 1653. (Perron-MD)
- 18314.0 HDH-Unknown, calling 460FEMAUX, probably FEMA at Louisiana State EOC, ALE at 1709. (Perron-MD)
- 20810.6 KWL92-US State Department, ALE call to KMN94, FL, then calling "Kilo Mike November 94" in voice, at 1422. (Perron-MD)

Voice Frequency Telegraphy Reprise

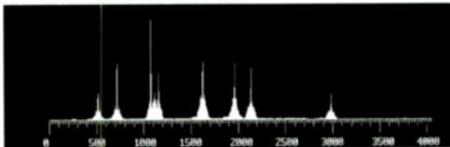
Back in our April column, we showed how the Voice Frequency Telegraphy (VFT) technique can be used to solve a number of challenges commonly experienced in HF digital communications.

Using VFT we can pack many channels into the bandwidth occupied by a single 3kHz voice channel and use it to send more data, send data with fewer errors, or send multiple independent channels of information all over the same transmitter.

❖ More VFT Configurations

In that introductory article, we took a look at a number of common VFT configurations still on the air, most of them using equally spaced channels of identical information. For example, the British Military Piccolo-6 VFT uses 400Hz channel spacing, and the BR6028 will show equally spaced 75bd/170Hz shift Baudot or KG84 encrypted RTTY channels.

As you might expect, though, rules are there to be broken, and a number of organizations use VFTs with rather distinctive and unusual configurations. You can still hear just such an example from the British Royal Navy. They use a very different kind of configuration which actually has some channels straddling others – or more accurately, have tones appearing on what one would expect to be channel centers. In many cases, the configuration is something like the following:



Most often, channel 1 sends encrypted data, while channel 2 sends a CARB or Channel Availability Broadcast (see *Digital Digest* March 2005). You can hear an example of this VFT on 12935 and 12919 kHz, sent from the transmitter complex near the Akrotiri Sovereign Base on Cyprus.

Chan	Mark	Center	Space	Traffic
1	500	600	700	75bd/200 CARB
2	1070	1105	1145	75bd/75 Hz encrypt.
3	1615	1785	1955	75bd/340 Hz encrypt.
4	2125	2550	2975	75bd/850 Hz encrypt.

❖ Now Leave Some Channels Out

Listening to the Royal Navy VFT for some time will also point out another common feature of VFTs: Sometimes various channels are switched off, leaving the others intact. These signals can be very confusing when they are first encountered by new listeners, since the lack of regularly spaced channels or lack of signals in the usual places can leave one wondering whether the signal is a VFT or just closely-spaced independent transmissions.

For example, there are quite often a number of 75bd/85Hz encrypted signals appearing either singly, as a pair, or all three at one time on 5111.71, 5112.91 and 5113.09kHz. These are likely Royal Navy signals, too.

Without a good knowledge of VFTs, when they run with just a single channel it would be easy to assume that the signal is just a single independent channel, rather than a VFT with some channels off-air. So, watch out for these VFT oddities in your travels around the bands.

❖ Spanish Police Back on HF

As we've documented several times through this column, longtime users of HF sometimes disappear, only to reappear years later using different equipment, but often preserving their operating practices and sometimes their frequencies, too.

This is the case with the Spanish Police (Guardia Civil) which during the '80s and early '90s operated an extensive SITOR-A based network to communicate between Madrid, other mainland HQs, and remote outposts on the Canary Islands and in the North African protectorates of Ceuta and Melilla.

Having taken a breather for a few years, reports have been coming in steadily of MIL-188-141A ALE (Automatic Link Establishment) being used to connect these stations, although the network does not appear to be as extensive as before. The same four-letter SITOR-A selcalls beginning with "TW", "TY", "TX" and "TZ" are being used as ALE identifiers. The ALE appears to trigger both regular voice and data traffic using the popular 2400bd MIL-188-110A serial tone HF modem.

Frequencies to check (kHz USB):
3266 3533 4561 5007 5286 5352 5379
5871 6935 6955 8151 9178 10182
10209

Some stations appearing in the network:

TWBA	Barcelona
TWLA	Vitoria
TWLC	Santander
TWLN	Pamplona
TXXX	HQ Madrid (also uses TXX1 and TXX2)
TZSA	Almeria
TZSM	Malaga
TZSO	Cordoba
TZSU	Ceuta

You can also check the profile of the former SITOR-based network on Utility Monitoring Central (see Resources).

❖ French Diplomatic Activity

Just before we leave you for this month, we wanted to put a quick word in for MFA Paris. The French diplomats are still active daily using their old 192bd/400Hz shift FEC-A equipment on 18757 kHz. This channel spends a lot of time receiving traffic from embassies like Rio de Janeiro, which uses the fictitious callsign S5F. Paris answers using callsign P6Z for civilian traffic and RFGW to reach the military attaches. Here's the typical call-up:

```
s5f de p6z
qtc 13 et je te qap sur la 31 dim 8
qtc 13 et je te qap sur la 31 dim 8
qtc 13 et je te qap sur la 31 dim 8
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Meanwhile, the newer French ALE network continues to grow on the following frequencies (kHz USB):

6900, 7668, 7740, 9052, 9124, 10187, 10825, 12170, 12200, 13513, 14671, 15921, 16136, 16320, 17477, 18307, 18396, 19233, 19636, 19988, 20055, 20616, 20794, 25055, 25301, 26301

On these frequencies you will find Paris using the identifier CER11 and CER41, along with many African and Middle Eastern embassies using the city name as identifier, like AMMAN, ABUDHABI and CONAKRY.

You can read more about the old and new network at UMC (see Resources).

That's it for this month. Happy digital DX-ing.

Resources at Utility Monitoring Central

Spanish Police Profile:
<http://www.chace-ortiz.org/moi/Spain.txt>
French Diplomatic Service:
<http://www.chace-ortiz.org/mfatext/France.txt>

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Voice of Indonesia – Opportunities Lost

VOI puts a good reliable signal into Central North America on 9525 in our mornings. The Indonesian hour at 1300 has some great music, and usually one English ID between 1315 and 1320, referring to <http://www.rri-online.com>. And get this: the carrier stays on after closing at 1400, silent past 1500, and presumably until 1600 when external service programming resumes. On occasion, modulation ceases before 1400. This waste of watts may be to keep the transmitter dehumidified in the tropics.

But why not modulate it, too? What a shame that VOI's English hours are only scheduled at three other times when they are difficult or inconvenient to hear in North America, 0200, 0800 and 2000 UT.

According to the Nagoya DX Circle, the azimuth on 9525 until 1400 is 30°, favorable for NAm, while after 1800 it is 315° for Europe.

However, Mick Delmage in Alberta notes 9525 is also audible at 1900 in German, 2000 in English; Wolfgang Büschel, Germany, and Zacharias Liangas, Greece, also hear 15150 before 1400 and after 1800, not just one or the other as had been the case (actually 15149.8, says Scott Barbour, NH, hearing English fair-poor at 2000), but it's no good in Oklahoma, especially with WYFR on 15155. If local noise permits, 9525 can be poorly audible at 2000.

The RRI website has a letters page with people posting incomplete reception reports, complains Mick Delmage. It's really weird – many are dated later in 2005! Some are totally off-topic, such as Monique

wanting someone to take responsibility for her pregnancy! I sent a message about running English in our mornings. Chuck Bolland also wrote voi@rri-online.com saying he wished 9525 were in English when he listens at 1000-1100, though that would be too early for most of us.

WEB REFERENCES

WRTH Summer Schedules, 94 pages of pdf, free even if you haven't bought the book (but you really should): <http://www.wrth.com>

Current SW Schedules By Language: <http://www.addx.de/Hfp-dat/plaene.php>

Domestic Broadcasting Survey 7: frequency list of active SW stations with domestic programming, also clandestines, may be purchased on paper or online via <http://www.dswci.org/dbs>

DRM Schedules: Three different versions: Sort in six different ways: <http://baseportal.com/baseportal/drmdx/main>

By time:

http://www2.rnw.nl/rnw/en/features/media/dossiers/drm_schedule.html

By frequency: <http://www.hfcc.org/data/A05drm.html>

Obituary for DXers: a new page keeping track of DXers and other radio personalities who have left us: <http://www.schoechi.de/obituary.html>

AFGHANISTAN Taliban has launched a mobile clandestine radio station with anti-US and anti-government propaganda, Islamic hymns, called "Shariat Shagh", or Voice of Shariat. Can be heard in the Kandahar area, on AM, FM and SW (Afghan Islamic Press Agency, London Daily Telegraph via Mike Terry, Andy Sennitt) Several weeks later, no SW frequency had been detected (gh)

ALASKA The two-transmitter schedule from KNLS did not go into effect until May 1. Unfortunately the new English broadcast at 1400 on 9795 collided with France via Japan in Vietnamese. It's bad here and bound to be much worse in the Asian target areas; per HFCC coordination, the only official overlap is in SE China where neither language is primary. Perhaps it's changed by now. Photos of the new installation may be still at <http://worldchristian.org/index.pl/latestnews> which also says a third transmitter could be added.

KNLS doubled its broadcast hours from 10 to 20 per day by adding the second transmitter. Why didn't they use the other 14 hours per day on the first transmitter? The prime-time concept (in Asia) rules. You'd think services in the local mornings would be useful. But this still leaves two transmitters otherwise idle between 1800 and 0800 UT – suspect KNLS if you hear some clandestine or Radio Free Asia broadcast on a new frequency you can't correlate with some other site (gh)

ANGOLA Site about the history of radio here: <http://angolaradio.amin-haradio.com> (Henrik Klemetz, Sweden, radioescutas) In Portuguese, loads of old photos, from colonial era, historic WRTH entries for each station (gh)

ANTARCTICA [and non] A month after last month's lead story was written, nothing had been done to resolve the collision between Voz Cristã, Chile, on 15475 and LRA-36, Base Esperanza, on 15476 at 1800-2100. VC was apparently expecting LRA-36 to file an official complaint, and even to confirm that they were actually in Antarctica rather than Argentina (which should be obvious); LRA-36 passed the buck to Radio Nacional in Buenos Aires to handle the matter, while hoping for a power increase, according to a message from the station to Manuel Méndez, Spain. But that would have done little to alleviate the situation. LRA-36 also has a total staff turnover every year, and to make matters worse, VC heard that its present manager was away on medical leave.

*All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; A-05=summer season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated*

However, the facts were clear and the solution even more so, not requiring any action from the Argentine or Antarctic side. VC should simply move to another frequency. Let's hope they finally have by the time you read this. Meanwhile VC kept making excuses on its Portuguese DX program, claiming they were not even aware LRA-36 existed until they started to get complaints from listeners around the world. We could sometimes hear that intriguing carrier on 15476, heterodyning the incomparably stranger signal on 15475 from Santiago (gh) At 2015, LRA-36 was suffering terrible interference from VC (Licciardi, Argentina, Conexión Digital)

ARGENTINA The story is much happier about the other collision we mentioned last month. On May 9, HCJB was ready to move off 11710, clearing that for RAE and Radio Nacional. Thanks to Doug Weber, HCJB went to 12000 at 2100-2300, and 11720 at 2300-0100. Unlike VC, HCJB was willing to resolve this without expecting an official complaint from Argentina, which may never have made it through the bureaucracy. We assume RAE is now heard much better in South America, although its off-frequency 11710.9 still produces a het with something else here, perhaps equally weak China during those hours (gh, OK)

Two X-band stations are putting out third harmonics above 5 MHz; one on 1670 and 5010.2 was heard at the Chascomus DX camp with nonstop music 24 hours; and AM 1710, Buenos Aires, which is really on 1700, was also heard at 1040-1100 on 5100 with romantic music; see <http://www.am1710.com.ar> (Arnaldo Slaen, Argentina, Noticias DX)

AUSTRALIA ARDS, Humpty Doo, very big signal on 5050 at 2010 with Koori music, lengthy ID and details, over Tanzania, until ARDS faded out and Tanzania in (Jem Cullen, Australia, Australian DX News) Had been inactive for about a year, but no reports from abroad. Indeed, ARDS is hostile to DX reports, since being heard outside its intended Arnhem Land coverage area reflects badly upon it! (gh)

BELARUS R. Belarus in English heard on a UT Saturday at 0200-0230, but Sunday at 0230-0300, poor-fair on 5970, weak on 7210 (Brian Alexander, PA, DX Listening Digest)

BHUTAN BBS changed its transmitting policy in 1999. So by the end of 2006 the whole country will be served by FM, and the SW transmitter will be phased out (Wilfried Solbach, Asia-Pacific Institute for Broadcasting Development, AIB Channel)

BOLIVIA Unheard for some time, R. Illimani is back on 6025, weak to very weak here, best

after 2300 when Budapest closes (Manuel Méndez, Spain, DXLD)

New Bolivian in late April at 0035 on 4498.12, ID as Radio Estambul [as in Turkey], on "4496" with Guayamerin, Beni Dept (Björn Malm, Ecuador, DXLD) Rather weak with local music at 1006 (Samuel Cassio, SP, Brasil, @atividade DX) Also heard by Gert Nilsson in Sweden signing off at 0207 to return at 0900. Apparently operated by someone named Yamal, who could be Turkish or Middle-Eastern (Henrik Klemetz, dxing.info)

In the month following last month's item, R. Virgen de Remedios, Tupiza, was widely reported, varying as high as 9235 (gh) The station itself clearly thinks it is testing on 3993 kHz '90 m band', as stated in their letter to me, saying it is licensed (Jan Edh, Sweden, DSWCI DX Window)

BRAZIL Rádio Guarujá Paulista replaced 5930 with 5940 (Rudolf Grimm) Heard around 0630 on 3235, 3385, 5045 and 5940 (Célio Romais, Panorama, both @atividade DX)

CANADA [and non] The CBC NQ SW Service, on its only frequency 9625, gets QRM from another SW station on the same continent, WYFR, between 1045 and 1245. HFCC doesn't see this as a collision, since CBC is for Northern Quebec, and WYFR is for Brasil, but in reality, WYFR puts plenty of signal toward the north, and has that low-latitude advantage. On a good day, CBCNQ is uncovered here when WYFR closes. After a 75-minute window, CBC is then hit by R. Australia on 9625 at 1400-1600. Since this is beamed WNW from Darwin, you'd think that would not be a problem in Central NAM - until you turn on a radio and try to hear CBC with RA instead dominating. Since no one else is beaming to the eastern half of Canada, CBC does not get any protection down south. Only on weekends is CBC in English during these morning hours (gh)

RCL at 1200-1500 weekdays, 1300-1600 weekends, is normally synchronized on 9515, 13655, 17800, but one morning we noticed 13655 running about two seconds behind the others. Wonder why? (gh)

CHINA [non] Established in the U.S., the Sound of Hope Radio Network is a news-and-entertainment broadcast service offering a unique and broad perspective on Chinese culture and its people. With local radio programs in more than 30 cities and a rich pool of webradio news and programs on demand, SOH has been able to reach millions of Chinese people in Europe, North America, Australia and some Asian countries. SOH also produces weekly English, French and Spanish programs; and 4 hours daily on SW to mainland China: 2200-2300 on 9635, 2300-2400 on 7310, 1300-1400 on 7310, 1600-1700 on 11765. See <http://www.sound-of-hope.net> (emediawire.com press release via Andy Sennitt, DXLD) Is anti-communist clandestine, Xiwang Zhi Sheng Guiji Guanpodientai, QSL card for SW reports to: 9ping@soundofhope.org (Takahito Akabayashi, Japan, DXLD) 11765, *1555-1615, nice Chinese music and singing, very strong jamming (drums and gongs) (Ron Howard, CA, DXLD)

COLOMBIA Ondas del Ortopuquio, Florencia, heard early in the morning on 3479.51, 3 x listed 1160 (Björn Malm, Ecuador, DXLD)

CUBA RHC blew away its scheduled Guarani on 17705, Portuguese on 15230, English on 9550, so at least ten instead of seven Spanish frequencies could carry a long-winded, non-Fidel speech at 2330 April 29 (gh) Still going at 0136 on 17705; it was Venezuelan Pres. Chávez speaking at the Karl Marx Theater in Habana (Adán González, DXLD) At least 11 SW transmitters can be deployed at any given time (counting Rebelde on 5025). (Terry L. Krueger, FL, *ibid.*)

Not officially scheduled, but R. Reloj can often be heard after 0700 on RHC's 6060 or 6000. RR has a national MW network 24/7 with ticks every second, time checks every minute and nothing but news in between with live announcers. The minute at hourtops gives the time in cities around the world, also streaming at <http://www.radioreloj.cu> (Tony Mendez, FL, DXLD) With Morse code "RR" IDs (gh) Recording from 6 MHz: <http://www.vincewerber.org/swl/radio-reloj-cuba.mp3> (Vince Werber, KA11IC, *ibid.*)

ECUADOR The new airport will be closer to our Pifo transmitter site than we thought, which lowers the ceiling below which we have to keep our towers. There was some hope we might be able to keep operating from Pifo after lowering some towers, but this is no longer an option. The previously planned coastal site was too far from our hydroelectric plant to be cost-effective, so we are looking for another site closer to Quito (Ralph Kurtenbach, HCJB, on VOA Talk to America) There were to be obstacle studies and RF studies of the Pifo transmitter site's impact on the new Quito airport, but the obstacle studies are such that we probably won't go on to the RF studies. Another option is to rent time from other stations. When you reach a certain (smaller) size, it makes sense to rent time elsewhere with lower overhead costs (Doug Weber, HCJB DX Partyline) See ARGENTINA

At first unID on 4560.06 at 1130, nonstop Ecuadorian music; at 0000 ID as R. La Voz de Naranjal, in Naranjal, so 3 x 1520.02 (Björn Malm, Quito, DXLD)

EGYPT R. Cairo's new 11885 in English to North America at 2300-2430 remained in the clear but very low modulation. I could hardly believe my S-meter that it was about equal to Cuba on 11875, which if anything was overmodulated and much, much louder. Cairo's other broadcast at 0200-0330 remained on 7260, subject to justifiable ham QRM (gh)

ERITREA [non] V. of Democratic Alliance, from a new opposition coalition, began a SW service April 21, 1500-1600 on 7165 and 9560 in four languages (Nharinet.com via Clandestine Radio Watch) Those are longtime frequencies of neighboring R. Ethiopia (gh) Lots of adjacent interference on 9560.1 from 1456, and very weak carrier on 7165.1, difficult to ID (Finn Krone, Denmark, BCDX)

GAMBIA [non] Another tyranny gets an opposition SW service. US-based Save the Gambia Democracy Project carried out a 3-day test in late

April at 2000-2015 on 9430. The group brought the fragmented opposition together under the National Alliance for Democracy and Development (NADD) and means to send a signal to the regime of former Sergeant Yahya Jemmah that the upcoming elections in October 2006 will be no cakewalk. See <http://www.sunugambia.com> (Nick Grace C., CRW) The tests were reported by Steve Lare, MI, Scott Barbour, NH, Jari Savolainen, Finland, in English and Wollof, and on the third day by Zacharias Liangas, Greece, and Christian Ghiboudo, France, including some French segments (since Gambia is surrounded by Senegal) (DXLD)

Site was Jülich, Germany (Observer, Bulgaria) Then decided to have a weekly half hour in English, Wollof and Mandinka (Nick Grace, CRW, Björn Fransson, Sweden, DXLD) Starting June 4, Saturdays 2000-2030 on 100 kW, 9405 instead, via Germany, brokered by R. Miami International, called Voices from the Diaspora (Jeff White, DXLD)

HUNGARY Contrary to all other references, the R. Budapest website shows 9560 for the 0100-0130 English to North America on UT Sundays, and 9590 the other six days. This makes no sense, with VOA Spanish on 9560 at that time - plus Cuban jamming, and we have been unable to confirm it (gh)

INDIA AIR Thiruvananthapuram has drawn complaints from Indian hams such as VU3MGU about spurs from its 7290 transmitter in the 40m hamband, on 7002, 7026, 7050, 7074, 7098, as well as 7121, 7314, 7362 on the other side, but nothing was done as AIR claimed not to be emitting harmonics (newindpress.com via Mike Terry, DXLD) These are not harmonics but spurs, plus and minus multiples of 24 kHz from 7290, a common problem with malfunctioning transmitters. doesn't AIR realize this? (gh)

INTERNATIONAL WATERS Coalition Maritime Radio One now broadcasts primarily on 6125 and 9133, and soon again on 15500. Can you receive us? (Matthew Wilson, CWO, USN, via Jan Edh, Sweden, dxing.info) Mostly Mideast and Indian music on 9133-USB, 1700-1830+, IDs in several languages including English (Stefan Björn, Sweden, *ibid.*) Believed to be low power, aboard ships near Bahrain, with anti-terrorism announcements in some seven languages; don't confuse with Salaam Watandaar, high power on 15500 to Afghanistan (gh)

IRAN V. of Justice, 9495, *0130-0230 good in English, also // 11875 very weak under Cuba except one occasion when Cuba was missing; also varied to 9495.51. One- or two-second time delay between frequencies (Brian Alexander, PA, DXLD) Per Eibi A-05, 9495 is Kamalabad site, 11875 is Sirjan (gh)

ISRAEL Kol Israel moved to 11590 for 1900-1925 English replacing 11605 which collided with Sweden // 15615, 15640 (Edwin Southwell, UK, World DX Club Contact) 15640 best here by far. DW also on 11605 at 1800-1900, so KI moved to 11590 for all languages between 1545 and 2000. Remember, June 30 is another possible SW closedown date if not revived (gh)

ITALY Radio Mi Amigo, via IRRS, 15725, shifted earlier to avoid interference, to Sat 0700-1400 (Ron Norton, NEXUS-IBA via Noticias DX) See also WESTERN SAHARA [non]

KUWAIT A fourth IBB SW transmitter here should be on air by August. It will be one of the deactivated units moved from Germany. It is hoped to refurbish an existing IBB antenna for tropical band use to Afghanistan; if not, present appropriations would not cover the \$800,000 cost for a new one (Aaron Zawitzky, DXLD)

MÉXICO The sad story of what has become of XERMX installations in a 25-slide show: <http://mx.photos.yahoo.com/systemadm/> (Roberto E. Gomez Morales, Noticias DX)

NEW ZEALAND Have a blast with Wayne's Music on RNZI, 15720, M-F 0106-0200; one week from the 1920s and 1930s, very listenable, sound-quality excellent. I really like this show and this station! (Lawrence H. Bulk, NJ, NASWA Flashsheef) And the following hour is more talk with Wayne Mowat, In Touch with New Zealand (gh) But 15720 was off the air when I tried to hear it (Mick Delmage, AB) RNZI goes off for monthly maintenance about 4-5 hours, usually on Thursdays between 2230 and 0500, sometimes on Fridays. But this time they were off until 0745. Expect more such outages as the new DRM transmitter is being installed. Full service expected to start next January. See <http://www.rnzi.com/pages/technical.php> (Mark Nicholls, NZ DX Times)

OMAN R. Oman is no longer heard in English at 0300 or 1400 (Dave Kenny, BDXC-UK Broadcasts in English) Contrary to SW Guide and other listings (gh) The Thumroyt transmitter was reactivated last year for a short time only, and this was when 15140 was again heard to carry English. But then it went off again and English is no longer heard at all. The Seeb transmitter appears to be operating as previously, best here on 13640, 0600-1400, only in Arabic (Noel R. Green [NW England], DXLD) According to a reply from R. Oman in January the full schedule including English from Thumrait between 1500-1600 [sic] on 15140 should be re-implemented "soon," but apparently they are facing technical troubles to keep both transmitters going with full schedule. Modulation transformer had been sent for repair and the transmitter was expected to be on air by end of May (Mauno Ritola, Finland, *ibid.*)

PAPUA NEW GUINEA Check 7120 around North American sunrise in case Wantok Radio Light met its target date of June 11 for regular service on its previously planned frequency, as predicted in our May column. A progress report was published April 29 detailing how the project was going, in partnership with HCJB, but never mentioned the frequency, just "tropical band" which this is not! Six 60-foot poles have been erected to hold up an otherwise unspecified "special antenna." Notice that most other PNG stations use 3-5 MHz for close-in coverage. Will 7120 try NVIS? Also see the illustrations, pdf and doc files via <http://www.MissionaryRadio.info> (gh)

PARAGUAY R. Nacional has been more active on 9736.9v, 0215-0330+,

Shortwave Broadcasting

sometimes music, or play-by-play sparts, but lots of adjacent interference (Brian Alexander, PA, DXLD) English ID at 0800; also heard well through the night here from 2156 to 0200 with fútbol, or Paraguayan music; 0101 ID actually giving frequency as 9737 (Manuel Méndez, Spoin, *ibid.*) Finally cut off at 0358; need a notch and USB or LSB to copy it (Walt Salmaniv, BC, *ibid.*)

PERÚ LV de Chiriaco – actually ID as R. Chiriaco – in Chiriaco, Imaza, Provincia Bagua, reactivated Sunday morning May 1 on 5264.96, heard as late as 1200 with religious music, then Peruvian folklore (Björn Malm, Ecuador, DXLD)

ROMANIA Something's missing in the contests run by RRI: you may win a visit to Ramania, but not including airfare to and from the country. Is that too much to ask? (Adán González, Venezuela, DXLD)

RRI A-05 English:

0100-0156	6040	9690	11820	15430
0400-0456	9780	11820	15140	17860
0630-0656	9655	11830		
1300-1356	11830	15105		
1800-1856	9635	11830		
2130-2156	7165	9535	9645	11940
2300-2356	6140	7265	9645	11940

(Observer, Bulgaria)

RUSSIA R. Station Tikhly Okean is alive again since 17 April, 0835-0900 on 12065 to the maritime area (Igor Ashikhmin and Raman Nazarov, Primorskoy Kray, Russia, Open DX via Signal) Also an Primorye Radio [a.k.a. "Radio 810"] in Vladivostok and streamed in stereo via <http://www.ptr-vlad.ru/tv&radio/listen/> Also new and old clips of R. Station Pacific Ocean at <http://www.intervalsignalsonline.com> (Dave Kernick, DXLD)

SOLOMON ISLANDS SIBC Honiara are using half power on 5020, running just 6 kW. Coverage of outer provinces is reported to be unaffected. Money saving exercise because of high costs of fuel (David Ricquish, Radio Heritage Foundation, <http://www.radioheritage.net> via HCDX)

SPAIN [nan] REE Lenguas Ca-Oficiales monitored in different order than given last month, M-F: Best on 15170 via Costa Rica, Bosque was first at 1242, notably incomprehensible except for the occasional Spanish name; 1248 went to Gallega (the double-L is pronounced like a single-L), and 1253-1258 Catalan. From May the signal in English at 0000 on 15385 become generally reliable, unlike April (gh)

SYRIA R. Damascus confirms that new 9330 has replaced 13610 for all external services, // 12085 (Rubén Guillermo Margenet, Argentina, World of Radio) The two English broadcasts, 2005-2210 heard on both here, but only announcing 12085. On another occasion only 13610 announced, not heard (Erik Kæie, Denmark, DXLD) Your clip said targets were Australia, New Zealand, Japan, on 12085. Program previews included: UT Wed 2140 Listeners Overseas (gh) The only Spanish broadcast, 2315-2430 for Americas, is too late for us in Spain (Vicent Mari, Valencia, Noticias DX) We could move it an hour earlier; what do you think? (Riad Sharaf Al-Din, R. Damascus, via Mari, *ibid.*)

UK The BBC has chosen former Sunday Times editor Sir Harold Evans to take over its Radio 4 [and BBCWS?!] slot vacated by the late Alistair Cooke. However, the deal had not been finalized nor a date fixed for him to start. Sir Harold would ruminate on life in New York, in particular, and the US in general. Lancashire-born Sir Harold, one half of a celebrated New York power couple with wife, Tina Brown, has received widespread praise for a series of books on recent US history (Guardian via Day Say)

USA Highly recommended reading about the atmosphere at VOA and the Radio Sawa issue: *The New Wave – The Voice Of America Is Being Drawn Out By A Mix Of Pop-Flavored Propaganda. What Should America Sound Like?* By Corey Pein, in the May-June issue of *Columbia Journalism Review*: <http://www.cjr.org/issues/2005/3/peinVOA.asp> (gh)

I served 32 years inside the bowels of the federal government, last 16 at Voice of America. At least at the transmission end, the US government has been very inefficient and wasteful of money. The old continental US VOA plants were owned and staffed by Crosley (WLWO, Bethany), CBS (KCBR, Delano), [NBC] and some others. Coming into VOA long after the privately-owned transmitter plants were federalized, I'd have to say they did the job efficiently and with the proper increase in contract cost to make a profit and still would have beat the government at doing it well. The lore of the old KCBR still figures big around the Delano Transmitting Station in terms of photos of that era, in records kept, and stories told of the personnel (all the original personnel were "federalized" and also have passed away or retired). As an alumnus of Greenville who served at Delano for two years, I cannot possibly deny that the old networks did the job much more efficiently than the Federal government (Charles A. Taylor, NC, IRCA)

Contrary to item last month, the new logo of RFE/RL of a Torch Afflame does not replace the Liberty Bell, but the Freedom Bell, a 10-ton bell especially made in the British foundry Gillett and Johnston and decorated with a frieze of five figures representing the five races [sic] of mankind passing the torch of freedom. It arrived in New York in 1949 and traveled to 21 cities in the United States as part of the "Crusade for Freedom" drive to raise money to found and promote Radio Free Europe. More than 16 million Americans responded with contributions and RFE and its bell logo were born. Instead of the five figures, the RFE bell logo had a vertical divide into a darker and lighter side, generally interpreted as the divide between the democratic West and the communist East. But for many years now, Europe has been whole and almost free and both the dividing line and the

bell have lost their meaning. The original Freedom Bell was permanently installed in West Berlin in 1950. Few people today know where it is, why it is there, and what it represents (RFE/RL website via Alan Roe, World DX Club Contact) But mainly funded covertly by CIA (gh)

Warning: potential new hate radio program. The stormfront.org website of the National Socialist Movement talks about negotiating with two US SW stations for airtime to broadcast a weekly one-hour program (Andy Sennitt, DXLD) Now which two US SW stations would even consider broadcasting such vile Nazi tripe? (gh)

For many years, Brother Stair was 24/7 on the #4 transmitter of WWCR, plus several hours duplicated on two other transmitters. Last year some of the #4 hours went to other preachers, and now WWCR-4 has cut B.S. back to 9 hours, weekdays only, according to the May schedule (gh) We have so much demand for airtime from ministries using other stations which have no audience, that we could fill up two more transmitters; for now, WWCR-4 will be taking on lots of new programs instead of Stair (George McClintock, WWCR) No doubt Stair was getting a big discount, but WWCR could charge more by breaking up the hours among different clients. Stair said he understood that this was a necessary business decision, though the programming replacing him was inferior, and anyway, his WWCR broadcasts were not getting the necessary financial support from listeners (gh) For 48 hours straight on weekends, #4 was supposed to go to Pastor Pete Peters' *Scriptures for America* (John Norfolk, DXLD) But Stair was still on there instead as of mid-May. Meanwhile, his website produced a sexy new display of his SW schedule at <http://www.overcomerministry.org/SW/> Trouble is, it's totally useless, with the WWCR schedule all wrong, and still showing WRMI on defunct 6870. You can pick any specific date into 2006 to display his imaginary schedule, so, whew, the Last Days are not quite here yet (gh)

KVOH's transmitter had been stuck on 17775 for a long time, but in early May actually heard on its other registered frequency, 9975 at 0136. WRTH shows that scheduled 0100-0300 only, though it's available 0100-0800 and 1300-1500. Usual distorted audio, screaming preachers in Spanish. 17775 still periodically puts out multiple spurs (gh)

Unidentified on 3750 at 1200 in the MDT zone with ABC news, *Daybreak USA*, 3 x 1250? (Don Maman, Alberta, HCDX) Could also be 5 x 750; most likely KOAL, Price UT (gh) Google does associate KOAL with *Daybreak USA*. Nigel Pimblett, AB, also thinks it's KOAL since he got this reply from them: (Moman, DXLD) We took a lightning hit that took out a lot of our antenna network system. While repairing the damage we operated directly into our second tower which was probably what caused the harmonic (KOAL via Pimblett via Moman, *ibid.*) Nice! 5x harmonics are not that common outside of Cuba. KOAL is also running IBOC. I wonder how that gets out on the harmonic? (gh)

VATICAN How much do you know about VR's charming little interval signal? As the WRTH used to show, the theme is part of the hymn *Christus Vincit*, meaning "Christ Wins", followed by *Christus Regnet*, *Christus Imperat* – "Christ Rules, Christ Reigns". It is probably the nearest the Holy See has to a national anthem, and is always used at enthronements and many other high religious occasions. The tune is described in many hymnals as "traditional chant", but according to one website – <http://romaaeterna.web.infoseek.co.jp/jpch/ch625.html> its authorship is claimed by a Czech, Jan Kunc, and dates from 1933. Whether this is true, like many concerns of the Church, has to be a matter of personal belief, but it is still a very memorable tune (Mark Savage, BDXC-UK Communication)

WESTERN SAHARA [non] Radio for Peace in English/Arabic/Spanish via IRRS Italy: 0600-0700 Sat on 15725, ex 1100-1200 Fri on 15665 (Observer, Bulgaria) IRRS press release said it was testing this with news in English Sat 0600, then 0630-0700 RFP in Spanish and Arabic, then R. Mi Amigo to 1400 [see ITALY]. IRRS also testing RFP at the beginning of May Sun 0800-0830 on 13840 20 kW, 1900-1930 on 5775 100 kW [so presumably Bulgaria then], Mon 2100-2130 on 5775 20 kW (via Noticias DX) But unknown if any of these continue (gh)

ZIMBABWE R. Zimbabwe, Gweru, 6045 channel is meant to be used 24 hours a day, but lately somewhat irregular and weaker. When 6045 is off, I cannot find any other Zimbabwean channel (Vaclav Korinek, RSA, DSWCI DX Window) Heard 6045 at 0050-0257, mostly non-stop Afropop, very few announcements in Vernacular, from *0257 covered by RFI, Issoudun on 6045 (Ron Howard, CA and Anker Petersen, Denmark, *ibid.*) 6045 is meant to be 24 hours in Ndebele & Shona. Daytime reception here in Zimbabwe is irregular with audio breaking up. Nighttime is extremely weak or off air. 3306 is inactive (David Pringle-Wood, Harare, DXLD)

In a move to control the flow of information in and out of Zimbabwe, Robert Mugabe's beleaguered government has acquired sophisticated phone-tapping, radio jamming and internet-monitoring equipment from communist hardliners in China. First to suffer is a popular UK-based shortwave radio station that sends out anti-Mugabe stories to Zimbabwe seven days a week.

SW Radio Africa has been experiencing jamming problems from transmitters in the Zimbabwean Midlands. Station founder Gerry Jackson picked up the International Press Institute's Free Media Pioneer Award for courageous journalism. "Mugabe will do anything to stop the truth being heard in Zimbabwe," she says. Hi-tech bugging includes updated versions of pirated Israeli-made equipment which enters Zimbabwe through Cuba. It's a copy of the sophisticated equipment Mossad uses to spy on Palestinians (Trevor Grundy, Scotsman, via Bruce Weiss, Alokesh Gupta)

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

0000 UTC on 13760

NORTH KOREA: Voice of Korea. Spanish sign-on and national anthem "Aqui la Voz de Korea," seventeen minute news and editorial on the working class in Korea. (Fernando Garcia, Baltimore, MD) 11545 English 1606-1618+ // 9990. (Harold Frodge, Midland, MI) 6398.9, 1124-1141. Korean text about America to anthem music; 9335, 1332-1352. **KCBS-Kanggye** 11680, 1410-1423. (Scott Barbour, Intervale, NH)

0004 UTC on 6857

PIRATE: The Crystal Ship. Foghorn interval signal to classic music tunes from the Doors. Additional loggings at 0031-0110 with ID as "you are tuned to the Crystal Ship, plundering the airwaves." QSL maildrop from announcer The Poet. Fair-good signal. **Undercover Radio** 6925, 0057-0117*. **WMPR** 6955, 0047-0055*. (Joe Wood, Greenback, TN)

0100 UTC on 7115

SERBIA & MONTENEGRO: International Radio. Serbo-Croatian for international service. Presumed newscast to Balkan-flavored pop music. Co-channel interference from Radio Cairo's Arabic service. (Stokes Schwartz, Bloomington, IL)

0220 UTC on 11700

BULGARIA: Radio. News on European Union Confederation followed by music program and identification at 0223. (Wood, TN) 7500, 1845 // 5800. (Bob Fraser, Belfast, ME)

0300 UTC on 3345

SOUTH AFRICA: Channel Africa. Interval signal and national anthem to ID and freq quote. Eight minute news to reports from Kenya and Zimbabwe. (Garcia, MD) South Africa's **Radio Sondergrense** 3320, 0348-0356 Afrikaans. (Wood, TN) South Africa's **TWR-Africa** 11640 at 0600. (Garcia, MD)

0300 UTC on 7110

ETHIOPIA: Radio. Xylophone musical notes to Amharic ID. Three gong-interval signal into newscast and ethnic vocals. (Garcia, MD, Barbour, NH) 9704, 0305-0321 // 7110; Ethiopia's **Radio Fana** 6940, 0314-0333 // 6210. (Barbour, NH)

0302 UTC

RUSSIA: Golos Rossii. Station identification followed by brief Russian news bulletin. Russian pop/rock music show past 0400 with brief commercials and presumed news updates. Excellent signal strength. (Schwartz, IL) **Voice of Russia** 7300, 2135 with **Musical Tales**. (Fraser, ME); 7250, 0130. (Howard Moser, Lincolnshire, IL)

0400 UTC on 6020

TURKEY: Voice of. Male announcer's English news bulletin with moderate signal strength. (Schwartz, IL)

0407 UTC on 4385

PERU: Radio Imperio. Spanish religious service before congregation. Poor signal quality. (Wood, TN) 4386.6, 0358-0403+ (Frodge, MI) Peruvian's monitored; **Radio Huanta** 2000, 4747.2 at 1045. (Garcia, MD) **Radio Altura** (tent.) 5014.6 1008-1031+. (Frodge, MI) **Radio Yura** (tent) 4716.6, 0045-0120. (Barbour, NH)

0500 UTC on 7105

MADAGASCAR: RTV Malagasy. Sign-on in Malagasy. Chants over drum beats into news and station identification. French briefs with interference from BBC at 0530. (Garcia, MD)

0500 UTC on 4910

ZAMBIA: Radio Zambia/ZBC. Fish eagle interval signal to station identification. Twelve-minute newscast to closedown at 0516 as "Radio Two." (Garcia, MD) ZBC 4910, 0248-0304 with ID. (Barbour, NH) Zambia's **Radio Christian Voice** 4965, 0045 in "the Voice" spot and address for program comments. (Frodge, MI)

0520 UTC on 4990

SURINAME: Radio Apintie. Extensive static for first time log of station. Upbeat pop and English rap music to tune from Ricky Martin and Madonna's **Express Yourself**. Poor-fair signal quality. (Wood, TN) 4990, 0250-0312. (Barbour, NH)

0543 UTC on 5029

COSTA RICA: University Network. Programming from the late Dr Gene Scott. Ray Steven's parody about a squirrel loose in a church in Pascagoula, Mississippi. Additional US religious broadcasters monitored as; **WYFR** 21455, 1940-1945*. (Wood, TN) **KJES** 15384.84, 2035-2040+; **KTBN** 15590, 2045-2101+; **WHRI** 15665, 2102-

2107+; **WJIE** 7490.1, 1729-1737+. **WYFR** 6085, 1651-1700+; (Frodge, MI; Tom Banks, Dallas, TX)

1323 UTC on 6150

SINGAPORE: Radio Singapore Int'l. Pop tunes "Radio Singapore" and "RSI" identification. UTC and local time check to English news at 1330. SIO 232 with occasional utility blasts. (Frodge, MI)

1335 UTC on 9525

INDONESIA: Voice of. Indonesian. Lite pop music program to announcer's ID and station web address. Traditional Indonesian music to vernacular announcement. National anthem at 1358 sign-off for above average signal strength. (Schwartz, IL)

1400 UTC 9870

NEW ZEALAND: Radio NZ Int'l. Time pips into news from announcer duo. Faint signal quality. (Fraser, ME; Banks, TX)

1430 UTC on 17735

TUNISIA: RTV Tunisienne. Arabic service of music and recitations. (Moser, IL) 1545 at 1530. (Wood, TN)

1443 UTC on 9405

PHILIPPINES: FEBC. Mandarin. Banter from male/female host. Various music bits and repetitive "Hallelujah" jingle at 1445. Language lesson to ID and fanfare at 1500.; 11730, 1818-1831 in Tagalog. (Frodge, MI) **Radio Philippines** 11730, 1856-1930*. (Barbour, NH) **VOA Philippines** relay 11705 at 1200 (Fraser, ME) **Radio Veritas Asia's** Tagalog/English service 11820 at 2305. (Schwartz, IL)

1600 UTC on 15605

FRANCE: Radio France Int'l. Station ID into program preview, news and comments // 11615. Signal faint under WYFR. (Fraser, ME)

1930 UTC on 7345

SLOVAKIA: Radio Slovakia Int'l. Sign-on ID into male's newscast // 5915. (Fraser, ME) 9440 at 0125. (Moser, IL)

2010 UTC on 6280

ISRAEL: Kol Israel. Report on Israeli-U.S. relationships on Palestinian peace talks // 9390. (Fraser, ME)

2010 UTC on 11655

MADAGASCAR: Radio Netherlands relay. *The Good Life* program on technology. World newscast to time pips, address and ID at 2030. (Wood, TN) // 7120 (Fraser, ME)

2044 UTC on 11875

ITALY: RAI. News to ID as "RAY" at 2045. (Wood, TN) Italian service 15250 // 11800 at 1900. (Fraser, ME); 17780 at 1423. (Moser, IL)

2101 UTC on 7250

VATICAN CITY: Vatican Radio. Poetry from Fr. Paul Murray and feature on Roman history to station ID. (Frodge, MI) 4005, 2224-2235 in presumed Italian. Interval signal loop to ID at 2230. Poor-fair signal quality. (Barbour, NH) 9605 at 0242-0318* // 7305. (Wood, TN) 7305 at 0410. (Schwartz, IL)

2121 UTC on 9505

CUBA: Radio Havana. Two male's English interview about Cuban and Caribe workers to 2125. Interval signal and ID to French service. SIO 3+32+ -lousy signal for Havana. Cuba's **Radio Rebelde** 5025, 1720-1730 in Spanish. (Frodge, MI)

2127 UTC on 15205

RWANDA: Deutsche Welle relay. News and mentions of Bonn, Germany to ID and address at 2129. (Wood, TN) 15410 at 2148. (Fraser, ME)

2145 UTC on 9525

GABON: Radio Afrique Numero Un. French service with mix of African and American pop music tunes from the 1970's. Additional African station logged as; **Voice of Nigeria** French 7255 at 2136; **RTV Guineene** French on 7125 at 2302. (Schwartz, IL)

2316 UTC on 5030

BURKINA FASO: Radio Burkina. French. Announcer's rap and pop tunes in English and French. Signal obliterated by **Radio Rebelde** at 0000. (Wood, TN)

*Thanks to our contributors - Have you sent in YOUR logs?
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(or e-mail gaylevanhorn@monitoringtimes.com)
English broadcast unless otherwise noted.*

Is Podcasting The Answer?

While I would not put myself in the camp of the kneejerk naysayers when it comes to new technologies, I might be easily counted as a natural skeptic – especially when something new emerges that is said to be in all ways superior to a means I am already using that has served and is still serving me well. (I think most SWLs and DXers will catch my drift.)

That's not to say that I'm averse to trying out new things. While I love shortwave radio, sometimes it's just not accessible. I'm a Sirius Satellite Radio subscriber. I often listen to the BBC and World Radio Network in the car that way. The BBC is carried by my local NPR affiliate overnights on weekdays. I listen that way, too. At work in a steel frame building that is singularly inhospitable to radio waves, I multitask using my employer's high speed internet connection to listen to any number of broadcasts and broadcasters. I am in no way a cave dweller. All of these modes complement shortwave and each other nicely in many respects.

I'm a recent recipient of an iPod. In my case, it's an iPod Shuffle – the least expensive model in the range – that I secured for the princely sum of \$100. It's the size of a pack of gum and can hold up to a dozen or so hours of voice and music in its 512MB capacity drive. Is it at all possible that this little device holds within it a potential for the salvation of international broadcasting as we have known it?

❖ Tall Challenge

Many of us who love shortwave as much for its content as for its technical fascinations harbor fear for the future of the medium from the same dual perspective. I've come to at least a tenuous conclusion that, despite challenges like the new man-made interference source created by broadband over power line (BPL) technology, shortwave's "expeditionary" pleasures will remain for some time to come in one form or another. But I've been somewhat less optimistic about the continued quality and quantity of the programming.

As a whole, the budgets supporting what might be termed "traditional" international broadcasting continue to decline as the environment in which they operate becomes more complex. Counterintuitively (at least to this writer), as understanding interrelationships between peoples and nations become more crucial

to our common futures, government interest in expending resources toward fostering stability in such relationships is demonstrably waning.

As has been discussed in this space numerous times, international radio stations are no longer the sole source of that programming and its distribution is no longer limited to – or even primarily reliant on – shortwave. Program sources continue to diversify and are almost constantly redefining themselves and their missions, confronted as they are with an ever-changing, multilayering climate.

Therefore, audience measurement, response and interaction have become increasingly vital to the very existence of longtime international broadcasters – so vital, in fact, that some quoted statistics and methodologies can appear suspect to longtime observers. Nonetheless, when survival is at stake, the measures taken can naturally become more strained or even desperate.

Add to this scenario efforts on the part of programmers to both expand the audience and simultaneously control costs through the implementation of a number of relatively new and emerging distribution platforms. Each of

these, at this point, appears to have its respective strengths and weaknesses; but not one of them appears able to establish itself as dominant.

In the end, it's all a fiercely competitive and challenging balancing act.

❖ Keeping What We Love

Of course we all know that, at its best, shortwave programming literally soars miles above anything else. With all its management faults, the **BBC World Service** still provides the best, most comprehensive news reportage and analysis on the planet. It is almost alone in contributing mightily to our efforts to better understand what is happening in our world through the mass electronic media.

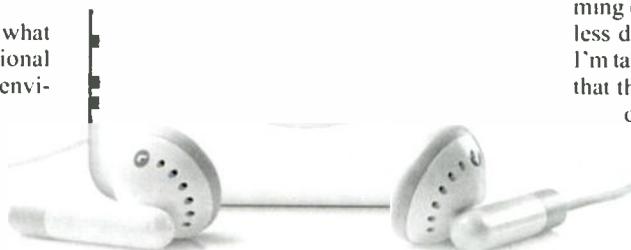
Radio Netherlands daily demonstrates that it fully understands that the best radio is the radio that tells a story in an imaginative and intelligent way.

Radio Australia, in conjunction with its domestic partner **ABC Radio National**, covers the widest range of topics of any network and refuses to talk down to its audience. On the contrary, **RA** challenges the listener to do something that few stations have the courage to demand – that they think and learn.

China Radio International broadcasts are growing in professionalism and ubiquity almost daily. **Radio New Zealand International** provides unique coverage, both culturally and in terms of news, of the Pacific island nations including its own. The **Voice of Russia** reminds us not only of that nation's long, grand and often tragic history; but also of its continued significance in the world today.

Several others – like **Radio Sweden**, **Radio Prague**, **Radio Slovakia**, **Radio Taiwan International**, **Radio Exterior de Espana**, **Radio Austria International** and **Radio Habana Cuba** – do a yeoman job providing unique insight into societies, cultures and individuals in their own small, but truly no less significant nations.

But also at its worst, shortwave programming can be some of the most boring and useless drivel imaginable – and you know what I'm talking about there as well. It can be argued that the added competition can serve to weed out this stuff; but it can just as easily force the broadcaster committed to quality into a spiral to the lowest common denominator in an effort to stave off the all-too-present cleaver wielded by those who in a too facile way



A Brief Podcasting Primer

From Wikipedia, the free encyclopedia: "Podcasting is a way of publishing sound files to the Internet, allowing users to subscribe to a feed and receive new audio files automatically... Users subscribe to podcasts using 'podcatching' software (also called 'aggregator' software) which periodically checks for and downloads new content. It can then sync the content to the user's portable music player"... [Hence the marriage of Apple's iPod and broadcasting into the new term *podcasting*, possibly first used in an article in *The Guardian* on February 12, 2004.] "Podcasting does not require an iPod; any digital audio player or computer with the appropriate software can play podcasts... Unlike radio or streaming media, podcasts are time-shifted, meaning that listeners have control over when they hear the recording."

Podcasting is an adjunct to live broadcasting, not a replacement for it. For example, podcasts cannot have live participation or reach large audiences as quickly as radio can. (But it also has significant advantages over traditional methods of broadcasting in that it allows individuals to easily transmit content worldwide, transcending difficulties like limited spectrum and the need for a license. But for our purposes here, we are looking at podcasting as a reception medium.)

Several broadcasters that produce content for their international services have begun to experiment with podcasting. These include **CBC Radio One** and **CBC Radio Three**, **ABC's Radio National** and **Triple J** networks and the **BBC**. Others have likely joined this effort since this column was prepared. Domestically, **KYOU** radio is broadcasting podcasts made by listeners, public radio podcast programs are listed at <http://www.publicradiofan.com/podcasts.html>, and Adam Curry is hosting a four-hour program radio program on **Sirius Satellite Radio** that discusses and airs podcasts. You can keep up with the rapid development of this new platform and media at <http://www.podcastingnews.com>, among other emerging resources on the internet. Just enter your favorite station and the word "podcast" or "podcasting" to learn if your favorite station or program has joined this realm.

"Do It Yourself" Podcast

There also is software available that allows you to record any streamed and archived program onto your computer hard drive for transfer to an iPod or other portable digital player, even if a broadcaster has not specifically earmarked the program for podcasting. This method is a bit less efficient in that the download takes place over real time rather than instantaneously as a compressed file. Richard Cuff, who authored a recent article in *MT* on the subject of recording and timeshifting shortwave broadcasts, recommends two programs for PC users: **Replay Radio** - <http://www.replay-radio.com/> and **Total Recorder** - <http://www.highcriteria.com/>. Ralph Brandi of NASWA recommends for Mac users **Audio Hijack** or **Audio Hijack Pro** by Rogue Amoeba <http://www.rogueamoeba.com>. I've been using this one, too, and have found it very easy to install and use. The Pro version has a nice "instant record" feature built in.

equate quality with audience size and then act accordingly.

It's an all too true maxim that money (or the lack thereof) changes everything. Lacking the ability to use some of the funding models (advertising, for example) available to other programmers, international broadcasting has always relied on a patron - typically, government or public money distributed through public corporations - to underwrite its efforts. In this way, it had been recognized that value or results could not always be measured precisely. I suppose this would make those believing in the value of cross-border broadcasting for its own sake something of a "faith-based" group. (It had to be said.)

However, in today's economics, value is value only if it can be demonstrated through some quantitative measure, even if the methodology can sometimes appear tenuous. Consequently, the kind of international broadcasting we love has come under budgetary threat just about everywhere.

At the same time, the economic model that is slowly emerging as a favorite to support all forms of media is the direct pay as you go plan. More and more, users are being asked to pay for what they want, and in more and more cases incrementally piece by piece.

❖ Enter Podcasting?

It's clear that if international broadcasting as we know it is to survive and flourish in this new era, new means of support - both in terms of verifiable, demonstrable listener numbers and cold hard cash - will have to be developed. For at least the foreseeable future, it appears that government support for international public service broadcasting will continue to wane. So, how about a new approach?

The technology exists to allow stations to offer for purchase MP3 (and other formatted) downloads of their programs. Means also exist for consumers to conduct cash and credit transactions over the internet. The Apple iTunes experience, for example, demonstrates that consumers will pay for content if it's compelling to them and attractively priced, and the transaction is easy to conduct.

So, will listeners be willing to pay for international broadcasting? Getting back to my iPod Shuffle, I really like having the added option of downloading or copying programs (see sidebar) onto my computer's hard drive, transferring them to my iPod and listening whenever I want - whether it's while I walk the neighborhood, during a flight or bus commute or while mowing the lawn. (I still love shortwave radio; but it's really not possible or at least very inconvenient to use one when I'm involved in those kinds of activities.)

To me, it's value added and if asked to pay for it, I would. I think others would, too. It could have the added benefit of being a useful way of proving to the budget directors that international broadcasting has a bona-fide constituency and should continue to be supported by its government and public patrons while exploring additional sources of support.

But on the other hand, maybe I'm too

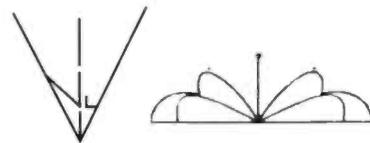
optimistic about the flexibility and open-mindedness that would be required of my fellow listeners. I hope that's not the case, because it's clear that radio is evolving into new forms and emerging on new delivery platforms and economic models. Ultimately, it would be of benefit to us all if we could find a way to preserve the essence of that which we love and find some way to influence the way it develops in the future. Maybe - just maybe - podcasting might offer that promise.

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July Scorchers

If it's July, it means just one thing! It's time to clean out the in-basket and QSL folders and devote this month to nothing but hot QSLs!

That's right...this month's column is packed with a variety of scorching QSLs representing ham radio, mediumwave, utility and shortwave radio.

Contributions are always welcome via email or regular mail, and if you'd like a personal reply please include a self-addressed envelope. Good luck on your summer (or winter for the southern hobbyists) DXing and QSLs, and don't forget to report often! Make this season a scorcher!

AMATEUR RADIO

Belize V31AD, 12/17 meters SSB. Full data color folder card. Received in 138 days for an SASE via QSL Manager N5DD Donald E. Daze, 8706 Winningham Lane, Houston, TX 77055-6634. (Larry Van Horn N5FPW, NC)

Jersey MJ/DL1EK (IOTA EU-013) 15 meters SSB. Full data color picture card. Received in 728 days via ARRL bureau. (Van Horn NC)

Revilla Gigedo XF4IH (IOTA NA-030 DXpedition) 10/12 meters SSB. Full data color folder card on third request. Received in 273 days for a registered letter, three US dollars and euro nested envelope via QSL Manager XE1H, Apartado Postal 118-481, México, D.F. 07051

XF4IH



México. Pleased with this rare catch! (Van Horn, NC)

Rodriguez Island 3B9C (IOTA AF-017 DXpedition) 20 meters SSB. Full data color folder card. Received in 57 days for two US dollars and nested Euro envelope, via QSL Manager FSDXA, P.O. Box 73, Church Stretton, SY6 6WF UK. Also verified via ARRL Logbook of the World (LOTW). (Van Horn, NC)

St. Paul Island CY9A (IOTA NA-094 DXpedition). 15/20 meters SSB. Full data color folder card. Received in 28 days via QSL Manager N5YL Vance H. Le Pierre, 2618 McGregor Blvd., Fernandina Beach, FL 32035. (Van Horn, NC)

BOTSWANA

VOA relay 4930 kHz. Full data North Marianas station card with Botswana site unsigned, plus VOA magnets and pens. Received in 21 days for a follow-up report to: 1330 Independence Avenue SW, Washington, DC 20237. Partial data verification from Botswana on IBB letterhead signed by Thomas R. Powell-Transmitting Plant Supervisor, plus VOA guide. Received in 24 days for one IRC. Station address: Botswana Relay Station, Moepeng Hill, Selebi-Phikwe, Botswana. (Scott Barbour, Intervale, NH)

BRAZIL

Radio Congonhas 4775 kHz. Prepared Portuguese card returned and stamped as verified, plus station sticker. Received in 78 days for a

Portuguese report, card and mint stamps. Station address: Praça Basílica 130, 36404-000 Congonhas MG, Brazil. (Sam Wright, Biloxi, MS)

Rádio Nacional da Amazônia, 11780 kHz. Full data station card signed by station Gerente. Received in two months for a English/Portuguese multilingual report, mint stamps, and SAE. Station address: Bloco-B, Radiobrás, 70710-750 Brasília DF, Brazil (or) Caixa Postal 258, 70359-970 Brasília-DF, Brazil. (Wright, MS)

INDIA

All India Radio-Bangalore 15235 kHz. Full data verification letter signed by R. Narasimha Swamy-Superintending Engineer. Received in one month for an English report. Station address: Superintending Engineer, Super Power Transmitters, All India Radio, Yelahanka New Town, Bangalore-560 064, Karnataka, India. (Arnaldo Slaen, Buenos Aires, Argentina)

JAPAN

Radio Japan 6145 kHz. Full data card signed by T. Sato. Received in 11 days for an English report. Station address: NHK World Radio Japan, Tokyo 150-800 Japan. <http://www.nhk.or.jp/english/>. (Dan Malloy, Everett, MA)

MALAYSIA

Voice of 9750 kHz. No data card unsigned, plus VOM patch, booklets and a Malaysian coaster. Received in 66 days for an English report and one IRC. Station address: Suara Malaysia, Wisma Radio Angkasapuri, P.O. Box 11272, 50740 Kuala Lumpur, Malaysia. (Barbour, NH)

MEDIUM WAVE

KKOB 770 kHz AM. Full data verification letter on Citadel Broadcasting Corp. letterhead, signed by Bill Harris-Director of Engineering/Southwest, plus coverage maps. Received in 9 days for an AM report, one US dollar and address label (used). Station address: 500 Fourth St., NW, Albuquerque, NM 87102-2102. (Bill Wilkins, Springfield, MO) <http://www.770kob.com>

KDRK 1050 kHz AM. Prepared QSL card returned, signed by Ray Edwards-Program Director. Received in 135 days for an AM report. Station address: 1601 E. 57th Avenue, Spokane, WA 99223. (Patrick Martin, Seaside, OR)

KFXD 630 kHz. Full data station card signed by Director of Engineering. Received in 16 days for an AM report and mint stamps. Station address: 827 Park Blvd., # 201, Boise, ID 83712-7782. Website: <http://www.kfxd.com> (Tom Banks, Dallas, TX)

KMZT 1510 kHz AM. San Rafael, CA. Prepared



card received as verified, signature illegible. Received in 150 days for an AM report. Station address: 1500 Cotner Ave., Los Angeles, CA 90025. (Martin, OR)

WCRK 1150 kHz AM. Frequency only letter signed by Anisa Croxdale-Program Director. Received in ten days for an AM report and stamped-addressed-envelope. Station logged while listening for WIMA-1150 DX Test. Station address: 204 Brown Street, P.O. Box 220, Morristown, TN 37815-0220. (Mike Hardester, Jacksonville, NC)

MEXICO

XERTA 4810 kHz. Full data logo card with illegible signature. Received in six months for a Spanish/English multilingual report, mint stamps and SASE. Station address: Plaza de San Juan 5, Primer piso, Despacho 2, Esquina con Ayuntamiento, Centro 06070-México D.F., México. (Duane Hadley, Bristol, TN)

MONACO

Trans World Radio 11865 kHz. Full data TWR Europe Map card with illegible signature, plus schedule and station sticker. Received in 125 days for an English report and one IRC. Station address: B.P. 349, MC-98007 Monte Carlo, Monaco-Cedex. (Frank Hillton, Charleston, SC)

UTILITY

Tokyo Volmet, 8828 kHz USB. Full data building card unsigned, plus letter and booklet on Japan Meteorological Agency. Received in 88 days for a utility report and two IRCs (returned). Station address: JMA-Office of Radio Communication, 1-3-4 Ohtemachi, Chiyoda-ku, Tokyo 100-8122 Japan. (Wilkins, MO)

VMC, Charleville, Australia 8176 kHz USB. Partial data letter on Bureau of Meteorology letterhead, signed by Tony Baxter. Received in 31 days for a utility report and two IRCs (returned). Station address: Bureau of Meteorology, GPO Box 1289k, Melbourne VIC 3001 Australia. (Wilkins, MO)

VMW, Wiluna, Australia 8113 kHz USB. Partial data verification on same letterhead as VMC. Received in 21 days for a utility report and two IRCs (returned) Address used same as VMC. (Wilkins, MO)

HOW TO USE THE SHORTWAVE GUIDE

0000-0100 twhfa USA, Voice of America 5995am 6130ca 7405am 9455af
 ① ② ③ ④ ⑤ 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 RFP)
me:	Middle East
na:	North America
pa:	Pacific
sa:	South America
va:	various

MT MONITORING TEAM

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Thank You ...

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Shortwave Broadcast Bands

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

Notes

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

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0000 UTC - 8PM EDT / 7PM CDT / 5PM PDT			
0000	0015	vi	Cambodia, National Radio 11940as
0000	0015		Japan, Radio 6145na 13650as 17810as 17825na
0000	0027		Czech Rep, Radio Prague Intl 7345na 9440na
0000	0030		Australia, Radio 9660as 12080as 13630pa 15240pa 17715as 17750pa 17775pa
0000	0030		Burma, Dem Voice of Burma 9435eu
0000	0030	twhf	Egypt, Radio Cairo 11885na
0000	0030		Serbia & Montenegro, Intl Radio 9580va
0000	0030		Thailand, Radio 9570va
0000	0030		UK, BBC World Service 3915as 5970as 6195as 9410as 9740as 11945as 11955as 15280as 15310as 15360as 17655as 17790as
0000	0030		USA, Voice of America 7215va 12140as 15185va 15290va 17820va
0000	0045		India, All India Radio 9705as 9950as 11620as 11645as 13605as
0000	0057		Canada, Radio Canada Intl 9690as
0000	0059		Spain, Radio Exterior Espana 15385na
0000	0100		Anguilla, Caribbean Beacon 6090am
0000	0100		Australia, ABC NT Alice Springs 2310irr 4835do
0000	0100		Australia, ABC NT Katherine 5025do
0000	0100		Australia, ABC NT Tennant Creek 4910do
0000	0100		Australia, HCJB 15525as
0000	0100		Canada, CFRX Toronto ON 6070do
0000	0100		Canada, CFVP Calgary AB 6030do
0000	0100		Canada, CKCN St John's NF 6160do
0000	0100		Canada, CKZU Vancouver BC 6160do
0000	0100		Canada, Radio Canada Intl 9755am 11990am 13710am
0000	0100		China, China Radio Intl 6020na 7180as 9570na 13600eu
0000	0100		Costa Rica, University Network 5030va 6150va 7375va 9725va
0000	0100		Germany, Deutsche Welle 7130as 9505as 9825as
0000	0100		Germany, Overcomer Ministries 9430na
0000	0100		Guyana, Voice of 3290do
0000	0100		Malaysia, Radio 7295as
0000	0100	vi	Namibia, Namibian BC Corp 3270do 3290do 6060do 6175do
0000	0100		Netherlands, Radio 9845na
0000	0100		New Zealand, Radio NZ Intl 15720pa
0000	0100		Sierra Leone, Radio UNAMSIL 6137do
0000	0100		Singapore, Mediacorp Radio 6150do
0000	0100	DRM	UK, BBC World Service 6010am
0000	0100		UK, BBC World Service 5975am
0000	0100		Ukraine, Radio Ukraine Intl 7440na
0000	0100		USA, AFRTS 4319usb 5446usb 5765usb 7590usb 7812usb 12133usb 12579usb 12133usb 12579usb 13362usb
0000	0100		USA, KAIJ Dallas TX 5755na
0000	0100		USA, KTBN Salt Lake City UT 7505na 15590na
0000	0100		USA, KWHR Naalehu HI 17510as
0000	0100		USA, WBCQ Kennebunk ME 5105na 7415na 9330na
0000	0100		USA, WBOH Newport NC 5920am
0000	0100		USA, WEWN Birmingham AL 5810va 7425va 13615va
0000	0100	mtwhf	USA, WHRA Greenbush ME 7520na
0000	0100	as	USA, WHRI Noblesville IN 7490am 9515am
0000	0100		USA, WHRI Noblesville IN 7315am
0000	0100		USA, WINB Red Lion PA 9320am
0000	0100		USA, WJIE Louisville KY 13595am
0000	0100	twhfa	USA, WMLK Bethel PA 7385am
0000	0100	sm	USA, WMLK Bethel PA 9955am
0000	0100		USA, WTJC Newport NC 9370na
0000	0100		USA, WWCR Nashville TN 3210na 5070na 7465na 13845na
0000	0100		USA, WWRB Manchester TN 3185na 5050na 5085na 5745na
0000	0100		USA, WYFR Okeechobee FL 6065na 9505as 11835na 17805na
0000	0100		Zambia, Radio Christian Voice 4965af
0030	0045	s	Germany, Pan American BC 9740as
0030	0100		Australia, Radio 9660as 12080as 13630pa 15240pa 15415pa 17715as 17750pa 17775as
0030	0100	mtwhfs	Germany, Bible Voice Broadcasting 6010as
0030	0100		Lithuania, Radio Vilnius 11690na
0030	0100		Sri Lanka, SLBC 6005as 11905as 15745as
0030	0100		Thailand, Radio 5890na
0030	0100		UK, BBC World Service 5970as 6195as 9410as 9740as 11955as 15280as 15310as 15360as 17790as
0030	0100		USA, Voice of America 7215va 9780va 11760va 15185va 15290va 17740va 17820va

0035	0100	sm	Austria, Radio Austria Intl 9870sa
0043	0058	twhfa	Austria, Radio Austria Intl 9870sa
0045	0100		Pakistan, Radio 9340as 11565as
0055	0100		Italy, RAI Intl 11800na

0100 UTC - 9PM EDT / 8PM CDT / 6PM PDT

0100	0115		Italy, RAI Intl 11800na
0100	0115		Pakistan, Radio 9340as 11565as
0100	0127		Czech Rep, Radio Prague Intl 6200na 7345na
0100	0128	s	Hungary, Radio Budapest 9560na
0100	0128		Vietnam, Voice of 6175na
0100	0129	s	Germany, Universal Life 9485as
0100	0130		Australia, Radio 9660as 12080as 13630pa 15240pa 15415pa 17715as 17750pa 17775as
0100	0130	mwfa	Belarus, Radio 5970eu 7210eu
0100	0130	mtwhfa	Hungary, Radio Budapest 9590na
0100	0130		Slovakia, Slovak Radio 5930na 9440am
0100	0130		Uzbekistan, Radio Tashkent 7190as 9715as
0100	0156		Romania, Radio Romania Intl 6040na 9690na 11820na 15430na
0100	0157		Netherlands, Radio 9845na
0100	0159		Canada, Radio Canada Intl 9755am 11990am 13710am
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 15560as
0100	0200		Australia, Voice Intl 7355as
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		China, China Radio Intl 6005na 6020na 9570na 11870as 13640as
0100	0200		Costa Rica, University Network 5030va 6150va 7375va 9725va
0100	0200		Cuba, Radio Havana 6000na 9820na
0100	0200		Germany, Overcomer Ministries 9430na
0100	0200		Guyana, Voice of 3291do
0100	0200		Indonesia, Voice of 9525as
0100	0200		Japan, Radio 5960as 11860as 11935sa 153235as 17560va 17685pa 17810as 17825ca 17845as
0100	0200	vi	Malaysia, Radio 7295as
0100	0200		Namibia, Namibian BC Corp 3270do 3290do 6060do 6175do
0100	0200		New Zealand, Radio NZ Intl 15720pa
0100	0200		North Korea, Voice of 7140as 9345as 9730am 11735am 13760as 15180as
0100	0200		Russia, Voice of 7180na 7250na 9665na 15545na 15595na 17660na
0100	0200		Sierra Leone, Radio UNAMSIL 6137do
0100	0200		Singapore, Mediacorp Radio 6150do
0100	0200		Sri Lanka, SLBC 6005as 11905as 15745as 6005as 11905as 15745as 9410as 11955as 15280as 15310as 17790as
0100	0200		UK, BBC World Service 5446usb 5765usb 7590usb 7812usb 12133usb 12579usb 12133usb 12579usb 13362usb
0100	0200		USA, KAIJ Dallas TX 5755na
0100	0200		USA, KTBN Salt Lake City UT 7505na
0100	0200		USA, KWHR Naalehu HI 17510as
0100	0200		USA, Voice of America 7115va 9885va 11705va 11725va
0100	0200		USA, WBCQ Kennebunk ME 5105na 7415na 9330na
0100	0200		USA, WBOH Newport NC 5920am
0100	0200		USA, WEWN Birmingham AL 5810va 7425va 13615va
0100	0200	mtwhf	USA, WHRA Greenbush ME 7520na
0100	0200	as	USA, WHRI Noblesville IN 7490am 9515am
0100	0200		USA, WHRI Noblesville IN 7315am
0100	0200		USA, WINB Red Lion PA 9320am
0100	0200		USA, WJIE Louisville KY 13595am
0100	0200	twhfa	USA, WMLK Bethel PA 7385am
0100	0200		USA, WTJC Newport NC 9370na
0100	0200		USA, WWCR Nashville TN 3210na 5070na 5935na 7465na
0100	0200		USA, WWRB Manchester TN 3185na 5050na 5085na 5745na
0100	0200		USA, WYFR Okeechobee FL 6065na 9505as
0100	0200	sm	Zambia, Radio Christian Voice 4965af
0100	0200	sm	USA, WMLK Bethel PA 9955am
0105	0130	sm	Austria, Radio Austria Intl 9870am
0113	0130	twhfa	Austria, Radio Austria Intl 9870am
0115	0130	a	Austria, Radio Austria Intl 9870as
0130	0200		Australia, Radio 9660as 12080as 13630pa 15240pa 15415pa 17715as 17750pa

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0130	0200	s	Belarus, Radio	5970eu	7210eu	
0130	0200		Iran, Voice of the Islamic Rep	9495am	11875am	
0130	0200		Sweden, Radio	9435va		
0130	0200	twhfa	USA, Voice of America	7405va	9775va	
			13740va			
0133	0200	sm	Austria, Radio Austria Intl	9870me		
0140	0200		Vatican City, Vatican Radio	9650as	12055as	
0143	0158	twhfa	Austria, Radio Austria Intl	9870na		
0145	0158	twhfas	Albania, Radio Tirana	6115eu	7160eu	

0230	0258		Hungary, Radio Budapest	9795na		
0230	0258		Vietnam, Voice of	6175na		
0230	0300	s	Belarus, Radio	5970eu	7210eu	
0230	0300		Sweden, Radio	6010na		
0245	0300		Myanmar, Radio	9730do		
0250	0300		Vatican City, Vatican Radio	7305am	9605am	
0256	0300		Turkey, Voice of	6140va	7270va	

0200 UTC - 10PM EDT / 9PM CDT / 7PM PDT

0200	0230		Austria, AWR Europe	9895as		
0200	0230	mtwfa	Belarus, Radio	5970eu	7210eu	
0200	0230	vl	Croatia, Croatian Radio	9925sa		
0200	0230		Iran, Voice of the Islamic Rep	9495am	11875am	
0200	0230	a	UK, Wales Radio Intl	9795sa		
0200	0300		Anguilla, Caribbean Beacon	6090am		
0200	0300	twhfa	Argentina, RAE	11710am		
0200	0300		Australia, ABC NT Alice Springs	2310irr	4835do	
0200	0300		Australia, ABC NT Katherine	5025do		
0200	0300		Australia, ABC NT Tennant Creek	4910do		
0200	0300		Australia, HCJB	15560as		
0200	0300		Australia, Radio	9660as	12080os	13630pa
			15240pa	15415pa	15515as	17750pa
			21725pa			
0200	0300		Australia, Voice Intl	7355as		
0200	0300		Bulgaria, Radio	9700na	11700na	
0200	0300		Canada, CFRX Toronto ON	6070do		
0200	0300		Canada, CFVP Calgary AB	6030do		
0200	0300		Canada, CKZN St John's NF	6160do		
0200	0300		Canada, CKZU Vancouver BC	6160do		
0200	0300		China, China Radio Intl	9580na		
0200	0300		Costa Rica, University Network	5030va	6150va	
			7375va	9725va		
0200	0300		Cuba, Radio Havana	6000na	9820na	
0200	0300		Egypt, Radio Cairo	7260na		
0200	0300		Germany, Overcomer Ministries	9430na		
0200	0300		Guyana, Voice of	3291do		
0200	0300		Malaysia, Radio	7295as		
0200	0300	vl	Namibia, Namibian BC Corp	6060do	3270do	3290do
			6175do			
0200	0300		New Zealand, Radio NZ Intl	15720pa		
0200	0300		North Korea, Voice of	4405as	13650as	
			15100as			
0200	0300		Philippines, Radio Pilipinas	11885va	15270va	
0200	0300		Russia, Voice of	5945me	7180na	9665na
			9860na	15545na	15595na	17660na
0200	0300		Sierra Leone, Radio UNAMSIL	6137do		
0200	0300		Singapore, Mediacorp Radio	6150do		
0200	0300		South Korea, Radio Korea Intl	9560va	11810sa	
			15575va			
0200	0300		Sri Lanka, SLBC	6005as	11905as	15745as
0200	0300		Taiwan, Radio Taiwan Intl	5950na	9680na	
			11875as	15465as		
0200	0300		UK, BBC World Service	5975am	975caf	
			9825am	11760me	11955as	12095am
			15280as	15310as	15360as	17790as
0200	0300		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0200	0300		USA, KAIJ Dallas TX	5755na		
0200	0300		USA, KJES Vado NM	7555na		
0200	0300		USA, KTBN Salt Lake City UT	7505na		
0200	0300		USA, KWHR Naalehu HI	17510as		
0200	0300	mtwhf	USA, Voice of America	7115va	9885va	
			11705va	11725va		
0200	0300		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na			
0200	0300		USA, WBOH Newport NC	5920am		
0200	0300		USA, WEWN Birmingham AL	5810va	7425va	
			13615va			
0200	0300		USA, WHRA Greenbush ME	5850na		
0200	0300	mtwhf	USA, WHRI Noblesville IN	7490am	9515am	
0200	0300	os	USA, WHRI Noblesville IN	7315am		
0200	0300		USA, WINB Red Lion PA	9320am		
0200	0300		USA, WJIE Louisville KY	13595am		
0200	0300	twhfa	USA, WMLK Bethel PA	7385am		
0200	0300	sm	USA, WMLK Bethel PA	9955am		
0200	0300		USA, WTJC Newport NC	9370na		
0200	0300		USA, WWCN Nashville TN	3210na	5070na	
			5935na	7465na		
0200	0300		USA, WWRB Manchester TN	3185na	5050na	
			5085na	5745na		
0200	0300		USA, WYFR Okeechobee FL	5985na	6065na	
			9505na	11835na	11855na	
0200	0300		Zambia, Radio Christian Voice	4965af		
0215	0230		Nepal, Radio	3230as	5005as	6100as
			7165as			
0230	0258	twhfas	Albania, Radio Tirana	6115eu	7160eu	

0300 UTC - 11PM EDT / 10PM CDT / 8PM PDT

0300	0320		Vatican City, Vatican Radio	7305am	9605am	
0300	0327		Czech Rep, Radio Prague Intl	7345na	9870na	
0300	0330		Egypt, Radio Cairo	7260na		
0300	0330		Myanmar, Radio	9730do		
0300	0330		Philippines, Radio Pilipinas		11885va	15270va
0300	0330		Thailand, Radio	5890na		
0300	0330		USA, KJES Vado NM	7555na		
0300	0330		USA, Voice of America	7290af	7340af	9885af
			9885af	12080af	12080af	17895af
0300	0330		Vatican City, Vatican Radio	9660af		
0300	0350		Turkey, Voice of	6140va	7270va	
0300	0355		South Africa, Channel Africa	6150af		
0300	0400		Anguilla, Caribbean Beacon	6090am		
0300	0400		Australia, ABC NT Alice Springs	2310irr	4835do	
0300	0400		Australia, ABC NT Katherine	5025do		
0300	0400		Australia, ABC NT Tennant Creek	4910do		
0300	0400		Australia, Radio	9660as	12080as	13630pa
			15240pa	15415pa	15515as	17750pa
			21725pa			
0300	0400	twhfas	Canada, CBC NQ SW Service	9625na		
0300	0400		Canada, CFRX Toronto ON	6070do		
0300	0400		Canada, CFVP Calgary AB	6030do		
0300	0400		Canada, CKZN St John's NF	6160do		
0300	0400		Canada, CKZU Vancouver BC	6160do		
0300	0400		China, China Radio Intl	9690am	9790am	
			11870as	15110as		
0300	0400		Costa Rica, University Network	5030va	6150va	
			7375va	9725va		
0300	0400		Cuba, Radio Havana	6000na	9820na	
0300	0400		Guyana, Voice of	3291do		
0300	0400		Japan, Radio	21610pa		
0300	0400		Malaysia, Radio	7295as		
0300	0400		Malaysia, Voice of	6175as	9750as	15295as
0300	0400	vl	Namibia, Namibian BC Corp	6060do	3270do	3290do
			6175do			
0300	0400		New Zealand, Radio NZ Intl	15720pa		
0300	0400		North Korea, Voice of	3560as	7140as	
			9345as	9730as		
0300	0400		Russia, Voice of	5900na	7180na	9665na
			9860na	15545na	15595na	17660na
0300	0400	vl	Rwanda, Radio	6055do		
0300	0400		Sierra Leone, Radio UNAMSIL	6137do		
0300	0400		Singapore, Mediacorp Radio	6150do		
0300	0400		South Africa, Channel Africa	3345af		
0300	0400		Sri Lanka, SLBC	6005as	11905as	15745as
0300	0400		Taiwan, Radio Taiwan Intl	5950na	9680na	15215va
			15320va			
0300	0400	vl	Uganda, Radio	4976do	5026do	7196do
0300	0400		UK, BBC World Service	3255af	5975am	
			6005af	6190af	6195eu	7160af
			9750af	11760me	11760as	11765af
			12095as	15280as	15310as	15420af
			15575me	17760as	17790as	21660as
0300	0400	vl/ mtwhf	UK, Sudan Radio Service	9625va		
0300	0400		Ukraine, Radio Ukraine Intl	7440na		
0300	0400		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0300	0400		USA, KAIJ Dallas TX	5755na		
0300	0400		USA, KTBN Salt Lake City UT	7505na		
0300	0400		USA, KWHR Naalehu HI	17510as		
0300	0400		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na			
0300	0400		USA, WBOH Newport NC	5920am		
0300	0400		USA, WEWN Birmingham AL	5810va	7425va	
			13615va			
0300	0400		USA, WHRA Greenbush ME	5850na		
0300	0400	mtwhf	USA, WHRI Noblesville IN	7490am	9515am	
0300	0400	os	USA, WHRI Noblesville IN	7315am		
0300	0400		USA, WINB Red Lion PA	9320am		
0300	0400		USA, WJIE Louisville KY	13595am		
0300	0400		USA, WMLK Bethel PA	7385am		
0300	0400		USA, WMLK Bethel PA	9955am		
0300	0400		USA, WTJC Newport NC	9370na		
0300	0400		USA, WWCN Nashville TN	3210na	5070na	
			5935na	7465na		
0300	0400		USA, WWRB Manchester TN	3185na	5050na	
			5085na	5745na		
0300	0400		USA, WYFR Okeechobee FL	5985na	6065na	
			9505na	11835na	11855na	
0300	0400		Zambia, Radio Christian Voice	4965af		
0300	0400		Nepal, Radio	3230as	5005as	6100as
			7165as			
0300	0400		Albania, Radio Tirana	6115eu	7160eu	

Shortwave Guide



0300	0400	vi	Zimbabwe, ZBC Corp	5975do		
0330	0345		Hungary, Radio Budapest	6025eu	9655eu	
0330	0345		Israel, Kol Israel 9345va	11605va	17600va	
0330	0357		Czech Rep, Radio Prague Intl	9445va	11600va	
0330	0358		Vietnam, Voice of 6175am			
0330	0400		UAE, Emirates Radio 12005na	13675na	15400na	
0330	0400	mtwhf	USA, Voice of America 17895af	7290af	12080af	
0330	0400		USA, Voice of America 9885af	4930af	6080af	

0400 UTC - 12AM EDT / 11PM CDT / 9PM PDT

0400	0430		Australia, Radio 9660as	12080as	13630pa	
			15240pa	15515po	21725pa	
0400	0430		France, Radio France Intl	7315af	11700af	
0400	0430		Sri Lanka, SLBC 6005as	11905as	15745as	
0400	0430		USA, Voice of America 6080af	7290af	9575af	
			12080af	17895af	9885af	11835af
0400	0456		Romania, Radio Romania Intl	9780va	11820va	
			15140va	17860va		
0400	0457		Netherlands, Radio 6165na	9590na		
0400	0458		New Zealand, Radio NZ Intl	15720pa		
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	twfhas	Canada, CBC NQ SW Service	9625na		
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		China, China Radio Intl	9755na	9690na	
0400	0500		Costa Rica, University Network	7375va	6150va	
0400	0500		Cuba, Radio Havana 6000na	9820na		
0400	0500		Germany, Deutsche Welle	15445as	11945as	
0400	0500		Guyana, Voice of 3291do			
0400	0500		Malaysia, Radio 7295as			
0400	0500		Malaysia, Voice of 6175as	9750as	15295as	
0400	0500	vi	Namibia, Namibian BC Corp	6060do	3270do	3290do
0400	0500		Nigeria, Radio/Kaduna	6090do		
0400	0500		Russia, Voice of 5900na	7180na	15545na	
			15595na	17660na		
0400	0500	vi	Rwanda, Radio 6055do			
0400	0500		Sierra Leone, Radio UNAMSIL	6137do		
0400	0500		Singapore, Mediacorp Radio	6150do		
0400	0500		South Africa, Channel Africa	3345af		
0400	0500	vi	Uganda, Radio 4976do	5026do	7196do	
0400	0500	DRM	UK, BBC World Service	6010na		
0400	0500		UK, BBC World Service	3255af	6005af	
			6195eu	7160af	9410va	11760eu
			11760me	11765af	12035af	15310as
			15280as	15360as	15420af	15575me
			17760as	17790as	21660as	
0400	0500	vi/ mtwhf	UK, Sudan Radio Service	9625va		
0400	0500		USA, AFRTS 4319usb	5446usb	5765usb	
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0400	0500		USA, KAIJ Dallas TX 5755na			
0400	0500		USA, KTBN Salt Lake City UT	7505na		
0400	0500		USA, KWHR Naalehu HI	17510as		
0400	0500		USA, WBCQ Kennebunk ME	9330na	7415na	
0400	0500		USA, WBOH Newport NC	5920am		
0400	0500		USA, WEWN Birmingham AL	5810va	7425va	
			13615va			
0400	0500	mtwhf	USA, WHRA Greenbush ME	5850na		
0400	0500	as	USA, WHRI Noblesville IN	5835am	7465am	
0400	0500		USA, WHRI Noblesville IN	5835am		
0400	0500		USA, WJIE Louisville KY	13595am		
0400	0500		USA, WMLK Bethel PA	9265eu	9955eu	
0400	0500		USA, WMLK Bethel PA	7385am		
0400	0500		USA, WTJC Newport NC	9370na		
0400	0500		USA, WWCR Nashville TN	3210na	5070na	
			5935na	5935na		
0400	0500		USA, WWRB Manchester TN	3185na	5050na	
			5085na	5745na		
0400	0500		USA, WYFR Okeechobee FL	6065na	6855eu	
			7355eu	9505eu	9715eu	
0400	0500		Zambia, Radio Christian Voice	4965af		
0400	0500	vi	Zimbabwe, ZBC Corp	5975do		
0430	0500		Australia, Radio 9660as	12080as	13630pa	
			15240pa	15415pa	17750pa	
			21725pa			
0430	0500		Nigeria, Radio/Ibadan	6050do		
0430	0500		Nigeria, Radio/Kaduna	4770do		
0430	0500		Nigeria, Radio/Lagos 3326do	4990do		

0430	0500		Serbia & Montenegro, Intl Radio	9580va		
0430	0500		Swaziland, TWR 3200af	4775af		
0430	0500		USA, Voice of America 7290af	9575af	11835af	12080af
			11835af	11835af	12080af	17895af
0445	0500		Italy, RAI Intl	6110af	7235af	9800af
0455	0500		Vatican City, Vatican Radio		11625af	13765af
0459	0500		New Zealand, Radio NZ Intl		11820pa	

0500 UTC - 1AM EDT / 12AM CDT / 10PM PDT

0500	0507	twfhas	Canada, CBC NQ SW Service	9625na		
0500	0520		Vatican City, Vatican Radio	4005eu	5885eu	
			7250eu			
0500	0530		Australia, Radio 9660as	12080as	13630pa	
			15160pa	15240pa	15515va	17750pa
0500	0530		France, Radio France Intl	7250eu	9825af	15160af
0500	0530	vi	Rwanda, Radio 6055do			
0500	0530		UK, BBC World Service	6005af	6190af	
			7160af	11765af	11940af	11955me
			12035af	12095va	15280as	15310as
			15420af	15575me	17760as	17790as
			21660as			
0500	0530		UK, BBC World Service	6005af	6195af	
			7160af	9410va	11765af	11940af
			15280as	15310as	15360as	17640af
			17760as	17790as	17885af	21660as
0500	0530		Vatican City, Vatican Radio	9660af		
0500	0555		South Africa, Channel Africa	9685af		
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		Canada, CFRX Toronto ON	6070do		
0500	0600		Canada, CKZN St John's NF	6160do		
0500	0600		Canada, CKZU Vancouver BC	6160do		
0500	0600		China, China Radio Intl	9590af	11710af	11880as
			17505af	17540as	15350as	15465as
0500	0600		Costa Rica, University Network	7375va	6150va	
0500	0600		Cuba, Radio Havana 6000va	11760va	6060va	9550va
0500	0600		Germany, Deutsche Welle	15410af	17800af	9630af
0500	0600		Guyana, Voice of 3291do			
0500	0600		Japan, Radio 5975eu	6110na	7230eu	
			15195as	17810as	21755pa	
0500	0600		Malaysia, Radio 7295as			
0500	0600		Malaysia, Voice of 6175as	9750as	15295as	
0500	0600	vi	Namibia, Namibian BC Corp	6060do	3270do	3290do
0500	0600		New Zealand, Radio NZ Intl	11820pa		
0500	0600		Nigeria, Radio/Ibadan	6050do		
0500	0600		Nigeria, Radio/Kaduna	4770do	6090do	
0500	0600		Nigeria, Radio/Lagos 3326do	4990do		
0500	0600		Russia, Voice of 17665pa	21790pa		
0500	0600		Sierra Leone, Radio UNAMSIL	6137do		
0500	0600		Singapore, Mediacorp Radio	6150do		
0500	0600		South Africa, Channel Africa	7240af		
0500	0600		Swaziland, TWR 3200af	4775af	9500af	
0500	0600	vi	UK, Radio 4976do	5026do	7196do	
0500	0600		UK, BBC World Service	6195eu	11760me	
			12095eu	15565eu	15575me	
0500	0600	vi/ mtwhf	UK, Sudan Radio Service	11795va		
0500	0600		USA, AFRTS 4319usb	5446usb	5765usb	
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0500	0600		USA, KAIJ Dallas TX 5755na			
0500	0600		USA, KTBN Salt Lake City UT	7505na		
0500	0600		USA, KWHR Naalehu HI	9510as	17510as	
0500	0600		USA, Voice of America	4930af	6080af	
			6180af	7290af	12080af	13645af
0500	0600		USA, WBCQ Kennebunk ME	7415na		
0500	0600		USA, WBOH Newport NC	5920am		
0500	0600		USA, WEWN Birmingham AL	5850va	7425va	
0500	0600		USA, WHRA Greenbush ME	7490na		
0500	0600		USA, WHRI Noblesville IN	7315am	7465am	
0500	0600		USA, WJIE Louisville KY	13595am		
0500	0600		USA, WMLK Bethel PA	9265eu	9955eu	
0500	0600		USA, WRMI Miami FL 7385am			
0500	0600		USA, WTJC Newport NC	9370na		
0500	0600		USA, WWCR Nashville TN	3210na	5070na	
			5935na	5935na		
0500	0600		USA, WWRB Manchester TN	3185na	5050na	
			5085na	5745na		
0500	0600		USA, WYFR Okeechobee FL	6855eu	9355eu	
0500	0600		Zambia, Radio Christian Voice	4965af		
0500	0600	vi	Zimbabwe, ZBC Corp	5975do		
0505	0520	m	Austria, Radio Austria Intl	17870me		
0505	0530	as	Austria, Radio Austria Intl	17870me		

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0515	0600		Zambia, Radio Christian Voice	9555af	
0525	0600	vi	Ghana, Ghana BC Corp	3366da	4915da
0530	0600		Australia, Radio	12080as	13630as
			15160pa	15415as	15515pa
			15240va		
0530	0600		Thailand, Radio	17690va	
0530	0600		UK, BBC World Service	6005af	6190af
			7160af 9410af	11765af	11940af
			15310as	15360as	15420af
			17760as	17790as	21660as
0530	0600	mtwhf	UK, BBC World Service	17885af	
0545	0600	twh	Austria, Radio Austria Intl	17870me	
0545	0600	vi	Rwanda, Radio	6055do	

0600 UTC - 2AM EDT / 1AM CDT / 11PM PDT

0600	0605	vi	Croatia, Croatian Radio	13820na	
0600	0615	as	South Africa, TWR	11640af	
0600	0630		France, Radio France Intl	11665af	15160af
			17800af		
0600	0645	mtwhf	South Africa, TWR	11640af	
0600	0655		South Africa, Channel Africa	15440af	
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	9660as	12080as
			15160pa	15415as	15515pa
			17750va		
0600	0700		Australia, Voice Intl	15335as	
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		China, China Radio Intl	9590af	11710af
			11870me	11880as	15350as
			15465as	17490eu	17505af
0600	0700		Costa Rica, University Network	5030va	6150va
			7375va 9725va	11870va	
0600	0700		Cuba, Radio Havana	6000va	9550va
			11760va		
0600	0700		Germany, Deutsche Welle	6140eu	7170af
			15275af	17860af	
0600	0700	DRM	Germany, Deutsche Welle	21675eu	
0600	0700	vi	Ghana, Ghana BC Corp	3366do	4915do
0600	0700		Guyana, Voice of	3291do	
0600	0700		Japan, Radio	7230eu	11715as
			11760as	13630va	15195as
			21755pa		17870pa
0600	0700		Liberia, ELWA	4760do	
0600	0700		Malaysia, Radio	7295as	
0600	0700		Malaysia, Voice of	6175as	9750as
0600	0700	vi	Namibia, Namibian BC Corp	3270do	3290do
			6060do	6175do	
0600	0700		New Zealand, Radio NZ Intl	11820pa	
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	15120af	
0600	0700		Russia, Voice of	17665pa	21790pa
0600	0700	DRM	Russia, Voice of	15780eu	
0600	0700		Sierra Leone, Radio UNAMSIL	6137do	
0600	0700	irreg/vl	Sierra Leone, SLBS	3316do	
0600	0700		Singapore, MediCorp Radio	6150do	
0600	0700	vi	Solomon Islands, SIBC	5020do	9545do
0600	0700		South Africa, Channel Africa	7240af	
0600	0700		Swaziland, TWR	4775af	9500af
0600	0700		UK, BBC World Service	6190af	7160af
			9410va 11765as	11955as	12095as
			15310as	15360as	15400af
			15575me	17640af	17790as
0600	0700	as	UK, BBC World Service	17885af	
0600	0700		USA, AFRTS	4319usb	5765usb
			7590usb	7812usb	12133usb
			12133usb	12579usb	13362usb
0600	0700		USA, KAIJ Dallas TX	5755na	
0600	0700		USA, KTBN Salt Lake City UT	7505na	
0600	0700		USA, KWHR Naalehu HI	9510as	13700as
0600	0700		USA, Voice of America	6080af	6180af
			7290af 12080af	13645af	
0600	0700		USA, WBCQ Kennebunk ME	7415na	
0600	0700		USA, WBOH Newport NC	5920am	
0600	0700		USA, WEWN Birmingham AL	5850va	7425va
			7570va		
0600	0700		USA, WHRA Greenbush ME	7490na	
0600	0700		USA, WHRI Noblesville IN	7315am	7465am
0600	0700		USA, WJIE Louisville KY	13595am	
0600	0700		USA, WMLK Bethel PA	9265eu	9955eu
0600	0700		USA, WRMI Miami FL 7385am		
0600	0700		USA, WTJC Newport NC	9370na	
0600	0700		USA, WWCR Nashville TN	3210na	5070na

0600	0700		5935na	5935na	
			USA, WYFR Okeechobee FL	5810eu	7355eu
			9680eu 11530eu	11580eu	
0600	0700	vi	Vanuatu, Radio	4960do	
0600	0700		Yemen, Rep of Yemen Radio	9780me	
0600	0700		Zambia, Radio Christian Voice	9865af	
0600	0700	vi	Zimbabwe, ZBC Corp	5975do	
0630	0645		Vatican City, Vatican Radio	4005af	5885af
			7250af 9645eu	11740ca	15595ca
0630	0656		Romania, Radio Romania Intl	9655eu	11830eu
0630	0700		Bulgaria, Radio	11600eu	13600eu
0630	0700	s	Germany, Bible Voice Broadcasting	5945eu	
0630	0700		Vatican City, Vatican Radio	11625af	13765ca
			15570va		
0645	0700	s	Albania, TWR	11865eu	
0645	0700	s	Monaco, TWR	9870eu	

0700 UTC - 3AM EDT / 2AM CDT / 12AM PDT

0700	0705		New Zealand, Radio NZ Intl	11820pa	
0700	0727		Czech Rep, Radio Prague Intl	9880eu	11600eu
0700	0730		Slovakia, Slovak Radio	9440va	15460pa
0700	0730		UK, BBC World Service	11760me	15575me
0700	0800	mtwhf	Albania, TWR	11865eu	
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, HCJB	11750au	
0700	0800		Australia, Radio	9660as	12080as
			15160pa	15240va	15415as
0700	0800		Australia, Voice Intl	15335as	
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		China, China Radio Intl	11880as	13710eu
			15350as	15465as	17490eu
0700	0800		Costa Rica, University Network	5030va	6150va
			7375va 9725va	11870va	
0700	0800		Eat Guinea, Radio Africa	15190af	
0700	0800		France, Radio France Intl	15605af	
0700	0800	as	Germany, Bible Voice Broadcasting	5945eu	
0700	0800		Germany, Deutsche Welle	6140eu	
0700	0800	DRM	Germany, Deutsche Welle	21675eu	
0700	0800	vi	Ghana, Ghana BC Corp	3366do	4915do
0700	0800		Guyana, Voice of	3291do	5950do
0700	0800	vi/as	Italy, IRRS 13840va		
0700	0800		Liberia, ELWA	4760do	
0700	0800		Malaysia, Radio	7295as	
0700	0800		Malaysia, Voice of	6175as	9750as
0700	0800	mtwhf/a	Monaco, TWR	9870eu	15295as
0700	0800		Myanmar, Radio	9730do	
0700	0800	vi	Namibia, Namibian BC Corp	3270do	3290do
			6060do	6175do	
0700	0800		Nigeria, Radio/Ibadan	6050do	
0700	0800		Nigeria, Radio/Kaduna	4770do	6090do
0700	0800		Nigeria, Radio/Lagos	3326do	4990do
0700	0800		Russia, Voice of	17495pa	17635pa
0700	0800	DRM	Russia, Voice of	15780eu	
0700	0800		Sierra Leone, Radio UNAMSIL	6137do	
0700	0800	irreg/vl	Sierra Leone, SLBS	3316do	
0700	0800		Singapore, MediCorp Radio	6150do	
0700	0800	vi	Solomon Islands, SIBC	5020do	9545do
0700	0800		South Africa, Channel Africa	7240af	
0700	0800		Swaziland, TWR	4775af	9500af
0700	0800		Swaziland, TWR	4775af	9500af
0700	0800		Taiwan, Radio Taiwan Intl	5950na	
0700	0800		UK, BBC World Service	6005af	6190af
			11940cf	11765af	11955as
			15310oc	15360os	15400af
			17760as	17790as	17830af
0700	0800		USA, AFRTS	4319usb	5465usb
			7590usb	7812usb	12133usb
			12133usb	12579usb	13362usb
0700	0800		USA, KAIJ Dallas TX	5755na	
0700	0800		USA, KTBN Salt Lake City UT	7505na	
0700	0800		USA, KWHR Naalehu HI	9510as	13700as
0700	0800		USA, Voice of America	6080af	6180af
			13645af		
0700	0800		USA, WBOH Newport NC	5920am	
0700	0800		USA, WEWN Birmingham AL	5850va	7475va
			7570va		
0700	0800		USA, WHRI Noblesville IN	7315am	7465am
0700	0800		USA, WJIE Louisville KY	13595am	
0700	0800		USA, WMLK Bethel PA	9265eu	9955eu
0700	0800		USA, WRMI Miami FL 7385am		
0700	0800		USA, WTJC Newport NC	9370na	
0700	0800		USA, WWCR Nashville TN	3210na	5070na
			5935na	5935na	
0700	0800		USA, WYFR Okeechobee FL	5985va	6855va

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0700	0800	vl	7355va9505va	9715va	9930va	
0706	0800		Vanuatu, Radio	4960do		
0715	0750	a	New Zealand, Radio NZ Intl		9885pa	
0715	0750	o	Albania, TWR	11865eu		
0730	0800		Manaca, TWR	9870eu		
0730	0800		Georgia, Radio Georgia		11805eu	
0730	0800	as	Guam, TWR/KTWR	15255as		
0730	0800	as	UK, BBC World Service		15575me	17885af
0740	0800	mtwhf	Guam, TWR/KTWR	15225as		

0815	0900	as	Guam, TWR/KTWR	11840as		
0830	0900		Australia, ABC NT Katherine	2485do		
0830	0900		Australia, ABC NT Tennant Creek	2325do		
0830	0900		Australia, Radio	5995as	9580as	9590as
			9710as 12080pa	13630po	15240po	15415pa
			17750pa			

0800 UTC - 4AM EDT / 3AM CDT / 1AM PDT

0800	0820	mtwhfs	Albania, TWR	11865eu		
0800	0820	s	Monaco, TWR	9870eu		
0800	0830		Australia, ABC NT Katherine	5025do		
0800	0830		Australia, ABC NT Tennant Creek	4910do		
0800	0830		Australia, Radio	5995as	9580as	9590as
			9710as 12080pa	13630pa	15240pa	17750pa
0800	0830	as	Australia, Radio	15415va		
0800	0830		Liberia, ELWA	4760do		
0800	0830		Malaysia, Voice of	6175as	9750as	
0800	0830		Myanmar, Radio	9730do		
0800	0830		Swaziland, TWR	4775af	6120af	9500af
0800	0845	as	Germany, Bible Voice Broadcasting	5945eu		
0800	0900		Anguilla, Caribbean Beacon	6090am		
0800	0900		Australia, ABC NT Alice Springs	2310irr	4835do	
0800	0900		Australia, HCJB	11750au		
0800	0900		Australia, Voice Intl	15335as		
0800	0900		Canada, CFRX Toronto ON	6070do		
0800	0900		Canada, CFVP Calgary AB	6030do		
0800	0900		Canada, CKZN St John's NF	6160do		
0800	0900		Canada, CKZU Vancouver BC	6160do		
0800	0900		China, China Radio Intl	11880as	13710eu	
			15350as	15465as	17490eu	17540as
0800	0900		Costa Rica, University Network	5030va	6150va	
			7375va9725va	11870va		
0800	0900		Eqt Guinea, Radio Africa	15190af		
0800	0900		Germany, Deutsche Welle	6140eu		
0800	0900	DRM	Germany, Deutsche Welle	21675eu		
0800	0900	vl	Ghana, Ghana BC Corp	3366do	4915do	
0800	0900	mtwhf	Guam, TWR/KTWR	11840as		
0800	0900		Guyana, Voice of	3291do	5950do	
0800	0900		Indonesia, Voice of	9525as	11785pa	15150al
0800	0900	vl/as	Italy, IRRS13840va	15725al		
0800	0900		Malaysia, Radio	7295as		
0800	0900		Malaysia, Voice of	15295as		
0800	0900		New Zealand, Radio NZ Intl	9885pa		
0800	0900		Nigeria, Radio/Ibadan	6050do		
0800	0900		Nigeria, Radio/Kaduna	4770do	6090do	
0800	0900		Nigeria, Radio/Lagos	3326do	4990do	
0800	0900	vl	Pakistan, Radio	15100eu	17835eu	
0800	0900		Papua New Guinea, Catholic Radio		4960do	
0800	0900		Papua New Guinea, NBC	4890do		
0800	0900		Russia, Voice of	17495pa	17635pa	21790pa
0800	0900	DRM	Russia, Voice of	15780eu		
0800	0900		Sierra Leone, Radio UNAMSIL	6137do		
0800	0900	irreg/ vl	Sierra Leone, SLBS	3316do		
0800	0900		Singapore, Mediacorp Radio	6150do		
0800	0900	vl	Solomon Islands, SIBC	5020do	9545do	
0800	0900	s	South Africa, African Radio League	17810af	7205af	
0800	0900		South Korea, Radio Korea Intl	9570as	9640eu	
0800	0900		Taiwan, Radio Taiwan Intl	9610pa		
0800	0900		UK, BBC World Service	6190af	11760me	
			11940af	11955as	15310as	15360as
			15400af	15485af	15575me	17640eu
			17760as	17790as	17830af	17885af
0800	0900		USA, AFRTS	21470af	21660as	
			USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0800	0900		USA, KAIJ Dallas TX	5755na		
0800	0900		USA, KNLS Anchor Point AK	11870as		
0800	0900		USA, KTBN Salt Lake City UT	7505na		
0800	0900		USA, KWHR Naalehu HI	9510as	13700as	
0800	0900		USA, Voice of America	6080af	7290af	
			13645af			
0800	0900		USA, WBOH Newport NC	5920am		
0800	0900		USA, WERN Birmingham AL	5850va	7425va	
			7570va			
0800	0900		USA, WHRI Noblesville IN	7315am	7520am	
0800	0900		USA, WJIE Louisville KY	13595am		
0800	0900		USA, WMLK Bethel PA	9265eu	9955eu	
0800	0900		USA, WRMI Miami FL7385am			
0800	0900		USA, WTJC Newport NC	9370na		
0800	0900		USA, WWCR Nashville TN	3210na	5070na	
			5935na	5935na		
0800	0900	s	USA, WWRB Manchester TN	9320na		
0800	0900		USA, WYFR Okeechobee FL	5950af	5985af	
			6855af 9930af			
0800	0900	vl	Vanuatu, Radio	4960do		

0900 UTC - 5AM EDT / 4AM CDT / 2AM PDT

0900	0915	vl	Ghana, Ghana BC Corp	3366do	4915do	
0900	0927		Czech Rep, Radio Prague Intl	21745va		
0900	0930		Australia, Radio	9580as	9590as	15240as
0900	0930	as	Australia, Radio	15415va		
0900	0930		Guam, TWR/KTWR	11840as		
0900	1000		Anguilla, Caribbean Beacon	6090am		
0900	1000		Australia, ABC NT Alice Springs	2310do	4835irr	
0900	1000		Australia, ABC NT Katherine	2485do		
0900	1000		Australia, ABC NT Tennant Creek	2325do		
0900	1000		Australia, HCJB	11750au		
0900	1000		Australia, Voice Intl	11955as		
0900	1000		Canada, CFRX Toronto ON	6070do		
0900	1000		Canada, CFVP Calgary AB	6030do		
0900	1000		Canada, CKZN St John's NF	6160do		
0900	1000		Canada, CKZU Vancouver BC	6160do		
0900	1000		China, China Radio Intl	15210pa	17490eu	
			17690pa			
0900	1000		Costa Rica, University Network	5030va	6150va	
			7375va9725va	11870va	13750va	
0900	1000		Eqt Guinea, Radio Africa	15190af		
0900	1000		Germany, Deutsche Welle	6140eu		
0900	1000	DRM	Germany, Deutsche Welle	21675eu		
0900	1000		Guyana, Voice of	3291do	5950do	
0900	1000	vl/as	Italy, IRRS13840va	15725al		
0900	1000		Malaysia, Radio	7295as		
0900	1000		Malaysia, Voice of	15295as		
0900	1000	vl	Namibia, Namibian BC Corp	3270do	3290do	
			6060do	6175do		
0900	1000	asm/DRM	Netherlands, Radio	7240eu		
0900	1000		New Zealand, Radio NZ Intl	9885pa		
0900	1000		Nigeria, Radio/Ibadan	6050do		
0900	1000		Nigeria, Radio/Kaduna	4770do	6090do	
0900	1000		Nigeria, Radio/Lagos	3326do	4990do	
0900	1000	vl	Pakistan, Radio	15100eu	17835eu	
0900	1000		Papua New Guinea, Catholic Radio		4960do	
0900	1000		Papua New Guinea, NBC	4890do		
0900	1000	vl	Rwanda, Radio	6055do		
0900	1000		Sierra Leone, Radio UNAMSIL	6137do		
0900	1000	irreg/ vl	Sierra Leone, SLBS	3316do		
0900	1000		Singapore, Mediacorp Radio	6150do		
0900	1000	vl	Solomon Islands, SIBC	5020do	9545do	
0900	1000		UK, BBC World Service	6190af	6195pa	9545do
			9605as 9740as	11760me	11940af	15310as
			15360as	15400af	15485af	15575me
			17640eu	17760as	17790as	17830af
			17885af	21470af	21660as	
0900	1000		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0900	1000		USA, KAIJ Dallas TX	5755na		
0900	1000		USA, KTBN Salt Lake City UT	7505na		
0900	1000		USA, KWHR Naalehu HI	9510as	9930as	
0900	1000		USA, Voice of America	9520va	15205va	
			17745va			
0900	1000		USA, WBOH Newport NC	5920am		
0900	1000		USA, WERN Birmingham AL	5850na	7425na	
0900	1000		USA, WHRI Noblesville IN	7520am	9495am	
0900	1000		USA, WJIE Louisville KY	7490am	13595am	
0900	1000		USA, WRMI Miami FL9955am			
0900	1000		USA, WTJC Newport NC	9370na		
0900	1000		USA, WWCR Nashville TN	5070na	5765na	
			5935na	9985na		
0900	1000	s	USA, WWRB Manchester TN	9320na		
0900	1000		USA, WYFR Okeechobee FL	5985af	6855af	
			9755af			
0900	1000	vl	Vanuatu, Radio	4960do		
0905	1000	vl/s	Greece, Voice of	9420eu	11645eu	15630eu
			15650eu	21530eu		
0930	0945		Israel, Kol Israel	15640va		
0930	1000		Australia, Radio	9580as	9590as	15240as
			15415pa			
0930	1000	s	UAE, Radio UNMEE	21460af		
0930	1000		Vatican City, Vatican Radio	5885eu		

1000 UTC - 6AM EDT / 5AM CDT / 3AM PDT

1000	1030		Australia, Voice Intl	11955as	13685as	
1000	1030		Guam, AWR/KSDA	11930as		
1000	1030		Mongolia, Voice of	12085as		
1000	1057		Netherlands, Radio	7315va	9790va	12065va
			13820va			

Shortwave Guide



1000	1059	New Zealand, Radio NZ Intl	9885pa		
1000	1100	Anguilla, Caribbean Beacon	11775am		
1000	1100	Australia, ABC NT Alice Springs	2310do	4835irr	
1000	1100	Australia, ABC NT Katherine	2485do		
1000	1100	Australia, ABC NT Tennant Creek	2325do		
1000	1100	Australia, HCJB	15425as		
1000	1100	Australia, Radio	9580as	15240as	
		15415pa			
1000	1100	Canada, CFRX Toronto ON	6070do		
1000	1100	Canada, CFVP Calgary AB	6030do		
1000	1100	Canada, CKZN St John's NF	6160do		
1000	1100	Canada, CKZU Vancouver BC	6160do		
1000	1100	China, China Radio Intl	15210pa	17490eu	
		17690po			
1000	1100	Costa Rica, University Network	5030va	6150va	
		7375va/9725va	11870va	13750va	
1000	1100	Guyana, Voice of	3291do	5950do	
1000	1100	India, All India Radio	13695as	15020as	15410as
		17800as	17895as		
1000	1100	Italy, IRRS 13840va	15725af		
1000	1100	Japan, Radio	6120na	9695as	11730as
		17585eu	17720va	21755pa	
1000	1100	Malaysia, Radio	7295as		
1000	1100	Malaysia, Voice of	15295as		
1000	1100	Netherlands, Radio	7240eu		
1000	1100	Nigeria, Voice of	15120af		
1000	1100	North Korea, Voice of	3560as	11710as	
		11735as	13650ca	15180ca	
1000	1100	Papua New Guinea, Catholic Radio		4960do	
1000	1100	Papua New Guinea, NBC	4890do		
1000	1100	Singapore, Mediacorp Radio	6150do		
1000	1100	Solomon Islands, SIBC	5020do	9545do	
1000	1100	South Africa, Channel Africa	11825af		
1000	1100	UK, BBC World Service	6190af	6195va	
		9605as/11760me	15310as	15360as	
		15485af	15575me	17540me	
		17760as	17790as	17885af	21470af
		21660as			
1000	1100	UK, BBC World Service	15400af	17830af	
1000	1100	USA, AFRTS	4319usb	5446usb	5765usb
		7590usb	7812usb	12133usb	12579usb
		12133usb	12579usb	13362usb	13855usb
		21660as			
1000	1100	USA, KAJI Dallas TX	5755na		
1000	1100	USA, KNLS Anchor Point AK	9795as		
1000	1100	USA, KTVB Salt Lake City UT	7505na		
1000	1100	USA, KWHR Naalehu HI	9930as		
1000	1100	USA, Voice of America	9705va	15205va	
		17745va			
1000	1100	USA, WBOH Newport NC	5920am		
1000	1100	USA, WEWN Birmingham AL	5745na	7425na	
1000	1100	USA, WHRI Noblesville IN	7520am	9495am	
1000	1100	USA, WINB Red Lion PA	9320am		
1000	1100	USA, WJIE Louisville KY	7490am		
1000	1100	USA, WRMI Miami FL 9955am			
1000	1100	USA, WTJC Newport NC	9370na		
1000	1100	USA, WWCR Nashville TN	5070na	5765na	
		5935na	15825na		
1000	1100	USA, WWRB Manchester TN	9320na		
1000	1100	USA, WYFR Okeechobee FL	5950na	5985na	
		6855na	9755na		
1030	1045	Ethiopia, Radio	7110af	9704af	
1030	1057	Czech Rep, Radio Prague Intl	9880eu	11615eu	
1030	1058	Vietnam, Voice of	7285as		
1030	1100	Iran, Voice of the Islamic Rep	15660as	17660as	

1100 UTC - 7AM EDT / 6AM CDT / 4AM PDT

1100	1104	Pakistan, Radio	15100eu	17835eu	
1100	1128	Vietnam, Voice of	9840as	7220as	7285as
1100	1130	Australia, Radio	5995as	6020as	9475as
		9560as/9580as	9590as	12080as	15240pa
1100	1130	Iran, Voice of the Islamic Rep	15660as	17660as	
1100	1130	UK, BBC World Service	6190af	11940af	
		15400af	15485af	17830af	17885af
		21470af			
1100	1157	Netherlands, Radio	11675na		
1100	1159	Germany, Universal Life	6055me		
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, HCJB	15425as		
1100	1200	Australia, Voice Intl	13635as	13685as	
1100	1200	Canada, CBC NQ SW Service	9625na		
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	China, China Radio Intl	11750na	13650eu	
		17490eu			

1100	1200	Costa Rica, University Network	5030vc	6150va	
		7375va/9725va	11870va	13750va	
1100	1200	Ecuador, -HCJB	12005am	21455am	
1100	1200	Germany, Overcomer Ministries		6110eu	
1100	1200	Italy, IRRS 13840va	15725af		
1100	1200	Italy, IRRS 13840va	15725af		
1100	1200	Japan, Radio	6120na	9695as	11730as
1100	1200	Malaysia, Radio	7295as		
1100	1200	Malaysia, Voice of	15295as		
1100	1200	New Zealand, Radio NZ Intl		9885pa	
1100	1200	Nigeria, Voice of	15120af		
1100	1200	Papua New Guinea, Catholic Radio		4960do	
1100	1200	Papua New Guinea, NBC	4890do		
1100	1200	Singapore, Radio Singapore Intl	6080a:	6150as	
1100	1200	South Africa, Channel Africa	11825wf		
1100	1200	Taiwan, Radio Taiwan Intl	7445as		
1100	1200	UK, BBC World Service	6195as	9740as	
		11760me	11865am	15310ms	15575me
		17640va	17760as	17790ms	
1100	1200	Ukraine, Radio Ukraine Intl		15675eu	
1100	1200	USA, AFRTS	4319usb	5446usb	5765usb
		7590usb	7812usb	12133usb	12579usb
		12133usb	12579usb	13362usb	13855usb
1100	1200	USA, KAJI Dallas TX	5755na		
1100	1200	USA, KTVB Salt Lake City UT	7505na		
1100	1200	USA, KWHR Naalehu HI	11555as		
1100	1200	USA, Voice of America	9705va	15205va	
		17745va			
1100	1200	USA, WBOH Newport NC	5920am		
1100	1200	USA, WEWN Birmingham AL	5745na	11530na	
		13615na			
1100	1200	USA, WHRI Noblesville IN	7520am	9495am	
1100	1200	USA, WINB Red Lion PA	9320am		
1100	1200	USA, WJIE Louisville KY	7490am		
1100	1200	USA, WRMI Miami FL 9955am			
1100	1200	USA, WTJC Newport NC	9370na		
1100	1200	USA, WWCR Nashville TN	5070na	5765na	
		5935na	15825na		
1100	1200	USA, WWRB Manchester TN	9320na		
1100	1200	USA, WYFR Okeechobee FL	5950na	5985na	
		6855na	9755na		
1125	1200	Vatican City, Vatican Radio	15595me		
1130	1159	Germany, Universal Life	6055me		
1130	1200	Australia, Radio	5995as	6020as	9475as
		9560as/9580as	9590as	12080as	15240pa
1130	1200	Bulgaria, Radio	11700eu	15700eu	
1130	1200	UAE, Radio UNMEE	21550af		
1130	1200	UK, BBC World Service	6190af	11940af	
		15485af	17830af	17885af	21470af
1130	1200	Vatican City, Vatican Radio	17515me		
1145	1200	Libya, Voice of Africa	17695af	21675af	21695af

1200 UTC - 8AM EDT / 7AM CDT / 5AM PDT

1200	1215	Cambodia, National Radio	11940as		
1200	1230	France, Radio France Intl	17815af	21620af	
1200	1230	Malaysia, Voice of	15295as		
1200	1230	UAE, AWR Africa	15135as		
1200	1230	Uzbekistan, Radio Tashkent	7285a:	15295as	
		17775as			
1200	1259	Canada, Radio Canada Intl	9660a:	15170as	
1200	1259	New Zealand, Radio NZ Intl	9885pa		
1200	1259	Poland, Radio Polonia	9525eu	11850eu	
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, HCJB	15425as		
1200	1300	Australia, Radio	5995as	6020a:	9475as
		9560as/9580as	9590as		
1200	1300	Australia, Voice Intl	13635as	13685as	
1200	1300	Canada, CBC NQ SW Service	9625na		
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	Canada, Radio Canada Intl	9515a:n	13655am	
		17800am			
1200	1300	China, China Radio Intl	9730a:	9760pa	
		11760pa	11980as	13650eu	13790eu
		17490eu			
1200	1300	Costa Rica, University Network	9725va	11870va	
		13750va			
1200	1300	Ecuador, HCJB	12005am	21455am	
1200	1300	Italy, IRRS-15725va			
1200	1300	Malaysia, Radio	7295as		
1200	1300	Netherlands, Radio	7240na		
1200	1300	Nigeria, Voice of	15120af		
1200	1300	Papua New Guinea, Catholic Radio		4960do	
1200	1300	Papua New Guinea, NBC	4890do		

Shortwave Guide



1200	1300		Singapore, Radio Singapore Intl	6080as	6150as	
1200	1300		South Korea, Radio Korea Intl	9650va		
1200	1300		Taiwan, Radio Taiwan Intl	7130as		
1200	1300		UK, BBC World Service	6190af	9605am	
			11760me	11865am	11940af	15190am
			15485af	15565eu	15575me	17640eu
			17640me	17830me	17885af	21470af
1200	1300		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
			USA, KAIJ Dallas TX	5755na		
1200	1300		USA, KNLS Anchor Point AK	9615as		
1200	1300		USA, KTBN Salt Lake City UT	7505na		
1200	1300		USA, KWHR Naalehu HI	11555as		
1200	1300		USA, Voice of America	6160va	9645va	
			9760va	15240va		
1200	1300		USA, WBCQ Kennebunk ME	17495na		
1200	1300		USA, WBOH Newport NC	5920am		
1200	1300		USA, WEWN Birmingham AL	5745na	11530na	
			13615na			
1200	1300		USA, WHRA Greenbush ME	15310na		
1200	1300	as	USA, WHRI Noblesville IN	9840am	11785am	
1200	1300		USA, WINB Red Lion PA	9320am		
1200	1300		USA, WJIE Louisville KY	7490am		
1200	1300		USA, WRMI Miami FL	7385am		
1200	1300		USA, WTJC Newport NC	9370na		
1200	1300		USA, WWCN Nashville TN	7465na	13845na	
			9985na	15825na		
1200	1300	s	USA, WWRB Manchester TN	9320na		
1200	1300		USA, WYFR Okeechobee FL	5950na	5985na	
			17505na	17750na		
1205	1220	m	Austria, Radio Austria Intl	6155va	13730va	
			17715va			
1215	1230	twhf	Austria, Radio Austria Intl	17715va		
1215	1300		Egypt, Radio Cairo	17835as		
1230	1245	h	Germany, Bible Voice Broadcasting	12065as		
1230	1245	mtwhf	Guam, TWR/KTWR	11750as		
1230	1258		Vietnam, Voice of	9840as	12020as	
1230	1300		Australia, HCJB	15405as		
1230	1300		Bangladesh, Bangla Betor	7185as		
1230	1300	s	Germany, Bible Voice Broadcasting	5890as		
1230	1300		Sri Lanka, SLBC	6005as	11930as	15745as
1230	1300		Sweden, Radio	13580va	15240na	15735va
1230	1300		Thailand, Radio	9600va		
1230	1300		Turkey, Voice of	15225eu	15535va	
1230	1300	a	UK, Wales Radio Intl	17745pa		
1235	1300	as	Austria, Radio Austria Intl	17715va		
1245	1300	twhf	Austria, Radio Austria Intl	6155eu	13730eu	
			17715va			

1300 UTC - 9AM EDT / 8AM CDT / 6AM PDT

1300	1315	s	Germany, Bible Voice Broadcasting	5890eu		
1300	1320	DRM	Canada, Radio Canada Intl	7240eu		
1300	1329		Canada, Radio Canada Intl	9660as	15170as	
1300	1329		Czech Rep, Radio Prague Intl	13580eu	21745af	
1300	1330		Ecuador, HCJB	12005am	21455am	
1300	1330		Egypt, Radio Cairo	17835as		
1300	1335		Turkey, Voice of	15225eu	15535va	
1300	1356		Romania, Radio Romania Intl	11830eu	15105eu	
1300	1357	DRM	China, China Radio Intl	7250va	11810va	
1300	1400		Anguilla, Caribbean Beacon	11775am		
1300	1400		Australia, Radio	5995as	6020as	9560pa
			9580pa	9590pa		
1300	1400		Australia, Voice Intl	13635as	13685as	
1300	1400	as	Canada, CBC NQ SW Service	9625na		
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	as	Canada, CKZU Vancouver BC	6160do		
			Canada, Radio Canada Intl	9515am	13655am	
			17800am			
1300	1400		China, China Radio Intl	9650am	11760pa	
			11900pa	11980as	13790eu	15260am
			17490eu	17625ca		
1300	1400		Costa Rica, University Network	9725va	11870va	
			13750va			
1300	1400		Germany, Deutsche Welle	6140eu		
1300	1400	vl/a	Italy, IRRS 15725va			
1300	1400		Jordan, Radio	11690na		
1300	1400		Malaysia, Radio	7295as		
1300	1400		New Zealand, Radio NZ Intl	6095pa		
1300	1400		Nigeria, Voice of	15120af		
1300	1400		North Korea, Voice of	4405eu	9335eu	
			11710na	13760na	15245eu	
1300	1400		Papua New Guinea, Catholic Radio		4960do	
1300	1400		Papua New Guinea, N8C	4890do		
1300	1400		Singapore, Radio Singapore Intl	6080as	6150as	
1300	1400		South Korea, Radio Korea Intl	9570as	9770as	
1300	1400		Sri Lanka, SLBC	6005as	11930as	15745as
1300	1400		UK, BBC World Service	6190af	6195as	

9740as	11760me	11940af	15190am	15310as		
15420af	15485af	15565va	15575me			
17640va	17760as	17790as	17830af			
17885af	21470af					
1300	1400		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
1300	1400		USA, KAIJ Dallas TX	5755na		
1300	1400		USA, KTBN Salt Lake City UT		7505na	
1300	1400		USA, KWHR Naalehu HI		11555as	
1300	1400		USA, Voice of America		9645va	9760va
1300	1400		USA, WBCQ Kennebunk ME		17495na	
1300	1400		USA, WBOH Newport NC		5920am	
1300	1400		USA, WEWN Birmingham AL		5745na	11530na
			13615na			
1300	1400		USA, WHRA Greenbush ME		15310na	
1300	1400	mtwhf	USA, WHRI Noblesville IN		15285am	
1300	1400		USA, WINB Red Lion PA		13570am	
1300	1400		USA, WJIE Louisville KY		7490am	
1300	1400		USA, WRMI Miami FL	7385am		
1300	1400		USA, WTJC Newport NC		9370na	
1300	1400		USA, WWCN Nashville TN		7465na	13845na
			9985na	15825na		
1300	1400		USA, WYFR Okeechobee FL		11830va	11865va
			11910va	17750va		
1330	1400	s	Australia, HCJB	15405as		
1330	1400		Guam, AWR/KSDA	11980as		
1330	1400	mtwhf	Guam, AWR/KSDA	15275as		
1330	1400		India, All India Radio	9690as	11620as	13710as
1330	1400		Laos, National Radio	7145as		
1330	1400		Sweden, Radio	15240na	15735va	
1330	1400		Uzbekistan, Radio Tashkent	17775as	7285as	15295as

1400 UTC - 10AM EDT / 9AM CDT / 7AM PDT

1400	1415	h	Germany, Bible Voice Broadcasting	7485as		
1400	1415		Russia, FEBA	9500as		
1400	1430		Australia, Radio	5995as	6080as	7240as
			9590as	9625pa		
1400	1430	mtwhf	Germany, Deutsche Welle		15725na	
1400	1430		Thailand, Radio	9830va		
1400	1445	a	Germany, Pan American BC		15650me	
1400	1459	as	Canada, Radio Canada Intl		9515am	13655am
			17800am			
1400	1500		Anguilla, Caribbean Beacon		11775am	
1400	1500		Australia, Voice Intl	13635as	15205as	
1400	1500	as	Canada, CBC NQ SW Service		9625na	
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, CKZU Vancouver BC		6160do	
1400	1500		China, China Radio Intl		9590as	11675as
			11765as	11775as	13685af	13740na
			13790eu	17630af	17650eu	
1400	1500	DRM	China, China Radio Intl		9610va	
1400	1500		Costa Rica, University Network		9725va	11870va
			13750va			
1400	1500		France, Radio France Intl		9580va	15615va
1400	1500	as	Germany, Bible Voice Broadcasting		7485as	
1400	1500		Germany, Deutsche Welle		6140eu	
1400	1500	vl/a	Greece, Voice of	9375eu	9420eu	9775eu
			12105eu	15630eu	15650eu	
1400	1500		India, All India Radio	9690as	11620as	13710as
1400	1500	vl/a	Italy, IRRS 15725va			
1400	1500		Japan, Radio	7200as	11730as	11840pa
1400	1500		Jordan, Radio	11690na		
1400	1500		Malaysia, Radio	7295as		
1400	1500		Netherlands, Radio	9345va	9890va	11835va
1400	1500		New Zealand, Radio NZ Intl		6095pa	
1400	1500		Nigeria, Voice of	15120af		
1400	1500	DRM	Russia, Voice of	9480eu		
			Russia, Voice of	6205as	7390as	9745as
			11755as	15605as	17645as	
1400	1500		Singapore, Mediacorp Radio		6150do	
1400	1500		South Africa, Channel Africa		11825af	
1400	1500		Sri Lanka, SLBC	6005as	11930as	15745as
1400	1500		Taiwan, Radio Taiwan Intl		15265as	
1400	1500		UK, BBC World Service		6190af	6195as
			7105as	9740as	11760me	11940af
			15485af	15565va	17640va	17790as
			17830af	21470af	21660af	
1400	1500		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
1400	1500		USA, KAIJ Dallas TX	5755na		
1400	1500		USA, KJES Vado NM	11715na		
1400	1500		USA, KNLS Anchor Point AK		9795as	
1400	1500		USA, KTBN Salt Lake City UT		7505na	15590na
1400	1500		USA, KWHR Naalehu HI		11555as	
1400	1500		USA, Voice of America		6160va	7125va

Shortwave Guide



1400	1500		9760va	15265va		
1400	1500		USA, WBCQ	Kennebunk ME	17495na	
1400	1500		USA, WBOH	Newport NC	5920am	
1400	1500		USA, WEWN	Birmingham AL	9955na	11530na
				15745na		
1400	1500		USA, WHRA	Greenbush ME	15310na	
1400	1500		USA, WHRI	Noblesville IN	9840am	15285am
1400	1500		USA, WINB	Red Lion PA	13570am	
1400	1500		USA, WJIE	Louisville KY	7490am	
1400	1500		USA, WRMI	Miami FL	7385am	
1400	1500		USA, WTJC	Newport NC	9370na	
1400	1500		USA, WWCR	Nashville TN	9985na	12160na
				13845na	15825na	
1400	1500		USA, WYFR	Okeechobee FL	11830va	11910va
				13695va	17750va	
1415	1430		Nepal, Radio		3230as	5005as 6100as
				7165as		
1430	1445	s	Germany, Pan American	BC	15650as	
1430	1500		Australia, HCJB		15390as	
1430	1500		Australia, Radio		5995as	6080as 7240as
				9475as	9590pa	9625pa
1430	1500	DRM	South Korea, Radio Korea	Intl	9770eu	
1445	1500	os	Germany, Pan American	BC	15650me	

1500 UTC - 11AM EDT / 10AM CDT / 8AM PDT

1500	1515	s	Germany, Pan American	BC	15650as	
1500	1515		Russia, FEBA		7320as	
1500	1528	s	Hungary, Radio Budapest		6025eu	9655eu
1500	1528		Vietnam, Voice of		9550va	9840va 12020va
				13860va		
1500	1530		Mongolia, Voice of		12015eu	
1500	1530		Sri Lanka, SLBC		6005as	11930as 15745as
1500	1530		UK, BBC World Service		6190af	6195as 6195as
				7105as	9740as	11860af 12095af
				15310as	15400af	15420af 15485af
				17790as	17790as	21470af 21490af
				21660af		
1500	1555		South Africa, Channel Africa		17770af	
1500	1557		Netherlands, Radio		9345va	9890va 11835va
1500	1559	as	Canada, Radio Canada	Intl	9515am	11780am 13655am
				17800am		
1500	1600		Anguilla, Caribbean Beacon		11775am	
1500	1600		Australia, HCJB		15390as	
1500	1600		Australia, Radio		5995as	6080as 7240as
				9475as	9590pa	9625pa
1500	1600		Australia, Voice Intl		11840as	13635as 15205as
1500	1600	as	Canada, CBC NQ SW Service		9625na	
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		Canada, Radio Canada	Intl	11675as	15360as
				17720as		
1500	1600		China, China Radio Intl		6100af	7160as 13685of
				11775as	11965eu	
				13740na	17490eu	
1500	1600	DRM	China, China Radio Intl		9610va	
1500	1600		Costa Rica, University Network		9725va	11870va
				13750va		
1500	1600	a	Germany, Bible Voice Broadcasting		17510me	
1500	1600	m	Germany, Bible Voice Broadcasting		13590as	
1500	1600		Germany, Deutsche Welle		6140eu	
1500	1600		Germany, Overcomer Ministries		6110eu	13810me
1500	1600	vi/as	Greece, Voice of		9375va	9420va 9775va
				12105va	15630va	
1500	1600		Guam, TWR/KTWR		12105as	
1500	1600		Japan, Radio		6190as	7200as 9505va
				11730as		
1500	1600		Jordan, Radio		11690na	
1500	1600		Malaysia, Radio		7295as	
1500	1600		New Zealand, Radio NZ Intl		6095pa	
1500	1600		North Korea, Voice of		3560af	4405eu
				9335eu	11710na	13760va
1500	1600		Russia, Voice of		4975me	7315af
				7325me	9810eu	11985me
1500	1600		Singapore, Mediacorp Radio		6150do	
1500	1600		South Africa, Channel Africa		11825af	
1500	1600		UK, BBC World Service		15565eu	15575me
1500	1600	vi/mtwhf	UK, Sudan Radio Service		15530va	
1500	1600		USA, AFRTS		4319usb	5446usb 5765usb
				7590usb	7812usb	12133usb 12579usb
				12133usb	12579usb	13362usb 13855usb
1500	1600		USA, KAIJ Dallas TX		13815na	
1500	1600		USA, KJES Vado NM		11715na	
1500	1600		USA, KTBN Salt Lake City	UT	15590na	
1500	1600		USA, KWHR Naalehu HI		11555as	
1500	1600		USA, Voice of America		7125va	9825va
				9850of	15195va	15445va
1500	1600		USA, WBCQ Kennebunk ME		17495na	
1500	1600		USA, WBOH Newport NC		5920am	

1500	1600		USA, WEWN Birmingham AL		9955na	11530na
				15745na		
1500	1600		USA, WHRA Greenbush ME		17640na	
1500	1600		USA, WHRI Noblesville IN		12020am	15285am
1500	1600	as	USA, WINB Red Lion PA		9740am	
1500	1600	mtwhf	USA, WINB Red Lion PA		13570am	
1500	1600		USA, WJIE Louisville KY		7490am	
1500	1600		USA, WRMI Miami FL		7385am	
1500	1600		USA, WTJC Newport NC		9370na	
1500	1600		USA, WWCR Nashville TN		9985na	9985na
				13845na	15825na	
1500	1600		USA, WYFR Okeechobee FL		11830va	11910va
				15520va	15770va	17750va
1505	1520	m	Austria, Radio Austria Intl		13775na	
1505	1530	os	Austria, Radio Austria Intl		13775na	
1515	1530	twhf	Austria, Radio Austria Intl		13775na	
1515	1600		Russia, FEBA		7320as	
1530	1545	w	Germany, Pan American BC		11610as	
1530	1545	s	Germany, Pan American BC		15650me	
1530	1600	mwh	Germany, Bible Voice Broadcasting		17510as	
1530	1600	s	Germany, Bible Voice Broadcasting		13590me	
1530	1600		Iran, Voice of the Islamic Rep		9635as	11650as
1530	1600	f	Russia, FEBA		9850as	
1530	1600		Russia, TWR		7535eu	7560as
1530	1600	mtwhf	South Korea, Radio Korea Intl		15725na	
1530	1600		UAE, AWR Africa		15225as	
1530	1600		UK, BBC World Service		6190af	11940af
				12095af	15400af	15485af 21470af
				21660af		
1530	1600		USA, Voice of America		6160va	9590va
				9760va	9845va	12040va 15550va
1530	1600		Vatican City, Vatican Radio		12065as	13765as
				15235as		
1535	1300	as	Austria, Radio Austria Intl		13775na	
1540	1600	whf	Germany, Bible Voice Broadcasting		13590me	
1545	1600	m	Austria, Radio Austria Intl		13775na	
1545	1600	twhf	Austria, Radio Austria Intl		13775na	
1545	1600	a	Germany, Bible Voice Broadcasting		13590me	
1545	1600	s	Germany, Pan American BC		15650me	

1600 UTC - 12PM EDT / 11AM CDT / 9AM PDT

1600	1615	mwf	Germany, Bible Voice Broadcasting		13590me	
1600	1615		Pakistan, Radio		11570va	11850af 15100va
				15725va		
1600	1627		Czech Rep, Radio Prague Intl		5930eu	17485af
1600	1628		Vietnam, Voice of		7280va	9550va 9730va
				11630va	13860va	
1600	1630	DRM/a	Canada, Voice of NASB		11900sa	
1600	1630	s	Germany, Pan American BC		15650as	
1600	1630		Guam, AWR/KSDA		11640as	11680as
1600	1630		Guam, TWR/KTWR		12105as	
1600	1630		Iran, Voice of the Islamic Rep		9635as	11650as
1600	1630		Jordan, Radio		11690na	
1600	1630		Myanmar, Radio		9730do	
1600	1645		Russia, FEBA		9850as	
1600	1650		New Zealand, Radio NZ Intl		6095pa	
1600	1700		Anguilla, Caribbean Beacon		11775am	
1600	1700		Australia, Radio		5995as	6080as 7240as
				9475as	9710as	
1600	1700		Australia, Voice Intl		11840as	13635as 15205as
1600	1700	a	Canada, CBC NQ SW Service		9625na	
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		China, China Radio Intl		6100af	9570af
				11900af	11940eu	11965eu 13760eu
				17490eu		
1600	1700	DRM	China, China Radio Intl		17510va	
1600	1700		Costa Rica, University Network		11870va	13750va
1600	1700		Ethiopia, Radio		5990af	7110af 7165af
				9560af	9704af	11800af
1600	1700		France, Radio France Intl		7170af	15160af
				15605af	17605af	17850af
1600	1700	s	Germany, Bible Voice Broadcasting		13590me	
1600	1700	s	Germany, Deutsche Welle		6170as	7225as
				17595as		
1600	1700		Germany, Overcomer Ministries		9845eu	
1600	1700	vi	Greece, Voice of		7475va	9420va 12105va
				15630va	17705va	
1600	1700		Malaysia, Radio		7295as	
1600	1700		North Korea, Voice of		3560va	9990me
				11545va		
1600	1700		Russia, Voice of		6070va	9405as 11640as
				11985af	12055va	15540va
1600	1700		South Korea, Radio Korea Intl		5975va	9870va
1600	1700		Taiwan, Radio Taiwan Intl		11815as	
1600	1700	DRM f	Taiwan, Radio Taiwan Intl		9770eu	
1600	1700		UK, BBC World Service		3915as	5975as
				6190af	6195as	9410eu 9510as

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			11940af	12095va	15105as	15310as		
			15400af	15420af	15485af	15565va		
			17790as	17820af	17830af	21470af		
1600	1700	vl/ mtwhf	21490af	21660af				
			UK, Sudan Radio Service				15530va	
1600	1700		UK, Voice Africa				13820af	
1600	1700		USA, AFRTS				4319usb	5446usb
			7590usb				7812usb	12133usb
			12133usb				12579usb	13855usb
1600	1700		USA, KAIJ Dallas TX				13815na	
1600	1700		USA, KJES Vado NM				11715na	
1600	1700		USA, KTBN Salt Lake City UT					15590na
1600	1700		USA, KWHR Naalehu HI				11555as	
1600	1700		USA, Voice of America				4930af	6160va
			7125va 9700va				9760va	9825va
			12080va				13600va	15195va
			15580af				17895va	15445va
1600	1700		USA, WBCQ Kennebunk ME				9330na	17495na
1600	1700		USA, WBOH Newport NC				5920am	
1600	1700		USA, WEWN Birmingham AL				11530va	13615va
			15685va				15745va	
1600	1700		USA, WHRA Greenbush ME				17640na	
1600	1700		USA, WHRI Noblesville IN				12020am	15285am
1600	1700	as	USA, WINB Red Lion PA				9740am	
1600	1700	mtwhf	USA, WINB Red Lion PA				13570am	
1600	1700		USA, WJIE Louisville KY				7490am	
1600	1700	mtwhfo	USA, WMLK Bethel PA				9265eu	
1600	1700		USA, WRMI Miami FL 7385am					
1600	1700		USA, WTJC Newport NC				9370na	
1600	1700		USA, WWCR Nashville TN				9985na	12160na
			13845na				15825na	
1600	1700		USA, WWRB Manchester TN				9320na	12170na
1600	1700	mtwhf	USA, WWRB Manchester TN				15250na	
1600	1700		USA, WYFR Okeechobee FL				6085va	11830va
			11865va				13695va	15520va
			18980va				21455va	17750va
1600	1700		Zambia, Radio Christian Voice				4965af	
1615	1630		Vatican City, Vatican Radio				4005eu	5885eu
			7250eu 9645me				15595me	
1615	1700	as UK	BBC World Service				11860af	
1630	1700		Egypt, Radio Cairo				11880af	
1630	1700		Guam, AWR/KSDA				11975as	
1630	1700		Slovakia, Slovak Radio					5920eu
1640	1700	†	Germany, Bible Voice Broadcasting				13590me	7345eu
1651	1700		New Zealand, Radio NZ Intl				6095pa	

1700 UTC - 1PM EDT / 12PM CDT / 10AM PDT

1700	1710	mtwh	Moldova, Radio PMR				5960eu	
1700	1720	f	Moldova, Radio PMR				5960eu	
1700	1727		Czech Rep, Radio Prague Intl				5930eu	17485af
1700	1728		Vietnam, Voice of				9725eu	
1700	1730		France, Radio France Intl					15605af
1700	1730		Swaziland, TWR				3200af	17605af
1700	1745		UK, BBC World Service				3255af	6005af
			6190af 9630af				12095af	15105af
			15420af				17820af	17830af
							15325af	21470af
1700	1755		South Africa, Channel Africa				9625na	
1700	1759		Poland, Radio Polonia				5965eu	7285eu
1700	1800		Anguilla, Caribbean Beacon				11775am	
1700	1800		Australia, Radio				5995as	6080as
			9580as 9710as					9475as
1700	1800		Australia, Voice Intl				11840as	13635as
1700	1800	o	Canada, CBC NQ SW Service				9625na	15205as
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		China, China Radio Intl				9695eu	11940eu
			13760eu					
1700	1800	DRM	China, China Radio Intl				12080va	
1700	1800		Costa Rica, University Network				11870va	13750va
1700	1800		Egypt, Radio Cairo				11880af	
1700	1800		Eq Guinea, Radio Africa					15190af
1700	1800	s	Germany, Bible Voice Broadcasting				13590me	
1700	1800	vi	Greece, Voice of				7475va	9420va
			15630va				17705va	12105va
1700	1800		Japan, Radio				9535va	11970eu
1700	1800		Malaysia, Radio				7295as	15355af
1700	1800		New Zealand, Radio NZ Intl					6095pa
1700	1800		Nigeria, Voice of				15120va	
1700	1800		Russia, Voice of				7390eu	9405as
			9890eu 11510af				11985af	9820eu
1700	1800	as	Russia, Voice of				11675eu	
1700	1800		UK, BBC World Service				3915as	5975as
			6195eu 7160as				9510as	12095va
			15565va					15310as
1700	1800	vi/ mtwhf	UK, Sudan Radio Service					11715va
1700	1800		UK, Voice Africa				13820af	
1700	1800		USA, AFRTS				4319usb	5446usb
			7590usb				7812usb	12133usb
							12579usb	13855usb

			12133usb	12579usb	13362usb	13855usb		
1700	1800		USA, KAIJ Dallas TX				13815na	
1700	1800		USA, KTBN Salt Lake City UT					15590na
1700	1800		USA, KWHR Naalehu HI				11555as	
1700	1800		USA, Voice of America				9345va 9850af	15410af
			9345va 9850af				15410af	15580af
1700	1800		USA, WBCQ Kennebunk ME				9330na	17495na
1700	1800		USA, WBOH Newport NC				5920am	
1700	1800		USA, WEWN Birmingham AL				11530va	13615va
			15685va				15745va	
1700	1800		USA, WHRA Greenbush ME				17640na	
1700	1800		USA, WHRI Noblesville IN				15285am	15785am
1700	1800	os	USA, WINB Red Lion PA				9740am	
1700	1800		USA, WJIE Louisville KY				7490am	
1700	1800	mtwhfo	USA, WMLK Bethel PA				9265eu	
1700	1800		USA, WMLK Bethel PA				15265eu	
1700	1800		USA, WRMI Miami FL 7385am					
1700	1800		USA, WTJC Newport NC				9370na	
1700	1800		USA, WWCR Nashville TN				9985na	12160na
			13845na				15825na	
1700	1800		USA, WWRB Manchester TN				9320na	11920na
			12170na					
1700	1800	mtwhf	USA, WWRB Manchester TN				15250na	
1700	1800		USA, WYFR Okeechobee FL				3955va	13695va
			17795va				18980va	21455va
1700	1800		Zambia, Radio Christian Voice				4965af	21680va
1700	1800	mtwhf	USA, WINB Red Lion PA				13570am	
1730	1745		Israel, Kol Israel				9345va	11590va
1730	1745	vi	Libya, Voice of Africa				11860af	15640va
1730	1745	mtwhf	UK, United Nations Radio				7150af	15495me
			17810af					
1730	1800		Bulgaria, Radio				9500eu	11500eu
1730	1800		Guam, AWR/KSDA				9385me	
1730	1800		Liberia, ELWA				4760do	
1730	1800		Philippines, Radio Pilipinas				17720va	15190va
			17720va					
1730	1800		Swaziland, TWR				3200af	9500af
1730	1800		Sweden, Radio				6065va	
1730	1800	mtwhf	USA, Voice of America				17895af	4930af
			17895af					11975af
1730	1800		Vatican City, Vatican Radio				15570af	11625af
			15570af					13765af
1740	1800	as	USA, Voice of America				17895af	4930af
			17895af					11975af
1745	1800		Bangladesh, Bangla Betar				7185eu	
1745	1800		India, All India Radio				7410eu	9445af
			11620eu				11935af	13605af
			15155af				17670af	15075af
1745	1800	vi	Libya, Voice of Africa				15220af	15615af
			17695af					15660af
1745	1800		UK, BBC World Service				12095af	3255af
			17820af				15105af	15400af
							17830af	21470af

1800 UTC - 2PM EDT / 1PM CDT / 11AM PDT

1800	1815	a	Germany, Bible Voice Broadcasting				11965as	
1800	1828	s	Vietnam, Voice of				7280va	9730va
1800	1829	w f	Germany, Universal Life				15675af	
1800	1830		Austria, AWR Europe				15280af	
1800	1830		Egypt, Radio Cairo				11880af	
1800	1830	s	Germany, Bible Voice Broadcasting				6015eu	
1800	1830		South Africa, AWR Africa				3215af	3345af
1800	1830		Swaziland, TWR				3200af	
1800	1830		UK, BBC World Service				3255as	5975as
			6190af 9510as				12095va	15400af
			17830af				21470af	15420af
1800	1850		New Zealand, Radio NZ Intl				6095pa	
1800	1856		Romania, Radio Romania Intl				9635eu	11830eu
1800	1857		Netherlands, Radio				6020af	9895af
1800	1859		Canada, Radio Canada Intl				13730af	9530af
			13730af				15255af	15420af
1800	1900		Anguilla, Caribbean Beacon				11775am	
1800	1900	mtwhf	Argentina, RAE				9690eu	15345eu
1800	1900		Australia, Radio				6080as	7240as
			9580as 9710as					9475as
1800	1900		Australia, Voice Intl				11685as	
1800	1900		Bangladesh, Bangla Betar				7185as	
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		China, China Radio Intl				9695eu	11940eu
			13760eu					
1800	1900	DRM	China, China Radio Intl				12080va	
1800	1900		Costa Rica, University Network				11870va	13750va
1800	1900		Eq Guinea, Radio Africa					15190af
1800	1900	o	Germany, Bible Voice Broadcasting				6015as	9430me
1800	1900	s	Germany, Bible Voice Broadcasting				9430me	
1800	1900		India, All India Radio				7410eu	9445af
			11620eu				11935af	13605af
							15075af	

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			15155af	17670af		
1800	1900		Liberia, ELWA	4760do		
1800	1900		Malaysia, Radio	7295as		
1800	1900		Nigeria, Voice of	15120va		
1800	1900		North Korea, Voice of	4405eu	13760eu	
			15245eu			
1800	1900		Philippines, Radio Pilipinas	11720va	15190va	
			17720va			
1800	1900		Russia, Voice of	9480eu	9745af	989Ceu
			11510af			
1800	1900		Taiwan, Radio Taiwan Intl	3965eu		
1800	1900		UK, BBC World Service	6195eu	9410eu	
			12095me			
1800	1900		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
1800	1900		USA, KAJI Dallas TX	13815na		
1800	1900		USA, KTBN Salt Lake City UT	15590na		
1800	1900		USA, Voice of America	4930af	985Caf	
			11975af	15410af	15580af	17895af
1800	1900		USA, WBCQ Kennebunk ME	7415na	9330na	
			17495na			
1800	1900		USA, WBOH Newport NC	5920am		
1800	1900		USA, WEWN Birmingham AL	11530va	13615va	
			15685va	15745va		
1800	1900		USA, WHRA Greenbush ME	17640na		
1800	1900		USA, WHRI Noblesville IN	15285am	15785am	
1800	1900	as	USA, WINB Red Lion PA	9740am		
1800	1900	mtwhf	USA, WINB Red Lion PA	13570am		
1800	1900		USA, WJIE Louisville KY	7490am		
1800	1900	mtwhfa	USA, WMLK Bethel PA	9265eu		
1800	1900		USA, WMLK Bethel PA	15265eu		
1800	1900		USA, WRMI Miami FL 7385am			
1800	1900		USA, WTJC Newport NC	9370na		
1800	1900		USA, WWCR Nashville TN	9975na	12160na	
			13845na	15825na		
1800	1900		USA, WWRB Manchester TN	9320na	11920na	
			12170na			
1800	1900	mtwhf	USA, WWRB Manchester TN	15250na		
1800	1900		USA, WYFR Okeechobee FL	13695eu	13780eu	18980va
			13800eu	17525eu	17795eu	
1800	1900		Yemen, Rep of Yemen Radio	9780me		
1800	1900		Zambia, Radio Christian Voice	4965af		
1815	1830	vl	Libya, Voice of Africa	9485af	11635af	11715af
			11860af	15660af	17695af	
1830	1900	vl	Greece, Voice of	7475va	9420va	12105va
			15630va	17705va		
1830	1900		Serbia & Montenegro, Intl Radio	6100eu		
1830	1900		Slovakia, Slovak Radio	5920eu	6055eu	
1830	1900		South Africa, AWR Africa	9590af		
1830	1900		Turkey, Voice of	9785eu		
1830	1900		UK, BBC World Service	3255af	3915as	12095af
			6005af 6190af	9410af	9630af	12095af
			15400af	15420af	17830af	21470af
1845	1858	mtwhfa	Albania, Radio Tirana	6115eu	7210eu	
1845	1900		Congo, RTV Congolaise	4765af	5985af	
1851	1900		New Zealand, Radio NZ Intl	9845pa		

1900 UTC - 3PM EDT / 2PM CDT / 12PM PDT

1900	1915		Congo, RTV Congolaise	4765af	5985af	
1900	1915	ts	Germany, Bible Voice Broadcasting	9430me		
1900	1920		Turkey, Voice of	9785eu		
1900	1925		Israel, Kol Israel	11590va	15615va	15640va
1900	1928		Hungary, Radio Budapest	3975eu	6025eu	
1900	1928		Vietnam, Voice of	7280va	9730va	
1900	1929	s	Germany, Universal Life	13820me		
1900	1930	o	Germany, Bible Voice Broadcasting	9430af		
1900	1930		Lithuania, Radio Vilnius	9710eu		
1900	1930		Philippines, Radio Pilipinas	11720va	15190va	
			17720va			
1900	1945		India, All India Radio	7410eu	9445af	9950eu
			11620eu	11935af	13605af	15075af
			15155af	17670af		
1900	1950		New Zealand, Radio NZ Intl	9845pa		
1900	2000		Anguilla, Caribbean Beacon	11775am		
1900	2000		Australia, Radio	6080as	7240as	9500as
			9580as 9710as			
1900	2000		Australia, Voice Intl	11685os		
1900	2000		Canada, CFRX Toronto ON	6070do		
1900	2000		Canada, CFVP Calgary AB	6030do		
1900	2000		Canada, CKZN St John's NF	6160do		
1900	2000		Canada, CKZU Vancouver BC	6160do		
1900	2000		Canada, Radio Canada Intl	17765am		
1900	2000		China, China Radio Intl	7295va	9440af	
			11940eu			
1900	2000	DRM	China, China Radio Intl	12080va		
1900	2000		Costa Rica, University Network	11870va	13750va	
1900	2000		Eq Guinea, Radio Africa	15190af		
1900	2000		Germany, Deutsche Welle	13780af	15520af	

1900	2000	vl	Ghana, Ghana BC Corp	3366do	4915do	
1900	2000	vl	Italy, IRRS 5775va			
1900	2000		Liberia, ELWA	4760do		
1900	2000		Malaysia, Radio	7295as		
1900	2000	vl	Namibia, Namibian BC Corp	3270do	3290do	
			6060do	6175do		
1900	2000		Netherlands, Radio	7120af	9895of	11655af
			17810af			
1900	2000	os	Netherlands, Radio	15315na	17660na	17735na
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	7255va		
1900	2000		North Korea, Voice of	4405eu	9975eu	
			11910eu	11535eu		
1900	2000		Papua New Guinea, Catholic Radio		4960do	
1900	2000		Papua New Guinea, NBC	4890do		
1900	2000		Russia, Voice of	7380eu	9890eu	
1900	2000		Sierra Leone, Radio UNAMSIL	6137do		
1900	2000	irreg/vl	Sierra Leone, SLBS	3316do		
1900	2000	vl	Solomon Islands, SIBC		5020do	9545do
1900	2000	m	South Africa, African Radio League			3215af
1900	2000		South Korea, Radio Korea Intl		5975va	7275eu
1900	2000	a	Sri Lanka, SLBC	6010eu		
1900	2000		Swaziland, TWR	3200af		
1900	2000		Thailand, Radio	7155eu		
1900	2000	vl	Uganda, Radio	4976do	5026do	7196do
1900	2000		UK, BBC World Service	6190af 6195eu	9410va	9630af 12095af
			15310me	15400af	17830af	
			USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
1900	2000		USA, KAJI Dallas TX	13815na		
1900	2000		USA, KJES Vado NM	15385na		
1900	2000		USA, KTBN Salt Lake City UT	15590na		
1900	2000		USA, Voice of America	4930af	6040af	
			9670va 9850af	11975af	13635va	13760af
			15410af	15445af	15580af	
1900	2000		USA, WBCQ Kennebunk ME	7415na	9330na	
			17495na			
1900	2000		USA, WBOH Newport NC	5920am		
1900	2000		USA, WEWN Birmingham AL	11530va	13615va	
			15685va	15745va		
1900	2000		USA, WHRA Greenbush ME	15665na		
1900	2000		USA, WHRI Noblesville IN	15285am	15785am	
1900	2000	as	USA, WINB Red Lion PA	9740am		
1900	2000	mtwhf	USA, WINB Red Lion PA	13570am		
1900	2000		USA, WJIE Louisville KY	7490am		
1900	2000	mtwhfo	USA, WMLK Bethel PA	9265eu		
1900	2000		USA, WMLK Bethel PA	15265eu		
1900	2000		USA, WRMI Miami FL 7385am			
1900	2000		USA, WTJC Newport NC	9370na		
1900	2000		USA, WWCR Nashville TN	9975na	12160na	
			13845na	15825na		
1900	2000		USA, WWRB Manchester TN	9320na	11920na	
			12170na			
1900	2000	mtwhf	USA, WWRB Manchester TN	15250na		
1900	2000		USA, WYFR Okeechobee FL	13695af	13800af	17795af 17845af
			18930af	18980af		
1900	2000		Zambia, Radio Christian Voice	4965af		
1900	2000	vl	Zimbabwe, ZBC Corp	5975do		
1915	1930	vl	Libya, Voice of Africa	11635af	11715af	
1925	1945		Armenia, Voice of	4810eu	9965as	
1930	1945	vl	Libya, Voice of Africa	11715af		
1930	2000	mtwh	Belarus, Radio	7105eu	7280eu	
1930	2000	as	Germany, Bible Voice Broadcasting	9430of		
1930	2000		Iran, Voice of the Islamic Rep	7205eu	9800eu	
			9925af 11660af	11670af	11860af	
1930	2000		Sweden, Radio	6065va		
1935	1955		Italy, RAI Intl	5960eu	9845eu	
1945	2000	vl	Rwanda, Radio	6055do		
1945	2000	DRM	Vatican City, Vatican Radio		9800am	
1950	2000		Vatican City, Vatican Radio	4005eu	5885eu	
			7250eu 9645eu			
1951	2000		New Zealand, Radio NZ Intl		11725pa	

2000 UTC - 4PM EDT / 3PM CDT / 1PM PDT

2000	2027		Czech Rep, Radio Prague Intl	5930eu	11600va	
2000	2030		Australia, Voice Intl	11685as		
2000	2030		Iran, Voice of the Islamic Rep	7205eu	9800eu	
			9925af 11660af	11670af	11860af	
2000	2030		Mongolia, Voice of	12015eu		
2000	2030		Swaziland, TWR	3200af		
2000	2030		USA, Voice of America	4930af	4940af	
			9850af 11975af	13670af	15410af	15445af
2000	2030		Vatican City, Vatican Radio	9755af	11625af	
			13765af			

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2100	2200		USA, WWRB Manchester TN 12170na	9320na	11920na	2230	2257		Czech Rep, Radio Prague Intl	7345na	9415na
2100	2200	mtwhf	USA, WWRB Manchester TN	15250na		2230	2259		Canada, Radio Canada Intl	9525as	9870as
2100	2200		USA, WYFR Okeechobee FL 17725va	11565va	13800va	2230	2300	as	12035as		
2100	2200		Zambia, Radio Christian Voice	17795va	18980va	2230	2300		Australia, HCJB	15525as	
2100	2200	vl	Zimbabwe, ZBC Corp	4965af		2230	2300		Guam, AWR/KSDA	11850as	15320as
2105	2159		Spain, Radio Exterior Espana	5975do					USA, Voice of America		9570va
2115	2130	vl	Libya, Voice of Africa	9570va	9840va	2245	2300		15145va		13755va
2115	2200		Egypt, Radio Cairo	11720am					India, All India Radio	9705as	9950as
2130	2145	tf	UK, BBC World Service	7165eu	9535eu				11645as	13605as	11620as
2130	2156		Romania, Radio Romania Intl	9645eu	11940na						
2130	2157		Czech Rep, Radio Prague Intl	9800af	11600na						
2130	2158	m-whfa	Albania, Radio Tirana	7120eu		2300	0000		Anguilla, Caribbean Beacon	6090am	
2130	2200		Australia, ABC NT Katherine	5025do		2300	0000		Australia, ABC NT Alice Springs	2310do	4835irr
2130	2200		Australia, ABC NT Tennant Creek	4910do		2300	0000		Australia, ABC NT Katherine	5025do	
2130	2200	m-whfa	Canada, CBC NQ SW Service	9625na		2300	0000	as	Australia, ABC NT Tennant Creek	4910do	
2130	2200		Sweden, Radio	6065va		2300	0000		Australia, HCJB	15525as	
2130	2200		Uzbekistan, Radio Tashkent	5025eu	9545eu	2300	0000	smtwhf	Bulgaria, Radio	9700na	11700na
			11905eu			2300	0000		Canada, CBC NQ SW Service	9625na	6070do

2200 UTC - 6PM EDT / 5PM CDT / 3PM PDT

2200	2210		Syria, Radio Damascus	9330eu	12085eu						
2200	2230	DRM	Germany, Deutsche Welle	9800as							
2200	2230		India, All India Radio	7410eu	9910pa						
2200	2230		Papua New Guinea, NBC	9675do							
2200	2230	mtwhf	Serbia & Montenegro, Intl Radio	7230pa							
2200	2245		Egypt, Radio Cairo	9990eu							
2200	2250		Turkey, Voice of	9830va							
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	13630as	15230as						
2200	2300	smtwhf	Canada, CBC NQ SW Service	15240pa	21740pa						
2200	2300		Canada, CFRX Toronto ON	9625na							
2200	2300		Canada, CFVP Calgary AB	6070do							
2200	2300		Canada, CKZN St John's NF	6030do							
2200	2300		Canada, CKZU Vancouver BC	6160do							
2200	2300		China, China Radio Intl	6160do							
2200	2300		Costa Rica, University Network	7175eu							
2200	2300		Eat Guinea, Radio Africa	13750va							
2200	2300		Germany, Deutsche Welle	15190af							
2200	2300	v	Ghana, Ghana BC Corp	7115as	9720as						
2200	2300		Guyana, Voice of	3366do	4915do						
2200	2300	v'	Malaysia, Radio	7295as							
2200	2300		Namibia, Namibian BC Corp	6060do	6175do	3270do	3290do				
2200	2300		New Zealand, Radio NZ Intl	15720pa							
2200	2300		Nigeria, Radio/Ibadan	6050do							
2200	2300		Nigeria, Radio/Kaduna	4770do	6090do						
2200	2300		Nigeria, Radio/Lagos	3326do							
2200	2300		Papua New Guinea, Catholic Radio	6137do	496Cdo						
2200	2300	irreg/ vl	Sierra Leone, Radio UNAMSIL	3316do							
2200	2300	vl	Sierra Leone, SLBS	5020do	9545do						
2200	2300		Solomon Islands, SIBC	15600eu							
2200	2300		Taiwan, Radio Taiwan Intl	5965as	5975am						
2200	2300		UK, BBC World Service	6195as	7105as	9605va	9740as	11955as			
2200	2300		USA, AFRTS	4319usb	5446usb	5765usb					
2200	2300		USA, KAIJ Dallas TX	7590usb	12133usb	12579usb					
2200	2300		USA, KTBN Salt Lake City UT	12133usb	12579usb	13362usb					
2200	2300		USA, Voice of America	15185va	15290va	15305va	17740va				
2200	2300		USA, WBCQ Kennebunk ME	9330na	17495na	5105na	7415na				
2200	2300		USA, WBOH Newport NC	5920am							
2200	2300		USA, WEWN Birmingham AL	9355va	9975va						
2200	2300	mtwhfa	USA, WHRA Greenbush ME	11765na							
2200	2300		USA, WHRI Noblesville IN	9495am							
2200	2300		USA, WINB Red Lion PA	13570am							
2200	2300	as	USA, WJIE Louisville KY	7490am	3595am						
2200	2300		USA, WRMI Miami FL7385am	9370na							
2200	2300		USA, WRMI Miami FL9955am	5070na	7465na						
2200	2300		USA, WTJC Newport NC	9985na	13845na						
2200	2300		USA, WWCN Nashville TN	11920na							
2200	2300		USA, WWRB Manchester TN	11740va	15770va						
2200	2300		USA, WYFR Okeechobee FL	4965af							
2205	2230		Zambia, Radio Christian Voice	11895as							
2215	2230	vl	Italy, RAI Intl	9925na							
2215	2230		Croatia, Croatian Radio								

2300 UTC - 7PM EDT / 6PM CDT / 4PM PDT

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	as	Australia, HCJB	15525as							
2300	0000		Bulgaria, Radio	9700na	11700na						
2300	0000	smtwhf	Canada, CBC NQ SW Service	9625na	6070do						
2300	0000		Canada, CFRX Toronto ON	6030do							
2300	0000		Canada, CFVP Calgary AB	6160do							
2300	0000		Canada, CKZN St John's NF	6160do							
2300	0000		Canada, CKZU Vancouver BC	6160do							
2300	0000		China, China Radio Intl	5915as	5990am						
2300	0000		Costa Rica, University Network	6145na	7180as	13680na	13750va				
2300	0000		Cuba, Radio Havana	9550na							
2300	0000		Egypt, Radio Cairo	11885na							
2300	0000		Germany, Deutsche Welle	5955as	9890as						
2300	0000		15135as								
2300	0000	vl	Ghana, Ghana BC Corp	3366do	4915do						
2300	0000		Guyana, Voice of	3291do							
2300	0000		India, All India Radio	9705as	9950as	11620as					
2300	0000		11645as	13605as							
2300	0000		Malaysia, Radio	7295as							
2300	0000	vl	Namibia, Namibian BC Corp	6060do	6175do	3270do	3290do				
2300	0000		New Zealand, Radio NZ Intl	15720pa							
2300	0000		Papua New Guinea, Catholic Radio	4960do							
2300	0000		Papua New Guinea, NBC	9675do							
2300	0000		Sierra Leone, Radio UNAMSIL	6137do							
2300	0000	irreg/ vl	Sierra Leone, SLBS	3316do							
2300	0000		Singapore, Mediacorp Radio	6150do							
2300	0000	vl	Solomon Islands, SIBC	5020do	9545do						
2300	0000		UK, BBC World Service	5975am							
2300	0000		USA, AFRTS	4319usb	5446usb	5765usb					
2300	0000		USA, KAIJ Dallas TX	7590usb	12133usb	12579usb					
2300	0000		USA, KTBN Salt Lake City UT	12133usb	12579usb	13362usb					
2300	0000		USA, Voice of America	15185va	15290va	15305va	17740va				
2300	0000		USA, WBCQ Kennebunk ME	9330na	17495na	5105na	7415na				
2300	0000		USA, WBOH Newport NC	5920am							
2300	0000		USA, WEWN Birmingham AL	9355va	9975va						
2300	0000	mtwhfa	USA, WHRA Greenbush ME	11765na							
2300	0000		USA, WHRI Noblesville IN	9495am							
2300	0000		USA, WINB Red Lion PA	13570am							
2300	0000	as	USA, WJIE Louisville KY	7490am	3595am						
2300	0000		USA, WRMI Miami FL7385am	9370na							
2300	0000		USA, WRMI Miami FL9955am	5070na	7465na						
2300	0000		USA, WTJC Newport NC	9985na	13845na						
2300	0000		USA, WWCN Nashville TN	11920na							
2300	0000		USA, WWRB Manchester TN	11740va	15770va						
2300	0000		USA, WYFR Okeechobee FL	4965af							
2300	0000		Zambia, Radio Christian Voice	11895as							
2300	0000		Italy, RAI Intl	9925na							

Monitoring Fort Jackson TRS

One of the major changes in the world of Milcom monitoring over the last half decade has been land mobile communications' switch from conventional frequencies to trunk radio systems (TRS). A good example of this change is the trunk radio system found at Fort Jackson, South Carolina. During a short visit to Columbia, South Carolina, we recently had the opportunity to monitor the base UHF trunk system in person, and it was a hotbed of activity.

The Fort Jackson system is part of a seven-site system shared with Fort Gordon near Augusta, Georgia. While we didn't have a chance to monitor the Gordon trunk radio sites for an extended period of time, we did uncover two of the Fort Jackson trunk radio sites.

Using the Uniden BCD396T scanner's control channel trunk monitoring technique (see this month's *First Look* review), here are the frequencies we observed during our visit. Control channels we monitored are marked with an asterisk.

Motorola APCO-25 Smartzone system

Motorola System ID: 01C

Site 6 406.3625* 408.1625 409.3625 410.1625 410.5625

Other reported frequencies: 406.7625 407.7625 408.3625

Site 7 406.5625 410.7625*

Other reported frequencies: 407.1625 407.3625

There were quite a few active talkgroups, with the military police (TG 404) being the most active on both sites. From our location in West Columbia, both sites were very strong and easily heard.

Talkgroups	Usage
404	Military Police
410	Unknown usage
411	Unknown usage
415	Fire Department/EMS Dispatch
416	Fire Department Fire Ground 1
427	Unknown usage
440	Unknown usage
450	Unknown usage
461	Unknown usage
466	Unknown usage
469	Unknown usage
491	Range Control
501	Unknown usage
536	Base Maintenance (utilities?)
537	Unknown usage

If you live near Fort Jackson or Gordon and have information to add regarding their trunk system, we would like to hear from you. Please contact us at the email address in our masthead or our snail mail address in Brasstown.

❖ Los Angeles 380-399.9 Trunk System

MT's *Fed File* columnist Chris Parris was recently in Los Angeles and did some monitoring of a new 380-399.9 MHz system that we first reported in the May edition of this column. Here is the latest information on the LA system.

Site 101 386.125 (Control Channel)
Site 102 386.100 (Control Channel)
Site 103 386.0375 (Control Channel)

APCO-25 frequencies observed:
386.250, 386.400, 386.550, 386.850, and 388.025 MHz

Chris says Site 101 is near downtown Los Angeles and notes the following data regarding that site:

System ID: 168

System Name: Unknown DoD Los Angeles

WACN: bee00

Tower Number: 101

Control Capabilities: Data, voice and registration
Frequencies: 385.0125, 385.2125, 385.8875, and 386.125* MHz

Site 103's location is unknown, but Chris reports it has a much weaker signal in downtown Los Angeles. Data from that site follows:

System ID: 168

System Name: Unknown DoD Los Angeles

WACN: bee00

Tower Number: 103

Control Capabilities: Data, voice and registration
Frequencies: 386.0375* and 386.3375 MHz

We have no more details on Site 102 other than the control channel listed above and that it was a neighboring system to site 103. During the period that Chris monitored the system he didn't hear any users on the system, just control channels and transmitters that keyed up with no audio.

We invite anyone in the southland and on the SoCalMilCom newsgroup to monitor this system and let us know what you are hearing once the system is up and operational.

❖ Dover AFB on 380-399.9 MHz

Dave Hudson recently reported on the Scan-DC newsgroup that Dover AFB has a trunk control channel up on 381.7375 MHz. No more details are known at this time and reports are requested from area monitors.

❖ 380-399.9 MHz Navy Ship Trunk Systems

Trunking technology isn't limited to just landlubbers. The U.S. Navy has been using this technology for several years now. The premier system in use on U.S. Navy ships is the HYDRA system, manufactured by M/A-COM in Lynchburg, Virginia.

M/A-COM has had a long history of providing HYDRA wireless communication systems for the U.S. Navy. Their AN/SRC-55 HYDRA Wireless Interior Communication System is a digital trunk repeater system that is based on their COTS EDACS technology. That system supports a maximum of 16,383 users divided between 2,047 user/talkgroups. M/A-COM's AN/SRC-55 HYDRA systems are currently operational in both the 380-399.9 MHz and the 406-420 MHz frequency bands.

Table one is a list of U.S. Navy ships currently using HYDRA trunk systems.

Table One: U.S. Navy Ships Using HYDRA Trunk Systems

*Equipment operates in 380-399.9 MHz

- USS Antietam (CG-54)*
- USS Ashland (LSD-48)*
- USS Bataan (LHD-5)*
- USS Bonhomme Richard (LHD-6)
- USS Boxer (LHD-4)*
- USS Carter Hill (LSD-50)*
- USS Comstock (LSD-45)*
- USS Enterprise (CVN-65)
- USS Eisenhower (CVN-69)
- USS Ford (FFG-54)*
- USS Fort McHenry (LSD-43)*
- USS Gory (FFG-51)*
- USS Germantown (LSD-42)*
- USS Gonzalez (DDG-66)
- USS Gunston Hall (LSD-44)*
- USS Hoppers Ferry (LSD-49)*
- USS Harry Truman (CVN-75)
- USS Iwo Jima (LHD-7)
- USS Kouffman (FFG-59)*
- USS Klakring (FFG-42)
- USS Milius (DDG-69)*
- USS Mobile Bay (CG-53)
- USS Monterey (CG-61)*
- USS Nassau (LHA-4)*
- USS Nicholas (FFG-47)
- USS Nicholson (DD-982)
- USS Nimitz (CVN-68)
- USS Oak Hill (LSD-51)*
- USS Pearl Harbor (LSD-52)*
- USS Pelelieu (LHA-5)*
- USS Ponce (LPD-15)
- USS Ronier (AOE-7)
- USS Ronald Reagan (CVN-76)*
- USS Rushmore (LSD-47)*
- USS Saipon (LHA-2)*
- USS San Antonio (LPD-17)*
- USS Stennis (CVN-74)
- USS Tarawa (LHA-1)*

USS Thorn (DD-988)
 USS Ticonderoga (CG-47)
 USS Tortuga (LSD-46)*
 USS Yorktown (CG-48)
 USS Valley Forge (CG-50)
 USS Whidbey Island (LSD-41)*

You can learn more about these shipboard trunk systems at <http://www.macom-wireless.com/hydra.asp>.

❖ MacDill Airfest 2005

Approximately 750,000 people crowded onto the flight line at MacDill AFB for a two day airshow known as *Airfest 2005*. One of those in the throng was Mark Davis, who monitored the event and passed along the following activity:

- 123.150 Ed Hammil (USAF Reserve) and the Geico team
- 123.450 Cyclone Frank Ryder (ORECK)
- 126.150 Airshow airboss
- 136.575 Heritage Flight (Lee Lauderback P-51/F-15)
- 143.850 Thunderbird Flight Demo Team
- 235.250 Thunderbird Flight Demo Team
- 261.400 Possible F-18 Demo discrete or UHF airboss

❖ Thunder in the Valley

MT Milcom regular Mike Riffle recently attended the Thunder in the Valley airshow at the Columbus Metropolitan Airport (KCSG) in Georgia, and reported the following frequencies in use:

- 34.650 US Army Silver Wings discrete (Fort Benning Command Exhibition Parachute Team)
- 120.100 Airshow airboss (normally KCSG tower)
- 121.900 Airshow tower (normally KCSG ground control)
- 123.150 Common air-air (Warbirds, Otto the helicopter)
- 136.575 USAF A-10 East demo discrete and Heritage Flight (Lee Lauderback P-51/F-15)
- 397.550 This frequency was passed to Raven 22 (UH-60 Silver Wings Jump Helo) by the airshow boss. Raven 22 advised they were already in comms with their ground unit (on 34.650). (Note: This is a DoD Inter Squad radio channel 7)
- 467.6125 Silver Wings ground/safety teams (FRS channel 10)

❖ New England Milcom Update

"The Researcher" has checked in again with the following updates for the northeast US.

- 140.0375/? Cape Cod AFS Pave Paw Operations
- 141.8875/? Cape Cod AFS Pave Paws Security and Training
- 148.5150 Otis ANGB 102 Fighter Wing Scramble Net
- 149.5000 Otis ANGB 102 Fighter Wing Aircraft Maintenance Net
- 150.1500 Otis ANGB 102 Fighter Wing Operations "Cape Ops" (AM mode)
- 163.4625 Hanscom AFB Security
- 163.5125 Otis ANGB 102 Fighter Wing Aircraft Maintenance Net B
- 163.5375 Otis ANGB 102 Security Parol <Channel 2>
- 165.1125 Hanscom AFB Fire Department Otis ANGB 102 Fighter Wing Civil Engineering Support

- 165.1375 Otis ANGB Security Patrol <Channel 1>
- 166.225/? Hanscom AFB Fire Department
- 173.4875 Otis ANGB Fire Department

- KMUO Mountain Home AFB
- 134.100 MOA Operations "Cowboy"
- KNTD Point Mugu NAS (Naval Base Ventura County), CA
- 306.600 New Plead Control primary frequency (ex-280.700)

❖ Frequency Changes

Jack NeSmith down in Florida checks in this month with the following milair frequency updates.

- KHMN Holloman AFB, NM
- 252.500 RAPCON Cherokee for Sentenial McGregor
- 305.500 RAPCON Cherokee for Lava Mesa

❖ Memphis ARTCC

In this month's FAA Air Route Traffic Control Center report we are going to take a look at the Memphis ARTCC. For the background on these systems see the June 2005 issue of *MT*.

And that does it for this month. Until next time, 73 and good hunting de NSFPW.

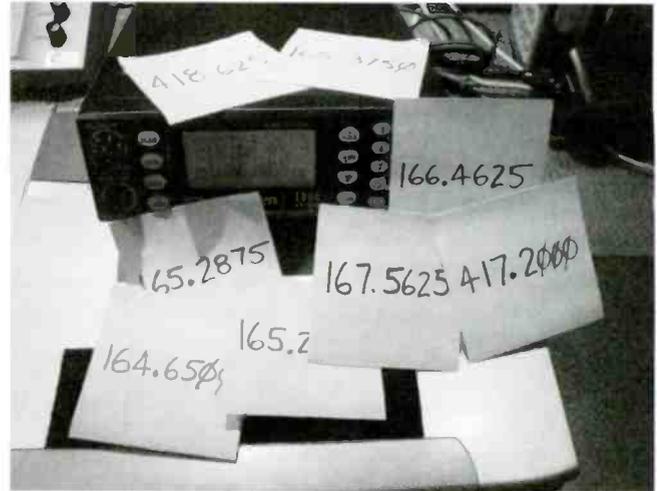
Table Two: Memphis ARTCC Frequencies

Note: all frequencies are in MHz and mode is AM.

RCAG Location:	VHF/UHF	ATC Service
Brinkley, AR	124.025	High
	126.850/263.150	Low Discrete: Approach/Departure Services
	135.300/335.800	Low: Approach/Departure Services
	296.700	High [Amber-4]
Columbus, MS	127.100/269.400	Low Discrete: Approach/Departure Services
	133.125/294.700	High
	134.775/363.200	High
	275.400	Low
Fayetteville, AR	320.400	Low
	126.100/269.000	Low Discrete: Approach/Departure Services
	132.550/353.800	High
	119.250/380.300	Low Discrete: Approach/Departure Services
Fort Smith, AR Graham, TN	124.275/285.500	High
	125.850/379.250	Low Discrete: Approach/Departure Services
	296.700	High [Amber-4]
	124.925/282.250	Ultra High
Greenville, MS	133.075/322.350	High
	135.875/269.350	Low Discrete: Approach/Departure Services
	127.425/298.950	Ultra High
	132.500/259.100	Low Discrete: Approach/Departure Services
Harrison, AR Hot Springs, AR	126.850/286.600	Low Discrete: Approach/Departure Services
	127.825/288.250	Low Discrete: Approach/Departure Services
	120.800/307.000	Low Discrete: Approach/Departure Services
	132.500/259.100	Low Discrete: Approach/Departure Services
Jackson, MS	285.200	High
	296.700	High
	316.150	Low
	135.750/263.000	Low Discrete: Approach/Departure Services
Louisville, MS	243.000	High
	282.100	High
	362.600	High
	134.650/350.300	Low Discrete: Approach/Departure Services
Malden, MO McKellar, TN	124.350/239.300	Low: Approach/Departure Services
	126.450/354.000	High
	127.975/239.300	Low
	134.650/316.150	Low Discrete: Approach/Departure Services
Memphis, TN	121.500/243.000	High (ARTCC Facility)
	124.025	High
	127.975	High
	118.625/317.650	Low
Memphis, TN	135.225	High
	322.300	Ultra High
	360.800	Low Discrete
	125.975/351.700	Low Discrete: Approach/Departure Services
Meridian, MS	128.275/285.400	High
	263.000	Low
	299.600	High
	377.200	High
Nashville, TN	118.875/306.300	Ultra High
	124.125/327.800	High
	133.850/317.600	Low Discrete: Approach/Departure Services
	132.100/263.100	Low Discrete: Approach/Departure Services (Joelton)
Nashville, TN Paducah, KY Pine Bluff, AR	133.650/292.150	Low Discrete: Approach/Departure Services
	125.475	High
	132.425/281.400	High
	135.875/269.350	Low Discrete: Approach/Departure Services
Russellville, AR	128.475/348.700	Low Discrete: Approach/Departure Services
	256.850	Ultra High
	343.800	Low
	126.750/353.500	Low Discrete: Approach/Departure Services
Shelbyville, TN South Fulton, TN Tupelo, MS	128.050/362.350	Low Discrete: Approach/Departure Services
	127.375/259.200	Ultra High
	128.500/279.550	Low Discrete: Approach/Departure Services
	134.400	Low
Walnut Ridge, AR	135.900/273.550	Low/High
	260.600	Low/High
	295.000	High
	120.075/289.400	Low Discrete: Approach/Departure Services
	132.375/257.600	High

“Noteworthy” Fed Files

If you are like me, you tend to collect a lot of frequency information over time and most of it seems to end up on little pieces of paper. We all try to keep these bits and pieces of information organized, but they often get the better of us. As I collect information for the *Fed Files* columns, I often end up with items that don't fit the space available, or they are not part of the column's topic. So I have decided to present you some of these “sticky notes” that have occupied my desk lately.



key up many times.

414.7500 MHz – Orlando US Postal Service Postal Inspectors repeater with clear, analog traffic. Also heard analog traffic on 415.0500 MHz while in the downtown Orlando area.

❖ TSA Correction

An anonymous reader corrected me on a small item that appeared in the January *Fed Files* about the TSA. I mentioned that the TSA personnel at DFW airport seem to be sporting UHF VISAR radios, but my spell checker turned it in to “Visor.” The VISAR is a model of Motorola radio and is a trademark of Motorola, Inc.

The source also mentioned that before the TSA moved to VHF frequencies, they were using the following UHF frequencies at Midway airport in Chicago for a time:

462.7500, 462.8000, 467.7750, 467.8000 and 468.8000 MHz

These are not federal frequencies, but when the TSA was first formed and the contract for new radios was still being let out, they seemed to use anything they could find for radio communications.

❖ Federal Trunking Continues

A few columns ago I mentioned several ways that federal and local communications systems are coordinated to work together. I recently found out that technology has taken this interoperability concept even further.

In the Phoenix, Arizona, area there is a P-25 digital trunked 800 MHz radio system serving the local public safety agencies. Local scanner enthusiasts monitoring the system have reported hearing a trunking control channel on a VHF federal frequency that appears to be part of the 800 MHz system. The frequencies of 165.5250 MHz and 165.6375 MHz have been broadcasting a Motorola trunking control signal that indicates a system ID of “534”. This same system ID is used for the Phoenix / Mesa digital radio system, which means that this federal trunk site is actually a part of the 800 MHz radio network used by local agencies.

This gives the users on both trunked systems completely seamless interagency communications between two different frequency bands and radio systems without any patches or operator assistance. It also means that the federal users can have their own VHF radios, but they can contact local police or public safety agencies with the same ease as calling any of their own agency units. If you are interested in further details, Motorola has a press release announcing the completion of this interconnection project:

<http://www.motorola.com/LMPS/pressreleases/page3356.htm>.

❖ BORTAC Anyone?

In doing some on-line research, I ran across the acronym of BORTAC. No, it's not some new alien race threatening the *Enterprise*, but it does appear to have two different meanings. One version of BORTAC stands for Border Tactical team, a rapid response team of the Border Patrol. (These are the folks who

❖ Florida Road Trip

Work took me to Miami and Orlando in March of this year. While I was there I had some brief periods where I could search for federal activity. Here is some of what I caught:

167.5250 MHz, 100.0 PL – This one has apparently been around a while and was well known to the local monitors in Miami. Apparently a bootleg taxi operation on a federal frequency, it even has a dial-in phone patch for the dispatcher to call the cabs. The traffic is mostly in Spanish, but with a few choice English phrases thrown in. It did make for some interesting listening!

168.8500 MHz – Most likely a CBP Border Patrol repeater at Miami International, I didn't catch any voice on it, but did hear the repeater

Table 1: Veterans Administration Medical Center Frequencies

City	MHz	Notes	Agency
Orlando, FL	163.2375	CSQ	Police phone patch
Chicago, IL	411.3500	D114	Police
Bedford, MA	163.3625	167.9 PL	Police
	165.5375	123.0 PL	Facilities & EMS
	167.8875	100.0 PL	Network
	168.5375	CSQ	Paging System
Brockton, MA	164.2125	167.9 PL	Police
	166.1375	123.0 PL	Facilities
Jamaica Plain, MA	163.2625	156.7 PL	Police
	166.0750	123.0 PL	Facilities
Leeds/Northampton, MA	163.2375	P-25	Police
West Roxbury, MA	162.2125	167.9 PL	Police
	164.0625	123.0 PL	Facilities
Togus, ME	163.0000		
	168.5250		
Manchester, NH	407.8375	P-25	Police
	407.8375	D165	Police phone patch
	408.2375	D627	Maintenance
	162.6125	P-25	Police
Providence, RI	408.2375		Police Channel 1
	417.2375		Police Channel 2 (Talk Around)
	409.4375		Maintenance Channel 3
	418.4375		Maintenance Channel 4 (Talk Around)
	413.4125		Resident Engineer Channel 5
White River Junction, VT	168.5250		VA Medical Center

carried out the infamous Elian Gonzales raid in Miami a few years ago.) They are based at Biggs Army Airfield in El Paso, Texas, and are highly trained and equipped for high-risk tactical operations. Specific radio frequencies for BORTAC operations are unknown, but I suspect that they would be short range and encrypted.

Another reference to BORTAC indicates that it stands for Border Tactical Communications System. This BORTAC is used in the San Diego, California, area and it is a system that allows patches between local, state and federal agencies communications systems. It is not a system of radios or transmitters, but simply an interconnection of various existing systems to a central control point that allows a dispatcher to connect one agency to another for communications.

These patches are used only as needed and are allowed only if both agencies request it. For example, the dispatch center could patch a CHP officer on his VHF low-band channel to a Border Patrol officer on his digital VHF hi-band radio so that they can communicate.

❖ Chicago Trip

I recently made a couple of quick trips to the Chicago area, but my business kept me close to the northwest part of the metro area. Here's what I found during my brief stays in the area:

Freq MHz	Agency
164.9875	Unknown agency
166.3750	CSQ - US Postal Service airside operations at O'Hare Airport
166.5875	100.0 PL - DHS Border Patrol / Customs operations at O'Hare Airport
168.1250	Unknown
168.8250	100.0 PL - DHS Border Patrol / Customs operations at O'Hare Airport
169.3000	P-25 - TSA at O'Hare Airport
169.5500	100.0 PL - DHS Customs (TAC 19)
170.0000	D116 - Unknown agency
172.1500	P-25 - TSA at O'Hare Airport
172.3000	Paging
172.9000	P-25 - TSA at O'Hare Airport
406.5500	Unknown agency, simplex units.
414.7500	82.5 PL - US Postal Inspectors "Chicago Base"
415.0500	82.5 PL - US Postal Inspectors "Chicago Base"
415.2000	103.5 PL - DHS Federal Protective Service

❖ Veterans Affairs Medical Centers

A number of folks have asked about frequencies for their local VA medical centers. There are quite a few frequencies used by the VA for their operations. Most locations were using VHF frequencies, but there seems to be a move towards the UHF federal band as new radios are being purchased. Table 1 is some information for some VA facilities around the country provided by a friend of the *Fed Files*.

In the Portland, Oregon, area, the VA Medical Center seems to have abandoned its federal VHF and UHF frequencies for space on the Portland 800 MHz trunked system.

The VA Security patrols apparently serve both the Portland VAMC as well as the Barnes VA Hospital in Vancouver, Washington. I will have more VA frequencies in future *Fed Files*!

❖ More About Roadrunner

Almost immediately after the March *Fed Files* hit the stands, I received some e-mails about the White House Communications Agency and their Roadrunner communications van. I had mentioned that the newest versions of this mobile communications system have been spotted in presidential motorcades for a while now. The e-mails I got from some readers all stated that this new vehicle was, in fact, a cell phone jamming setup. In my description of the new technology involved in the WHCA Roadrunner, I never said it *wasn't* a cell phone jamming system, but I don't think that is its exclusive purpose.

Tactical communications jamming, including cell phones, is an interesting and complicated topic. Do an internet search some time for "cell phone jamming" and you will find more than a few companies that sell tactical RF jamming solutions for not only cell phones, but almost any frequency band you wish.

❖ FPS Trunked System

I recently passed through the Atlanta area and was able to monitor the Federal Protective Services' UHF trunked system in downtown Atlanta. While much of the FPS radio system is starting to convert to P-25 digital, every other city I've monitored has used conventional systems, not trunked.

The Atlanta system appears to have four different sites all operating as a networked, trunk system, but almost all the traffic monitored on this system was the FPS Police around the federal buildings in Atlanta. There may be other agencies using this system, so it's worth keeping an ear open. Here's what I found for the system frequencies:

Site 1 -	406.4125, 407.2125, 408.5375, 410.1250 MHz
Site 2 -	406.5625, 407.1625, 408.5625, 410.3625, 410.5625 MHz
Site 3 -	407.3625, 408.3625, 408.7625, 409.3625, 410.7625 MHz
Site 4 -	406.7625, 406.9625, 407.5625, 407.8625, 408.9625 MHz

The Site 1 frequencies appear to be in downtown Atlanta. All four of the trunked sites are receivable from the downtown area, but I don't know where these other sites are located. Anyone have any further information on this system? Please feel free to pass it along to us here at the *Fed Files*!

❖ Postal Inspectors

Recent reports seem to indicate that changes are in the works for the US Postal Inspectors radio systems. Recently a new frequency was noted with some activity in the

Portland, Oregon, area that may be a new Postal Inspectors P-25 digital repeater on 407.1875 MHz. 407.725 MHz has also been active with both analog and encrypted digital traffic.

Some listeners seem to think that the Postal Inspectors are "flipping" their repeater input and output frequencies, so search around in the 407-409 MHz segment of the federal UHF bands and see if something new shows up there.

❖ Operation Falcon

During the early part of April, the US Marshal's Service of the Justice Department conducted a nationwide sweep of wanted criminals referred to as Operation Falcon. You can read more about this operation at the US Marshal's web site, <http://www.usdoj.gov/marshals/falcon/index.html>. I heard some of Falcon in my home base of Portland, Oregon, while it was happening, but since the operation had not been announced to the public yet, I didn't really know what I was listening to!

Frequencies that were active around the two weeks or so of activity included:

163.2000	US Marshals nationwide
164.6000	127.3 PL Marshals, sometimes referred to as EXODUS channel
166.4625	DHS Common, seemed to be some analog traffic concerning warrants
167.6375	127.3 PL Marshals repeater that seems to have been set up for this operation.

This frequency has been used up in the Seattle area, but had not been heard in the Portland area until now. At one point someone came on this repeater and identified as KEX720, which is an FBI call sign used by the Portland FBI Field Office. This seems to confirm that the operation was a joint Justice Department operation.

❖ MT Bulletin Board

When writing this column I sometimes have information that I would like to share with *MT* readers, but waiting for the magazine to be published didn't keep the information fresh enough. I would like to start trying to post some of this timely information on the *Monitoring Times* Bulletin Board on the *MT* web site. You can get there by going to: <http://www.monitoringtimes.com/cgi-bin/ultimatebb.cgi>.

Check it out and we'll see you in the September *Fed Files*!

Video Piracy by David Lawson

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 954-610-2546

This column contains information about current security technology used by cable and satellite providers. This information is not suitable elsewhere.

ScramblingNews.com

New Life for Marine HF Morse

VE3G0, VE3GO de K6KPH, K6KPH, Ga Ron, you are 559, 559 near San Francisco. The name is RD, RD. How copy? VE3GO de K6KPH.

I was thrilled to finally contact K6KPH, the amateur station at the site of the restored KPH Marine Coast Station. Not only was it on 15m CW, but it was International Marconi Day as well. The operator was Richard Dillman, who is one of the people responsible for the restoration of this famous station.

K6KPH uses the original transmitters and receivers at the KPH site. The transmitters are RCA "L" sets from the 1950s and put out 1.5 kW to extended Zepp antennas. K6KPH can be found on 7.050, 14.050, 18.097.5 and 21.050 MHz CW. They do activate 3545 if conditions warrant. They are active Saturdays from 1200 to 1600 PST on 7.050 and 14.050 MHz, and on special event days like Marconi Day. KPH is also on the air, and schedules can be seen at their website.

However, their special event is the "Night of Nights." This is July 12, 2005, and is the anniversary of the last commercial Morse message. KPH will be on the air on its original marine frequencies – 4.247, 6.447.5, 8618, 13.002, and 17.016.8 MHz, along with 426 and 500 kHz CW. I certainly want to hear and QSL this station as well. Transmissions will commence at 1700 PST July 12 (0000 UTC July 13) Check <http://www.radiomarine.org> for exact details.

The best news coming out of the Maritime Radio Historical Society is that they have received an FCC license to establish a new Marine CW Coast Station – KSM. This news alone has made me start my antenna modifications here at VE3G0. I am determined to receive and QSL this new station. KSM will be activated for commercial traffic; however, not much is expected. The primary purpose of this Coast Station will be to reestablish commercial Morse. Work is already going on for MF 6 and 12 MHz operations.

KSM was a Globe Wireless Station from 1933 to 1941, so the call has a real history. The license has arrived and the 6 MHz transmitter has been tested. Details of the work are as follows:

"KSM will use the CW transmitting and receiving facilities of KPH at Bolinas (transmitting) and Pt. Reyes (receiving), California. We use these facilities when we activate KPH for "Night of Nights" and other events.

"While the exact equipment we will use for KSM is still under discussion, it appears that we will use a 1940s vintage Press Wireless PW-15 on 12Mc and a 1950s vintage RCA 'K' set on 6Mc. MF will use a 1990s vintage two frequency Henry. We moved two PW-15s from the KFS transmit-

ting site to the Bolinas site and have restored one transmitter to operational status. We feel this must surely be the only operating PW-15 in the world."



KSM's RCA "K" set being tuned by Tom Horsfall.

❖ NOAA Research Vessel

On February 12th, I had the pleasure to contact NOAA Research Vessel *Ronald H. Brown* via N7LGG, Wade Blake, on the Maritime Mobile Service Net. Being a marine history enthusiast and knowing this ship's connection to the *Titanic* and *Robert Ballard*, I had to have a contact. I received an email from Wade, who is the executive officer. Information about this vessel and her electronic equipment can be obtained through their website. I have included a copy of the email received:

"I was pleased to be able to make contact with you on 14.300 MHz at ~2125Z on 12 FEB 2005. At the time, we were located far off the coast of Brazil at 17° South, 025°W. I was using a Yaesu FT-857 at 100 Watts into an SGC-231 coupler and 23 ft. whip antenna. As you know, I'm aboard the NOAA Ship *Ronald H. Brown*, a U.S. Government oceanographic research ship, where I am the Executive Officer and sometimes acting Commanding Officer. This is currently NOAA's (National Oceanic and Atmospheric Administration) largest oceanographic and atmospheric research ship at 274 feet long. NOAA has its own Uniformed Service called the NOAA Commissioned Corps that has its roots in science and survey operations dating back to the early 1800s (<http://www.noaaacorps.noaa.gov>).

"The project we're currently working on is part of a large scale, international, worldwide climate variation study undertaken by a number of ships over many years. During this project we left from Punta Arenas, Chile, in January and started taking ocean water and air samples from near 60°S, 030°W surrounded by icebergs from Antarctica. We're working our way north, passing

by South Georgia Island and north along 025°W longitude. The ship stops every 30 nautical miles and conducts ... measurements, and collects specific water samples at various depths ... for many scientific studies including studying the world ocean circulation and carbon dioxide cycle that affects the world climate.

"While I am an oceanographer as well, my role is running and managing the ship for the visiting scientists who participate in the various scientific projects that take us around the world. As you noted, last year we conducted a survey of the *Titanic* wreck site with Dr. Robert Ballard with National Geographic Society and NOAA's Ocean Exploration program. The year before we participated in the mapping and photographic survey of the German U-Boat U-166 just off the Mississippi River delta. This project was filmed for several History Channel shows. We also conducted an air pollution survey off New England last summer before heading to the Pacific to deploy sets of deep ocean moorings in the eastern equatorial Pacific, including a Tsunami warning mooring for Chile.

"So we get around, and amateur radio helps me to stay in touch with the world. I utilize the Winlink 2000 HF e-mail system to enter position reports and send some emails. I have connected up with stations 7,000 nm away and I've been impressed with the system's performance. I frequently monitor the Maritime Mobile Service Net, but down below 40°S near South America, it's difficult to hear anyone.

"During my career with NOAA, I've had the opportunity to travel to many places that few people get to visit, including much of the Arctic, down near Antarctica, many remote tropical islands and many remote places in the Atlantic and Pacific – including all the ocean in between!"

Wade included a picture of the vessel anchored off Clipperton Island. He said he never had a rig while there, but I can just imagine the radio pile up if he began an unannounced operation from this rarely visited island and rare DX opportunity. Wouldn't I like to be a part of that trip!

❖ Modern Marine Communications

Readers seem to be enjoying the column, and I have received some interesting email. I mentioned the General Operator's certificate for Canadian Marine Officers who travel off the coast. Eric Stapleton, VE3SQ, was taking that course in St. John's NFLD. He sent me a message by marine narrow band direct printing (nbdp) SITOR, from their location via WLO, Mobile, Alabama. I am



NOAA Ship RONALD H. BROWN, R-104, holding position off Clipperton Island, Eastern Tropical Pacific. Photo by Wade Blake.

pleased to have received a message through this famous marine coast station. I have contacted W4WLO which is located at the marine station site. The text is as follows:

THIS IS A FORWARDED EMAIL MESSAGE VIA RADIOTELEX FROM VX9IYE THE GMDSS STATION AT THE MARINE INSTITUTE AT ST. JOHN'S, NL.

THE STATION CONSISTS OF A FURUNO FS-1562-15 SSB TRANSCEIVER, A FURUNO DP-5 RADIO TELEX TERMINAL AND A FURUNO DSC-6A MF DSC TERMINAL RECEIVER. THE STATION CO-ORDINATES ARE 47 DEG 35 MIN NORTH AND 52 DEGREES 44 MINUTES WEST. THE SELCAL IS 0583 MMSI 003160001. THE ANTENNA IS A HORIZONTAL WIRE ANTENNA.

73, ERIC VE3SQ

Another interesting amateur radio contact was FT5XO, on a DXpedition to the Kerguelen Islands. They are located about halfway between Africa and Australia, but at the Latitude of New Zealand. A couple of days later, I contacted VK6DXI/mm on 7 MHz CW. This was the vessel carrying the DXpedition home.

I can truly say that the Maritime Mobile Service Net on 14 300 USB and the CW bands have produced some great marine contacts even an SWL would have a great time monitoring. I contacted UA0ZDA/mm, a Russian vessel on the way back from Antarctica on 7 MHz CW in March, as well as several pleasure vessels in the Caribbean. I have acted as a relay for net control and also provided some information.

❖ VHF

The VHF Marine bands have come alive again in this region. I have heard radio checks from many vessels as they get their yearly inspec-



Training exercise for the CG Cutter Bittern and an SAR Comorant Helicopter. (Photo by Richard Beaudoin, CCG)

tions. As you read this in July, the traffic in the Great Lakes region will be at its maximum. Listening to the bands, I have already learned when the icebreakers were coming up the river, when the navigation aids were replaced for the season, and when the first commercial vessel was coming up the Seaway.

Last night I monitored Seaway Clayton on Channel 13 (156.650 MHz) and they were talking to three Canadian Coast Guard Cutters. *Cape Hearne*, *Cape Dundas* and *Cape Discovery* were built in Vancouver and were unloaded from the freighter *Federal Manitou* in Port Alfred, Quebec. The three vessels are new 47 ft. motor lifeboats and are heading to Burlington to be equipped for lakes service. What made this great for me was the fact the *Cape Dundas* will be the new vessel for the base here in Kingston. As a Coast Guard Auxiliary member, I hope to make a few trips on her this year.

❖ Myrtle Beach, SC

My annual March visit to Myrtle Beach produced some interesting monitoring and the chance to meet some great people. I monitored traffic on 2182 kHz and 5696 kHz USB. On VHF I heard the Cape Fear Pilot on channels 16 and 12. Coast Guard stations in Georgetown, Charleston, and Fort Maken were also heard. The Coast Guard uses channels 21A, 22A, 23A and 83A. Some local bridges were heard on channel 9.

Membership in the Coast Guard Auxiliary allowed me to visit the Coast Guard station in Georgetown, SC. I was impressed by the friendliness of the staff and the efficiency with which this base was operated. Petty Officer Beau Woods, the OOD, checked my ID and provided some interesting information about radio in the area.

He said the new US Marine Radio program, Rescue 21, was not in effect in this area yet but is coming. When GMDSS (Global Marine Distress and Safety System) equipment is activated, the main impact on pleasure craft will be enabling DSC (Digital Selective Calling) Marine radios. These radios allow a digital distress message and selective calling of other vessels. Information on the program can be obtained on the internet at <http://www.uscg.mil/rescue21>.

The amateur radio net for the Grand Strand Amateur Radio Club and Petty Officer Woods suggested I contact Fred Williston, AF4MB, who is in the US Coast Guard Auxiliary. He is the Coxswain of an auxiliary patrol vessel and also has set up his own coast marine radio station as a result. I was unaware this was permitted in the US.

Fred has his amateur station and a marine station equipped with VHF and HF marine radio. The equipment is efficiently installed and well maintained. His phased HF marine vertical, oriented North-South along the Intercoastal waterway, provides excellent HF coverage. I was impressed by his antenna installation. His station, Georgetown-1, has been inspected by the appropriate authorities and is now active.

I would like to spend more time with this very friendly retired fighter pilot. I know his efficient patrol vessel, trained crew, and radio station will be an asset to the auxiliary. I certainly hope to take up his offer of going on patrol with him during my next visit to SC. One thing he

showed me was that every crew member had a PPERB (Personal Position Indicating Radio Beacon) in his protective suit. If the person were to go overboard, then the PPERB would become active. Similar to the 406 MHz EPIRBs which report ships in an emergency, this beacon enables the crewmember's position to be tracked by satellite.

A pamphlet produced by the Boat US Foundation (<http://www.boatus.com>) on weather for the mariner provided the following frequencies: VHF Channel 22A (157.1 MHz) for USCG broadcasts as well as 2670 kHz HF. Information stations can be found on 4428.7, 6506.4, 8765.4 and 13113.2 USB. It also included a reminder that North Atlantic weather info can be found on WWV broadcasts at 5, 10, 15 and 20 MHz, and that NOAA weather radio stations can be heard in coastal areas with weather, wave and tide info.

❖ US Marine Radio Licenses

Dick Holbert K2HZ wrote to me and explained that, in the United States, voluntary marine radio mobile stations do not need a station license or an operator's certificate. However, he said for International operation, specifically including Canada, a station license and Restricted Operator's Permit was required. Canada does require a Restricted Operator's Certificate, which includes a section on GMDSS and DSC equipment, but no station license until you go on an international voyage. I urge all mariners to check the regulations for their country and any country to which they voyage.

❖ Canadian HF SAR Frequency

My editor forwarded me some letters from John B. Musgrave, who lives on a vessel in Oona River, BC. I have written to him and asked him to send me any frequency information he can. He did mention VHF channels 16 (156.8) and 22A (157.10) as being used in the Prince Rupert area. He also mentioned 5717 USB as being used by the SAR aircraft during a rescue mission.

This seems to be a common Canadian SAR frequency, as it has been active on the East Coast as well. John is working toward his amateur license and I hope I can work him on the air in the future.

❖ Closing Comments

I really appreciate the suggestions, information and comments that I receive. The positive support from folks such as Rich, KC8HMJ (ex WPE8FLZ) from Michigan, makes writing this column rewarding. Please send me information on what you hear and what frequencies are active in your area. This makes the column more interesting and informative to all readers. Try monitoring 5717 and 5696 USB for some interesting listening.

Now, I must get back to my back yard. The tower is coming down for fresh paint, a refurbishing of the R-7 vertical, plus the installation of cross arms to attach the new HF sloper antenna and a new 6 dB gain VHF antenna for monitoring. This, plus the new cables, will hopefully put more RF into the shack.

73 and good DX!

Summertime Listening

Welcome to the July issue of *Below 500 kHz*. Tuning the basement band during the warmer months presents some special challenges for DXers. First, there are static crashes to contend with – and they can be quite heavy. Lightning, even at distances of 100 miles or more, can generate enough noise to disrupt or obliterate your listening.

The longer hours of daylight also limit the time most of us have available for nighttime “skip” work. The signals we do hear tend to be close-in “regulars” rather than the prime DX catches we hope for in the cooler months. Finally, summer often demands much of our time away from the shack – yard work, vacations and other recreational activities take their toll.

Don’t despair! Summer is not a time to hang up the headphones. Here are some tips for making the most of your time at the dials...

- ✓ **Start Early** – Do most of your listening in the morning, and you’ll be surprised what can be heard before the noise has a chance to build up. Before 10 a.m. is best, since there may still be some nighttime skip in effect, especially on the higher LW frequencies (300 kHz and up).
- ✓ **Antenna is Key** – Avoid the common “longwire” antenna, especially in the summer. These antennas can act as “noise collectors” particularly in urban and suburban locations. Many operators have noted that they seem to pick up every light dimmer and motor in the neighborhood. Instead, consider using a Loop Antenna or an Active Antenna. Two commercial sources for these antennas are LF Engineering Co. (<http://www.lfengineering.com>) and Palomar Engineers (http://www.palomar-engineers.com/Loop_Antenna/loop_antenna.html). You can also build your own loop or active antenna for a very reasonable cost. Check the web for a plethora of design ideas.
- ✓ **Roadtrip!** – Planning a summer getaway? Why not pack your portable receiver, a beacon directory, and your logbook for some new-to-you signals? Imagine the excitement of tuning the band with an entirely new set of signals to hear. We all need a break, so be sure to log some quality time away from the radio as well!
- ✓ **Locals** – The pleasant conditions of summer also make it ideal for tracking down your local beacons. All you’ll need is your portable receiver, a local map,

and a compass. By using your portable’s internal antenna you can take two or more directional bearings and plot these on the map. The intersection of the bearing lines will show you where the beacon is located. (And no cheating with GPS, either!) Once you’ve found a beacon, why not snap a picture for the pages of MT?

- ✓ **Batteries Required** – Summer invariably brings with it some power outages, so it’s a good idea to keep some fresh batteries in your portable rig. When the power goes out, you’ll have the advantage of operating while all of the dimmer controls, TVs, motors and other static-generating stuff is “off the air.” These magic moments come rarely, so be ready! You may even want to run a tape recorder to preserve the moment (got any more batteries?).

❖ 500 kHz to Light up?

Via *ARRL Letter*, we learn of an application filed by the American Radio Relay League for a 500 kHz experimental license. The item reads: “The ARRL has applied to the FCC for a Part 5 Experimental license on behalf of a group of amateurs interested in operating in the vicinity of 500 kHz. ARRL General Counsel Chris Imlay, W3KD, announced the filing during a meeting of the ARRL Executive Committee April 9 in Denver. The experimental application was among several items the EC dealt with in addition to its recommendations to the ARRL Board of Directors regarding a planned regulation-by-bandwidth petition.”

“If granted, the two-year Part 5 license would permit experimentation and research between 495 and 510 kHz using CW and PSK31 at power levels of up to 20 W effective radiated power. ARRL Member Fred Raab, W1FR, of Burlington, Vermont, would manage the project, which calls for 23 discrete fixed sites from New England to California and Minnesota to Louisiana.”

❖ Mailbag

Vic Rosser, N4VIC (GA), writes: “I really enjoy your column now that I’ve begun monitoring beacons. I use a Harris RF-590 and a Yaesu FT-757GXII connected to a 190’ wire for monitoring. My most interesting catch so far is ZYG /400 kHz at Charlottetown, PEI, Canada. I live just outside Atlanta, GA, and that is about 1200 miles away. I have not been able

to find any information on the beacon, however. It would also be nice to QSL this one, but being new to the hobby, I don’t know how. I am a ham, N4VIC, but have never tried to QSL anything other than a ham. Any help would be appreciated and keep up the good work.”

Hello, Vic, and thanks for writing. I am pleased to answer your question about QSLing beacons. It certainly is possible to receive a QSL from these stations, and you can take a few special steps to maximize your chances of success. First, you’ll need to make your own card with blanks for the recipient to fill in his/her title and signature. We call this a Prepared Form Card (PFC). You can look through some back issues of *Below 500 kHz* for examples of suitable PFCs. The design is entirely up to you, but it should prominently show the ID, Frequency, and Location of the beacon.

Next, you should send it to the airport nearest the beacon, which, in the case of ZYG, is the Charlottetown Airport in the Province of Prince Edward Island. Mailing addresses for most airports are easily found on the Web. Send your request “ATTN: Aids to Navigation” and it should get routed to the right person. You should include a brief note explaining that you are conducting a hobby survey of these stations, and request them to sign and return the card in the pre-addressed envelope that you provide.

Mail originating in Canada must have Canadian postage, so you won’t be able to affix U.S. stamps. The Post Office can give you information on International Reply Coupons (IRCs) or you could just enclose a “greenback” for the purpose of postage. This is a common practice with hams when QSLing foreign destinations.

❖ LWCA Dues to Rise

The annual cost of *The Lowdown* journal has increased, effective July 1, 2005. The U.S. rate had remained constant at \$18/year for the past several years, even including the two most recent postal increases.

However, publisher Bill Oliver reports that the printers have raised their rates significantly, making it necessary to pass along the increased cost to members. As of July 1, the domestic rate is \$21/year for regular mailing or \$24 mailed in an envelope; \$21 to Canada; and \$26 elsewhere. (All figures are in U.S. dollars.) *Lowdown* dues may be sent to: Longwave Club of America, 45 Wildflower Rd., Levittown, PA, 19057-3209. Complete information about the club is available at <http://www.lwca.org>.

Taliban Radio Resurrected

For many years, Shariat Shagh was the radio voice of the Taliban government in Afghanistan. It has now been very widely reported in the press that the Taliban have resurrected this station as a clandestine with a mobile transmitter. The station name translates into English as the Voice of Shariat. Thus far, the station has only been using a mobile transmitter on local frequencies, so it is inaudible in North America. But, the station caused a worldwide stir, and it is possible that a shortwave relay may appear from this one. Keep your eyes and ears open. The Taliban have announced a schedule running from 0200-1400 UTC. They claim a transmitter range of five southern Afghanistan provinces in the Kandahar area, so it appears that a medium wave AM transmitter is currently in use by the new clandestine.

❖ Derby Radio Shortwave

A truly novel pirate popped up on the weekend of this year's Kentucky Derby. The station mixed a recording of a sportscaster's actual call from the horse race with banjo renditions of "My Old Kentucky Home." It is unusual for pirate radio stations to carry sports coverage, but this new one did just that. They proudly announced that they have been active since 2005. If you heard them, they asked for e-mailed reception reports to derbyshortwave@hotmail.com

❖ Another Zimbabwe Clandestine

Several DXers are reporting that Radio Voice of the People, a clandestine beamed to Zimbabwe, is using 7120 kHz for broadcasts that are sometimes audible in North America, although this frequency of course cannot be heard around 1700 UTC which is broad daylight on this side of the Atlantic. If you hear them, reports go to Radio Voice of the People, PO Box 5750, Harare, Zimbabwe. It is widely assumed among DXers that this is another clandestine who buys time on licensed transmitters as a brokered broadcast. In this case, the signal probably comes from Madagascar.

❖ Sudan Clandestine

Another relatively new clandestine is producing some loggings on both sides of the Atlantic. Radio Nile, which uses 12060 and 15320 kHz for a half hour at 0430 UTC, broadcasts mainly in Arabic to Sudan. But, it frequently includes English language IDs at the beginning

of its transmissions, so this one is worth a try.

❖ The Corsair Transmitter

Many pirate radio DXers have always admired the high quality, low power, "Grenade" transmitters that used to be custom manufactured by the legendary Radio Animal. A new contender has arisen in the amazing portable pirate transmitter market. As we see here this month, the Corsair transmitter fits in a tiny Altoids-size mint tin. Its output is 10 watts. It uses a Pierce oscillator instead of a modulation transformer.



If you are interested in additional technical details on this innovation, the transmitter is discussed at http://www.geocities.com/thecorsairtx/The_Corsair.html

❖ Australian Pirate Logged

Via DXplorer, Arnaldo Slaen in Argentina heard one of the most unusual pirate transmissions of the decade so far. South American pirate Radio Cochiguaz from Chile relayed Australian pirate Hobart Radio International on April 21 using 6950 kHz from 0102-0122 UTC in lower sideband. Any North American DXers who heard this one were treated to three continents at once during the same broadcast.

❖ What We Are Hearing

Monitoring Times readers once again heard nearly two dozen different North American pirates this month. You can hear them, too, if you use some simple techniques. Pirate radio stations never use regular announced schedules, but shortwave pirate broadcasting increases noticeably on weekends and major holidays. You sometimes have to tune your dial up and down through the pirate radio band to find the stations, but the primary North American pirate frequency of 6925 kHz, plus or minus 30 or 40 kHz, remains the best place to scan for the pirates. More than 90% of all North American shortwave pirate broadcasts are heard on or near 6925 kHz.

Ann Hoffer Radio- Some pirate is still trying to promote music by this female singer. (Uncertain; try Belfast)

Captain Morgan- Among the pirate captains on the air today is this rock music operation. (None, says

to send loggings to ACE, and has QSLed lately) Channel Z- They feature a mix of their own programming and relays of European pirates. (Uses channelzradio@gmail.com e-mail)

Derby Radio Shortwave- We feature this one above this month. (Uses derbyshortwave@yahoo.com e-mail)

Ground Zero Radio- Dave Gunn's parodies and rock music allegedly come from a studio in an abandoned nuclear missile silo. (Elkhorn)

James Bond Radio- This one plays tunes from old James Bond movies, sometimes with other audio antics mixed in. But, it is a mysterious operation so far. (None)

NOAA Weather Radio Relay- This new one relays local NOAA weather from various USA cities, so as to provide a wider listening audience for weather forecasts in St. Louis, New Jersey, and other locations. (None)

Radio Metallica Worldwide- Dr. Tornado has been gone for many months now, but he has not been forgotten. Relays of his old superpowered 5 kW broadcasts are back on the pirate band now. (Blue Ridge Summit)

Radio First Termer- Rebroadcasts of this old documentary about military broadcasting to USA troops during the Vietnam War are still common fare on the pirate bands. (None)

Radio Novocaine- Their rock music is not top of the charts hit material, so they differ from licensed rock broadcasters. (None)

Take it Easy Radio- They took their name from the Eagles rock tune, but they also play rock by other artists as well. (Merlin and takeiteasyradio@yahoo.com e-mail)

The Crystal Ship- The Poet is more unpredictable in his frequencies than any other North American pirate. He shows up with rock and political comment in various places including 6925, 4071, 4510, 4700 and 6857 kHz. (Belfast and uses tcshortwave@yahoo.com e-mail)

The Mule- Our readers clarify that this station programs music by the rock group "Government Mule." (Elkhorn and uses mule6925@yahoo.com e-mail)

Undercover Radio- Dr. Benway still broadcasts his rock music "from the middle of nowhere." Per QSL's, he claims to use a 300 watt transmitter. (Merlin and uses undercoverradio@mail.com e-mail)

Voice of Laryngitis- All of the Huxley family players are back with what is probably the most entertaining pirate in history. Their original comedy is hilarious. New shows combine reruns of their classic productions and new material, including their interval signal veteran Farty the Seal, who now sings "Smoke on the Water." (Belfast)

WHGW- Old time radio drama rebroadcasts and rock music are still the programming mix on this one. (Uses whgw6925@myway.com e-mail)

WHYF- The James Brownyard memorial station, supposedly from North East, PA, features pirate comedy and antique temperatures for Lake Erie cities. Many think that this is the most prominent North American pirate on the air today. (Providence and uses whypradio@gmail.com e-mail)

WKZP- For almost two decades they were rarely heard, but this veteran rock music station has now returned to the air. (Blue Ridge Summit)

WMPR- This mysterious "Dance Party" rock music pirate remains on the air. They play toe-tapping

continued on page 61

Hamming It Up on the Weekends

As I have indicated in columns past, what passes for normal operating time here at N2EI is to sit down in the evening after dinner and family chores for a nice CW ragechew. I operate at other times and on other modes as well, but over the last few years that is the happy rut I've dug for myself. This was not always the case, however. When Number One and Number Two Sons were younger, weekday evenings were devoted to family fun and, quite often, helping out with homework. Now, with one out of college and the other with a driver's license, they are happy to leave Dear Old Dad to his radios. But, when the boys were younger my only real chances to operate were commuting in the car and on weekends.

It occurs to me that many folks find their prime ham radio time falling on the weekend. Further, given the busy nature of the work-a-day world, even weekend operating time is wedged in between all those other activities modern life crams into our "off" days. I've heard from more than one person over the years whose excuse for never getting their amateur radio license was the lack of time to play radio.

Well, as "Dude" Lebowsky once said, "This will not stand!" Therefore, it is time for us to peruse some of the exciting operating opportunities any new ham or old timer can take advantage of on any given weekend.

❖ State QSO Parties

One of the great amateur radio accomplishments is 5 Band Worked All States. 5 Band WAS can probably be achieved by any amateur radio operator with a moderate station setup and a reasonable dose of good old ham tenacity. Regular domestic QSO operation will take any ham a long way toward the goal of working a station in each state on 10, 15, 20,



Pennsylvania has a great QSO party the Second Week of October and for County Hunters it offers 67 Counties.

40 and 80 meters, but to fill in those gaps and hard-to-get states, weekends are when you will find the various State QSO Parties.

Most State QSO Parties are organized by an individual club or groups of clubs for the home state. Each QSO Party has unique rules, but the main thing to remember is that, during the contest period, a large number of hams from the target state will be operating on all bands. Most of the contests also set recommended frequencies, so it is fairly easy to find folks to work.

Another feature of such operating events is that hams will work a bit harder to fight the propagation gods during a State QSO Party. For example, from here in New Jersey it's a bit hard to get the closer states on 20 meters. Normally the signal skips right over them to distant places. I remember ignoring an opening to Africa while I shouted frantically at a guy in Delaware to finish up nailing down that state in my log. I was able to get Vermont on 20 during the New England QSO party (a multi-state event), because it was in that 1-lander's interest to listen for my whisper of a signal carried by Near Vertical Incidence propagation. Any other time, it is unlikely the station would have bothered digging me out of the noise.

Lists of the various QSO parties can be found on the Internet and in many ham publications. I also include the State QSO Parties for the current month in the inset in this column.

❖ Contesting in General

Most contest activity occurs on weekends in the radio hobby. Remember what I have pointed out in various columns past: You do not have to plan to tie yourself to your operating position for 72 hours on a contest weekend. If you are not going for *The Big Score*, you can still have a lot of fun by sweeping the bands for an hour so in search of stations to fill your log book for any awards you are seeking. As long as you play by the contest rules, you will be just as welcome as everyone else participating.

❖ DXpeditions

The opportunity to work rare DX stations is affected by so many factors. First of all, there has to be a ham operating from the desired location. Then they have to be operating at a time of day when the path between you and their station will be advantageous to you both. DXpeditions – organized efforts by a group of hams to put a rare entity on the air – are often

the best bet for adding those new ones on the way to DXCC or even the Honor Roll. Most organized DXpeditions are set up to operate continuously throughout their time on site. This allows you to catch a propagation path, no matter the time of day or night, that is best for your location.

I bring this idea up in relation to weekends because some of those openings are going to fall at odd hours. It's probably easier for many folks to jump out of bed at 3:00a.m. local time to grab Radio Freedomia and then sink back to bed and sleep in a bit longer on a weekend than it is during workdays. Keep an eye on the ham press and DX related Web sites on the Internet for details of when various operations are going to be QRV.

❖ County Hunting

Trying to work hams in each of the 3077 counties in the United States is quite an accomplishment. It's not usually a matter of operating really high power with big antennas. Many of the folks involved in this aspect of the ham hobby operate mobile with modest power. To work 'em all is more about cooperation and camaraderie than it is about watts and waiting around.

While any contact can count (and most hams begin the journey toward Worked All Counties by scouring their QSO cards to see what folks they have worked already), most of your activity will center on the Mobile County Hunters Nets on 14336 SSB and 14.056.5 CW. These nets coordinate the efforts of mobile stations as they drive to give out various counties to folks waiting on the net for any and all unlogged and confirmed counties.

County Hunters have their own protocols and even their own language. A great way to dip your toe in the water is to monitor the net frequencies and check out all the details at <http://www.countyhunter.com/> or <http://marac.org/> While County Hunting goes on all the time, weekends bring out the majority of the mobile operators, especially those going out to offer rare counties to the nets. A few words of warning, though: County Hunting can be very addictive. It's a lot of fun and you will meet a lot of great folks along the way. By the way, if you are not quite up to the challenge of working all US counties, a number of states offer worked all counties awards – a great way to dip your toe into the county hunting waters.

❖ Special Event Stations

On any given weekend, somewhere in the United States and sometimes even the world, a group of hams will get together to operate from a unique location or to commemorate a place, time or event. Special Event Stations always hold a special place in this ham's radio heart because, more often than not, they are pure fun. Rarely do the operators of a Special Event Station take themselves too seriously. Usually the ham radio operations are going on from festive locations and that rubs off on the radio crew.

I've been on both sides of the microphone with Special Events, and either giving or getting a Special Event contact is worth the time and effort. Most Special Event Stations offer unique certificates or QSL cards to give the station worked a bit more to hang on the wall than a traditional QSL card. Some of these certificates are real works of art. Unless they are commemorating a date-specific event (e.g., Veteran's Day), Special Event Stations tend to be weekend operations. A glance at any of the major amateur radio publications or sites will yield a list of scheduled Special Event operations for any given date.

Most stations also list likely operating frequencies, but do not forget they may need to go up or down a number of kHz to avoid QRM. If you don't know of any specific events on a given weekend, you can often find some activity by tuning around 30 to 50 kHz up from the edge of the General Class operating segment of any open band. It seems to be a pattern that this is "Special Event Alley" on any given weekend.

❖ Volunteer Activities

Of course, you have taken the time to become aware of your regional amateur radio emergency services organization. Be it Amateur Radio Emergency Service (ARES), Radio Amateur Civil Emergency Service (RACES), or both, most of these groups are always looking for hams to help out. Many such groups practice their emergency radio network skills by providing radio support to various non-ham activities. Bicycle races, walk-a-thons, parades are all likely weekend activities where you might find hams gathered together to practice their skills and serve their community.

Most such operations are set up around VHF/UHF repeater systems, so they are a great place for new Technician Class hams to get their feet wet in the radio hobby. In addition to learning more about your equipment, radio net procedures, and getting to know other hams, you will be practicing for how you may be able to really help out in a true emergency. I have always maintained that emergency services are the rent we hams pay for our frequencies. Weekends give many hams the chance to do their part.

❖ Field Operations

Many hams find it a great deal of fun to head for the hills, valleys, forests or seashores

with their gear for some weekend ham fun. Some folks combine their radio activity with other hobbies such as camping or bicycling.

This is the time of year when I like to load my Elecraft K1, a battery pack, and some wire antennas into a daypack and either head out on foot or on my Mountain Bike to work a few QSOs from somewhere deep in Mother Nature. It is easier than ever to put together a good portable station. We've talked about it several times in this column, but rigs like the Elecraft K1 & KX1, the Yaesu FT-817, and a number of others make it easy to play radio almost anywhere you want to go.

If your operations tend toward VHF/UHF activity, you can experiment with mountain-topping or activating rare grid squares. VHF/UHF folks sometimes make the mistake that this type of "roving" activity is limited to contests. If you let it be known that you are planning to operate from a rare grid square, I can almost guarantee that the contacts will come so fast you'll have trouble writing everything down in your log book.

❖ Just Spin the Dial

And don't forget, even if you can't get warm and fuzzy about any of the operating activities and events listed above in this column, you can always just sit down at your transceiver and tune across the bands listening for someone calling CQ. Or, you can park yourself on a clear frequency and call CQ yourself. You can always find a QSO somewhere on the bands. It may not be the most exciting and exotic QSO in your log book, but it will be a conversation with another person who shares an interest in the greatest hobby in the world. You may even make a new friend. Rag chewing rules on the weekends, too!

Have fun! I'll see you on the bottom end of 40 meters, but on weekends, you never know where you might hear Old Uncle Skip.

UNCLE SKIP'S CONTEST CALENDAR

RAC Canada Day Contest
July 1 0000 UTC - 2359 UTC

World Lighthouse Contest
July 2 0600 UTC - July 3 1200 UTC

Original QRP Contest
July 2 1500 UTC - July 3 1500 UTC

MI QRP July 4th CW Sprint
July 4 2300 UTC - July 5 0300 UTC

IARU HF World Championship
July 9 1200 UTC - July 10 1200 UTC

FISTS Summer Sprint
July 9 1700 UTC - 2100 UTC

QRP ARCI Summer Homebrew Sprint
July 10 2000 UTC - 2400 UTC

North American QSO Party, RTTY
July 16 1800 UTC - July 17 0600 UTC

CQ Worldwide VHF Contest
July 16 1800 UTC - July 17 2100 UTC

RSGB IOTA Contest
July 30 1200 UTC - July 31 1200 UTC

Outer Limits continued from Page 59

music with a good signal, but we still know little about them. (None, has QSLed only at the Winter SWL Festival)

WSPY- This one spices up its rock music with subtle parodies of "spy" numbers stations. (None)

XERV Relay- A pirate has been rebroadcasting programming from XERV, a program that originates from a licensed Los Angeles station without Mexican call letters. (None)

❖ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign locations, especially in Europe where the value of the US dollar is plunging rapidly. 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 69, Elkhorn, NE 68022; PO Box 28413, Providence, RI 02908; PO Box 109, Blue Ridge Summit, PA 17214; and PO Box 293, Merlin, Ontario NOP 1W0.

Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. The best bulletins for submitting pirate loggings with a hope that pirates might QSL the logs 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@icam.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, and a few pirates will occasionally QSL a web site report left on the FRN.

❖ 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: Skip Arey, NJ; John T. Arthur, NY; Dave Balint, OH; Artie Bigley, OH; Jerry Berg, MA; Ralph Brandi, New Jersey; Chris Campbell, OH; Ross Comeau, MA; Richard Cuff, PA; Rich D'Angelo, PA; Bob Dettling, IL; Gerry Dexter, WI; Bill Finn, PA; Harold Frodge, MI; William T. Hassig, IL; Harry Helms, TX; Jacob Klee, VA; Chris Lobdell, MA; Greg Majewski, CT; Larry Magne, PA; Dan Malloy, MA; Mark Morgan, OH; Lee Reynolds, NH; John Poet, Unknown; Fred Roberts, Germany; Martin Schoech, Germany; John Sedlacek, NE; Arnaldo Slaen, Argentina; Bryan Smith, PA; Ed Walsh, AL; Niel Wolfish, Ontario; Mike Wolfson, OH; Joe Wood, TN; and Bob Zanotti, Switzerland.

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Kevin Carey

P.O. Box 56, W. Bloomfield, NY 14585

Antenna Types: Mr. Beverage's Wave

Last month we discussed two antenna designs which, unlike most antenna designs, did not derive in some way from the original designs of Heinrich Hertz. These were the axial-mode and radial-mode helical antennas. This month we again discuss a "non-Hertzian" antenna design: the Beverage (fig. 1).

This antenna, one of the wave antenna designs, has several desirable characteristics: it is easy to construct, it has a very wide bandwidth, and it is very directional. Also, when utilized in one of its more sophisticated configurations, the nulls of a Beverage antenna can often be steered to reduce received interference. This steering is conveniently accomplished electrically, rather than by the more difficult and more expensive electro-mechanical (motorized) steering of some other antennas. The antenna's low mounting height is a plus, but the required length of the element – commonly several hundred feet or more – often presents a problem.

The Beverage has relatively low efficiency due to losses caused by the proximity of its element to the earth. Nevertheless, it is quite useful on bands with significant received noise. Thus, Beverages find application primarily at low and medium frequencies, although under certain conditions they can be useful at frequencies as high as the 20-meter band.

Both broadcast-band DXers and hams working the 160-meter or 80-meter bands are attracted to the Beverage for its ability to reject interference and leave the desired signal relatively in the clear. This pulling stations out of interference is a good demonstration that antennas which provide a high signal to noise ratio

can be very effective receiving antennas even if they have low efficiency. However, because of losses due to its low efficiency, the Beverage is seldom employed as a transmitting antenna.

❖ How it Works

When a vertically-oriented, incoming, electromagnetic (EM) wave (i.e.: radio wave) is in contact with the earth, the electrical field of that wave is sometimes thought of as "having its foot in the ground." As the wave moves forward, the lower portion of the wave travels more slowly than the upper, causing a tilt (fig. 1).

The Beverage antenna's wire element is analogous to one conductor of an open-wire transmission line, and the earth is analogous to the other conductor. The wire element is horizontal: parallel to the ground. If an incoming wave encounters the antenna's element when the wave is upright (not tilted), the wave induces no current into the element. As the tilt becomes more prominent, the induction increases. Thus the antenna performs poorly over water or highly-conductive soil which produces less tilt, and performs better as soil conductivity decreases.

❖ Let's Make a Beverage Antenna

The Beverage design we will cover is simply a long wire strung a few feet above the earth (fig. 1). Estimates for the best length for that wire range from "greater than a half wavelength" to "one wavelength" to "as long as you can make it." So you can pick the length you like. The lon-

ger the wire, the more directional the antenna.

The following equations give the approximate length of wire required for one wavelength. $L(\text{ft}) = 972/\text{Freq}(\text{MHz})$. Or $L(\text{m}) = 296/\text{Freq}(\text{MHz})$. Thus, at 1 MHz, 972 ft of wire is one wavelength in length.

The antenna should be mounted about eight to twelve feet above ground. Wave antennas require low heights, and some of the early ones made by Beverage himself were simply an insulated wire laid out on dry, poorly-conducting earth with no elevation at all.

Construction is simple. If you use insulated wire, you can use trees or high bushes as supports by draping the wire over limbs of appropriate height. Use insulators to attach the wire to supports if the wire is not insulated. Keep it high enough to avoid snagging pedestrians and vehicles.

To make the antenna unidirectional as shown in fig. 1, connect a 500-ohm resistor to one end and connect the resistor to ground. The resistor should be non-inductive: carbon-element resistors are OK, but not wire-wound ones. Usually a ground rod works adequately as a connection to earth, but in very-dry, rocky ground, wires in or on the ground as radials or a ground screen can help. Without the resistor the antenna receives well in both directions, indicated by the two direction-arrows in fig. 1.

More information on designing Beverage antennas is found on the web sites given elsewhere in this column, and in the 20th edition (and possibly other editions also) of the *ARRL Antenna Book*. Joe Carr's *Practical Antenna Handbook* (4th and perhaps other editions) also has useful information about Beverages.

Outdoor antennas should have lightning protection. The minimum is to never use the antenna when lightning is likely, and to disconnect the antenna and ground it when it is not in use.

❖ Are There Other Types of Antennas?

Although this series of six articles on antenna types has not been a comprehensive coverage of antenna designs, we have covered examples of the most common communication-antenna designs used today. On the other hand, there are many other antenna designs not mentioned here. A larger sample of available antenna designs can be found by paging through antenna-engineering texts such as: Jasie's *Antenna Engineering Handbook*, Johnson's revisions of Jasie's *Handbook*, Lo Y.T. and Lee S.W.s' *Antenna Handbook*, or

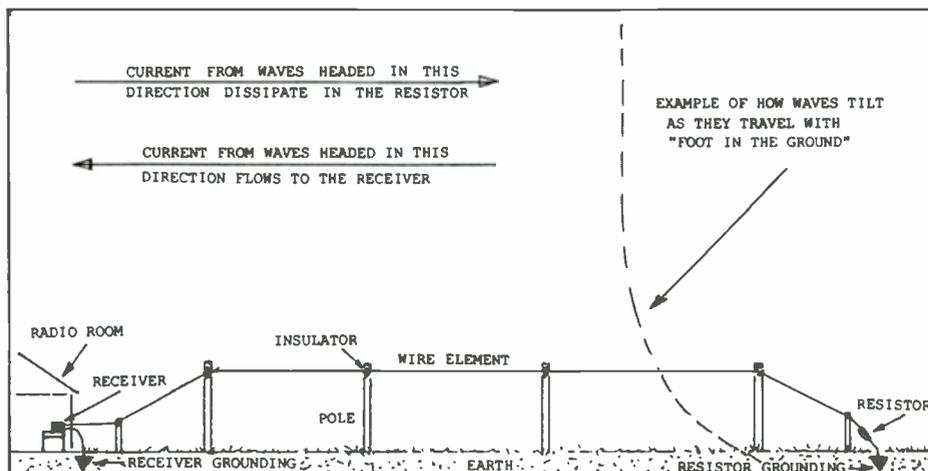


Fig. 1. A uni-directional Beverage antenna shown with a portion of a tilted incoming wave which is being received.

This Month's Interesting Antenna-Related Web site:

This first site gives information on several types of Beverage designs, including steerable arrays:
<http://exax.net/>

For more on the Beverage, including both historical, and technical information, check:

<http://www.hard-core-dx.com/nordicdx/antenna/wire/beverage/index.html> and
http://users.rcn.com/oakridge.ma.ultranet/Beverage_info/RCT_Beverage/RCT_Beverage.html

This next site reports an interesting interview with Harold H. Beverage, who discusses the Beverage antenna, diversity reception, and more:

<http://www.hard-core-dx.com/nordicdx/antenna/wire/beverage/interview1.html>

the British *The Handbook of Antenna Design*, Volumes 1 and 2, edited by A.W. Rudge, K. Milne, A.D. Olver and P. Knight.

RADIO RIDDLES

Last Month:

I said: "The axial-mode helical antenna discussed this month transmits signals with what we call 'circular polarization.' Do all antennas

with circularly-shaped elements produce circular polarization? And can antennas with non-circular elements yield circular polarization? And what is 'polarization' anyhow?"

Well, EM waves, such as radio waves, contain both an electrical and a magnetic field. The polarization of an electromagnetic wave is defined as the orientation of the electric field of the wave. If this field is aligned vertically, then the wave is said to have "vertical polarization." If the field is horizontal, the wave is said to have "horizontal polarization." Both vertical and horizontal polarization are examples of "linear" polarization, as opposed to circular polarization (discussed below).

With linearly polarized antennas, the orientation of the electrical field is identical for each successive bit of the EM wave as it leaves the antenna. Both the waves and the antenna itself are referred to as "linearly polarized." With some other antennas, successive bits of the electrical waves leave the antenna at progressively changing orientations, such that, during one cycle, the orientation of the electrical field has progressed through 360 degrees (a full circle). Such antennas and waves are said to be "elliptically" polarized. If the wave's strength at each instant of emission is identical, then the antenna and its waves are said to be "circularly" polarized. Incidentally, both circular and linear polarization are special cases of elliptical polarization.

Although antennas with single, straight, linear elements tend to produce linear polarization, certain combinations of linear elements can produce circular polarization. And antenna

designs with circularly shaped elements do not necessarily produce circular polarization. It is the relationship of the EM fields from different portions of the antenna's element or elements, rather than the shape of the elements themselves, which produce circular or linear polarization. Indeed, some circularly-polarized antennas contain only linear (straight) elements, and most simple, circular loop antennas produce linear polarization.

This Month:

Okay, so EM waves and antennas are polarized. Is this of theoretical interest only, or is there some practical value in knowing about polarization?

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.

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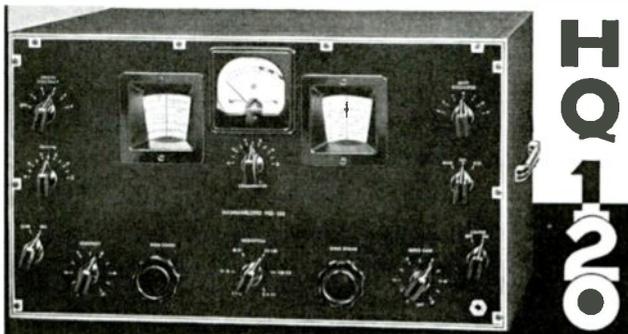
Hammarlund Medium-Priced Receivers

So far in this column, we've worked with short-wave radios from the low-priced end of the Hallicrafters and National company lines. Now it's probably time for us to take on a receiver of greater complexity. So I decided to choose a model from the Hammarlund Manufacturing Company, which was the third major manufacturer of now-vintage communications sets.

Back in the early 1930s, Hammarlund was a pioneer in the manufacture of superheterodyne communications receivers for radio amateurs. Its 1931 "Comet" became the improved "Comet Pro" in the following year. In 1936, Hammarlund introduced its top-of-the-line "Super Comet Pro." That radio was the ancestor of the superbly-built and highly respected "Super Pro" series. Long recognized as being among the top performers of the industry, the series remained in production until 1973. But, unlike Hallicrafters and National, Hammarlund never produced low-priced sets and was slow to produce radios in the medium-priced range.

❖ The HQ-120-X and its Descendants

In 1938, however, the company released the HQ-120-X (the "X" referred to the presence of a crystal filter, although this suffix was not always used with HQ-120s so equipped). Introduced at about \$129.00, it was roughly in the same price class as Hallicrafters' SX-23 Skyrider and National's NC-100-X. The HQ-120-X won quick acceptance for its quality construction, professional appearance and high performance. Over the years, the price rose, and the radio was selling for over \$200.00 when civilian production ceased at the beginning of World War II.



The HQ-120-X from a 1939 Hammarlund ad. Notice that the "X" suffix is not used in the ad even though the receiver pictured definitely has crystal filter controls.

Of course, appearing as it did during the Depression years, the potential market for this excellent radio was somewhat limited. Right after the war, however, Hammarlund released a cosmetically and (to an extent) electrically updated version. This was the extremely popular HQ-129-X. I'm including pictures of both radios here. Later descendants of the HQ-120 were the HQ-140, -150, 160 and -180, all introduced in the 1950s.

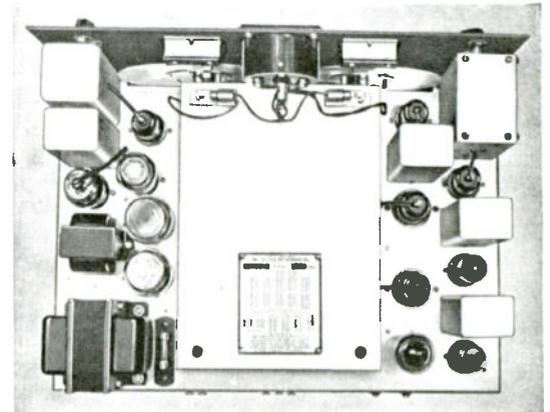
Those of you who remember my introduction of the 1946 Hallicrafters S-40 as a mostly-cosmetic update of the pre-war S-20R Sky Champion, will see that we are dealing with a similar situation here. You'll notice that all of the controls and indicators are in precisely the same positions on both models, leading one to the reasonable assumption that there is very little physical difference behind the front panels. I'm including pictures of both interiors to show that this is so.

The major cosmetic difference, besides the different paint scheme, seems to be in the streamlined control knobs and tuning dial/s-meter surround. Many hams preferred the appearance of the prewar set because of its no-nonsense commercial look. Nevertheless, the fraternity reached into their fatter postwar wallets to purchase the '129-X in great numbers. Attesting to that fact is the frequency with which this radio shows up at hamfests and other radio flea markets.

My brother has, in his ham shack, a '129-X that I refurbished for him. He says that it can pick up anything he is able to receive on his modern Ten Tec transceiver (though not with the same selectivity of course). The '120-X has the same "hot" reputation, and it is the model that will be the subject of our current restoration project. However, most of what I do to the HQ-120-X will be just as applicable to the later receiver.

❖ Comparing the '120-X and '129-X

As already suggested, both radios have the same front-panel controls: crystal selec-



Top view of HQ-120-X chassis. Compare with HQ-129-X chassis top view shown elsewhere on these pages.

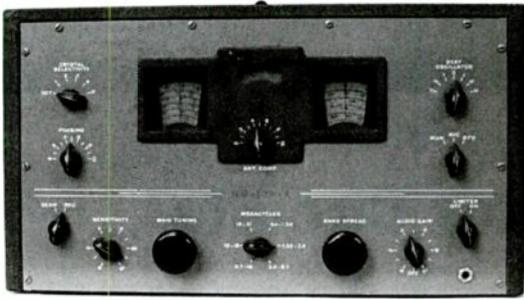
tivity, crystal phasing, send-receive, r.f. gain, audio gain, noise limiter, mvc-avc-bfo, bfo pitch, bandswitch, antenna compensator, main tuning, bandspread tuning. The controls are at identical locations, as are the phone jacks. And both radios have the same six tuning ranges: .54-1.32, 1.32-3.2, 3.2-5.7, 10-18 and 18-31 MHz.

Comparing the functional stages of the two sets, we also have strong similarities. Each model has one stage of r.f. amplification, an oscillator/mixer with voltage regulation, three i.f. stages, a.v.c., two audio stages, noise limiter and an "S"-meter amplifier. The '120-X accomplishes these functions with 11 tubes plus rectifier; the '129-X gets by with 10 tubes plus rectifier.

The tube complements of the two models are somewhat different, but the r.f. and first two i.f. tubes of the radios are closely related. Where the HQ-120-X uses 6S7s at these positions, 6SS7s are found in the HQ-129-X. The 6S7 has a top cap for the control grid connection; the 6SS7 control grid is brought out to a base pin instead.

The extra "S" in the 6SS7 designation refers to the fact that the tube is "single ended" (all connections available at the base). During this era, many grid-capped tubes were changed to single-ended types. To name a few common conversions: 6A7 became 6SA7, 6J7 became 6SJ7, 6K7 became 6SK7. The new configuration simplified wiring and made for shorter lead lengths.

It is odd that, while another 6S7 would be expected at the '120-X's third i.f. (the '129-X has a 6SS7 there), one finds a 6F6 instead. I couldn't believe my eyes when I first looked at



The HQ-129-X is a dead ringer for the HQ-120-X except for a bit of postwar streamlining.

the tube complement and had to verify it from another source. I can't explain the eccentric use, as an r.f. amplifier, of a power amplifier tube that normally serves as an audio output stage. Perhaps a knowledgeable reader can enlighten us.

The remaining tubes in the '120-X are 6K8 converter, 6Z7 noise limiter, 6F8 first audio/detector/a.v.c., 6SF5 "S" meter amplifier, 6J7 beat frequency oscillator, 6V6 audio output, VR-150 voltage regulator and 5V4 rectifier. An earlier version of the HQ-120-X used a pair of 6H6s in place of the 6Z7 and 6F8.

I won't be showing full schematics of these radios during the coming restoration series. Each one would take up at least half a page if run large enough to be readable and I can't spare that much space! I will include applicable schematic sections as necessary for the development of the story. Readers interested in seeing complete schematics of the HQ-120-X (both versions) and HQ-129-X are invited to send a long s.a.s.e. (one stamp will do it) to Marc Ellis, P.O. Box 1306, Evanston, IL 60204-1306.

❖ A First Look at the Restoration Project

The '120-X I originally purchased was sold to me by a local ham. It may have been the first restoration radio in recent years that I've ever tried out before doing a complete recapping. I know too well the risk of sudden capacitor failure when firing up a long-dormant set. However, this ham was anxious to show me how well the receiver worked and, for dramatic effect, had arranged to have it already running in his shack when I arrived at his home. Otherwise I never would have let him turn it on.

Once I got it home, since the ice was already broken, so to speak, I couldn't resist hooking the set up to an antenna and turning it on. There seemed to be reception on all bands except 10-meters, which was dead as a doornail. Not even any static. I suspected that the 10-meter antenna coil was open, and a quick ohmmeter check showed me that was the case.

Probably the previous owner had left the radio connected to an outside antenna for long periods of time with the bandswitch set for 10-meter reception. Eventually, a lightning-induced static charge did the deed. This is not an uncommon problem to find in vintage communications receivers.

I also noticed several signs of owner modification and crude repair. All in all, I decided

that it might be a good idea to get my hands on another '120-X to cannibalize for parts as needed. Eventually I found one with a somewhat beat-up front panel that had been drilled to take a switch for an added crystal calibrator. Not only that, but its tuning and bandspread knobs had been replaced with some that looked as if they had come from a Hallicrafters set. The cabinet was also very rough. It, too, was drilled with extra holes and the factory-installed handles were missing. But the radio seemed otherwise complete and I was able to get it for a good price.

❖ The Parts Set - A Godsend!

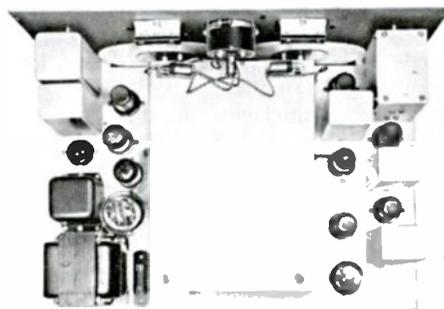
After studying both radios carefully for the first time in preparation for this column, I was very happy that I had purchased the second set. In the first place, that set was the newer model (with the 6Z7 and 6F8) which was the circuit I preferred and the one covered by my operating/service manual. My original radio was the older model with the 6H6s.

Secondly, even though the original radio was working and had a decent panel and cabinet, there were many crudely installed and obviously non-original parts. I recently came across the expression "rogue parts" to describe such components. I can't remember where I saw it or I would credit the source. It's very apt!

The worst area was around the power supply, where a filter capacitor had obviously blown. Packed into the space below the rectifier tube was a tangle of cobbled-together junkbox electrolytics. While the owner's slovenly repair could have been fairly easily reversed, I was apprehensive about other careless changes that might not be so easy to spot.

A few odd "repairs" that I did spot were really head scratchers. For instance, all or most of the tube grid cap clips were crudely soldered non-originals. Don't ask me why! And there were resistors in series with the pilot lights. Apparently this previous owner was too cheap to buy replacement bulbs with the correct voltage ratings.

Perhaps the most discouraging thing was that the plastic bandspread dial had become so warped that it would not run properly in its



Top view of the HQ-129-X chassis. General layout is almost identical to that of the HQ-120-X.

slot and thus could not be rotated throughout its range. I was very pleasantly surprised by the "S" meter face, however, which had not become yellowed like those on many '120-Xs I have seen (including the one on the parts set).

The bandspread dial on the parts set was just fine, though, and the original condition of its wiring belied the atrocities done to the front panel. I was able to spot a few carefully-replaced paper capacitors, but that was about it.

I'm feeling a little like Baron Frankenstein as I envision the composite radio I plan to put together from these two sets. I'll start by mating the front panel (including the "S" meter) and knobs from my original receiver with the chassis of the "parts set" prior to restoring the latter. Of course, any other components found to be defective during the restoration will also be swapped out from my original set (which will now become the parts radio).

After the reassembly, I'll begin changing out every one of the myriad paper and electrolytic capacitors, a process that will probably take at least twice as long as with the recently restored National NC-57 and Hallicrafters S-40. Most of this work will be done "offstage," so to speak, so you readers won't have to look over my shoulder for the entire repetitive process. Then, if no unforeseen problems come up, we'll be ready to apply power for an initial "smoke test."

Come back next month and we'll get started!

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Simple Voltage Regulator Circuits

Ian Poole G3YWX

When making experimental circuits in the shack, small power regulator circuits may be needed to supply a separate part of the circuit. Or, a regulator circuit may be needed to supply an oscillator or a particular integrated circuit (IC) that needs to be run from a lower supply voltage than the rest of the circuit. When these requirements occur, it is very useful to be able to quickly hook up a circuit to meet the need so that the rest of the circuit can be finished as quickly as possible without having to divert onto a second project to build a new power supply!

In addition to being a handy circuit to have on hand, building a regulator circuit is an easy project to help the beginner understand electrical circuitry in a real "hands on" sense.

There is a variety of simple regulator circuits that can be put together very easily using components that are likely to be available in the "junk box." Using these components is not only cheaper, but can be a whole lot quicker. As we all know, ordering components takes time even when it is over the Internet, as delivery can take days. Even if there is a local component store, it will take at least an hour to make the purchase and get back. All of this takes time away from valuable construction time.

❖ Options

Some of the simplest circuits use a zener diode, one or two transistors, and a small handful of other components. These are all likely to be available in the spare components box, and you can choose the best circuit to suit the components that are to hand. Although quite simple, these circuits can all provide an easy solution that is quite adequate in many instances.

❖ Resistor-Zener Regulator

The simplest circuit of all consists of just a simple zener diode and a series resistor. This may be satisfactory for many situations where the current drawn is relatively constant and not too large. The value of the zener diode should be that of the required voltage.

When choosing the value for the resistor, it is necessary to calculate the current flowing through the load, i.e., the item for which the stabilized voltage is required. As a rule of thumb, the level of current flowing through

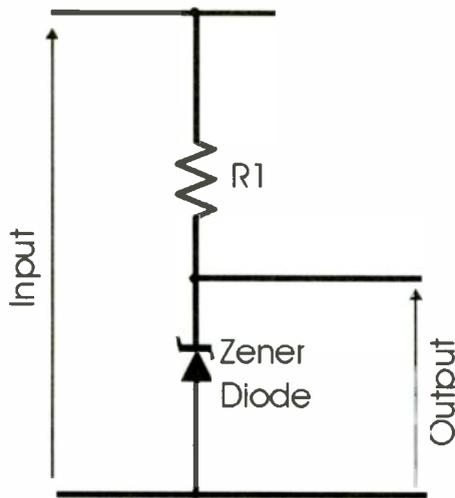


Figure 1 A simple zener diode regulator

the zener diode is assumed to be nine times that flowing through the load. In other words, the series dropper resistor has ten times the current flowing through the load.

It is then a simple matter to use Ohm's Law to calculate the values. This gives a good level of margin so that if the load current varies, there will still be enough current flowing through the zener diode to maintain regulation.

To take an example, we have a 12 volt supply and need to produce a 5 volt supply at 1 milliamp. This means that first we need a 5 volt zener diode. We also have to drop 7 volts (12 volts minus 5 volts) across the resistor. We also need to run 10 milliamps (10 times 1 milliamp) through the resistor. Using Ohm's Law (resistance equals voltage divided by current), we can calculate the value of the resistor to be $7/0.01$ ohms or 700 ohms. The nearest value to this is 680 ohms.

It is worth noting that a zener diode needs to have a certain level of current flowing through it to stabilize satisfactorily. 10 milliamps is satisfactory for this, but below about 5 milliamps might not be.

We also need to check that neither the resistor nor the zener diode is dissipating too much heat. As the power in watts is simply the voltage across it times the current flowing through it, we can check the power they are dissipating. The resistor has 7 volts across it and there is 10 milliamps flowing through it. This works out to be $7 \times .01$ or 70 milliwatts. This is quite acceptable for the standard zener that can dissipate 300 milliwatts.

Although we have had to estimate the current taken by the load, it is not at all critical. The way we have calculated the circuit values leaves plenty of margin for variation.

❖ One-Transistor Regulator

If current levels higher than a few milliamps are needed, the power levels that are dissipated in the series resistor and the zener diode soon start to become much higher and the normal components found in the junk box may not be able to dissipate the power. Remember that power rises as the square of the current or voltage.

To overcome this, it is possible to use a slightly more complicated circuit using the simple resistor/zener network we have already looked at, and then buffer this using a transistor. In this way the "amplification" factor of the transistor can be used to buffer the zener diode resistor network.

A typical circuit is shown in Figure 2. It uses the transistor in what is known as an emitter follower circuit. In the circuit, R1 and ZD1 form the same network that we saw before.

To calculate the values is again very simple. Again we have to have an estimate of the current that will be drawn by the load. Again we are able to leave plenty of margin to allow the circuit to work well over a wide range of load conditions. The current drawn into the base of the transistor is the load current divided by the current gain of the device – (the h_{FE} value as indicated in the data books). Most small signal transistors

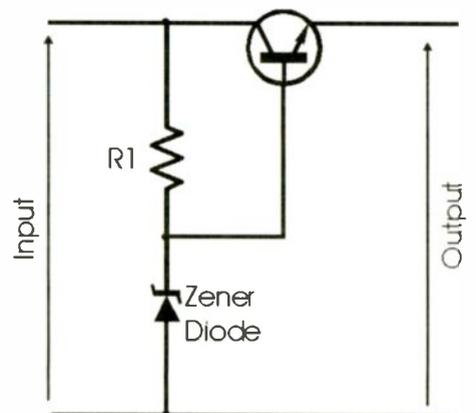


Figure 2 A simple one transistor regulator circuit

have a gain well in excess of 50.

The resistor R1 is chosen so that the zener diode draws around 10–15 milliamps. This figure of current will allow around 1–2 milliamps to flow into the base of the transistor, providing for an output current of up to 50–100 milliamps or possibly more to the circuit.

Again, the levels of power dissipation should be calculated to ensure that the components are able to dissipate the power without getting too hot. Don't use a transistor that is too small and gets too hot. This will only burn your finger if you touch it and greatly reduce the reliability of the component. If it fails, then it may fail in a short circuit mode and put the full supply voltage onto the load circuit. This could result in further damage. Use a transistor that can safely dissipate the power.

A further point to note is that as there is a 0.6 volt potential drop from the base to the emitter of the transistor, the output voltage from this regulator is 0.6 volts less than the zener voltage.

❖ Two-Transistor Version

The problem using larger "power" transistors is that they often have a lower level of gain. Some small signal devices may have current gain levels of anywhere from 50 to 800 or 900. Power transistors may only have gain levels of 30–50. This may result in too much current being drawn from the resistor/zener diode circuit and the level of regulation being lost. To overcome this, a two-transistor configuration can be used.

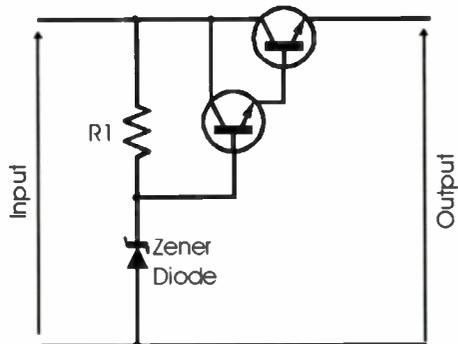


Figure 3 A simple two transistor regulator circuit

By using this type of circuit configuration, the current gains of both transistors are used, and the overall gain is the figures of each transistor multiplied together. So, even if the power transistor only has a gain of 25 for example, if the small signal transistor has a gain of 100, then the overall gain is 2500, which is large by any standards.

The design takes place as before. The only difference is that this time the voltage drop from the zener diode to the output is twice 0.6 volts, i.e. 1.2 volts.

The only point to remember is that sufficient current should be allowed to flow in the zener diode to enable it to conduct

properly. A value around 10 milliamps is generally satisfactory.

❖ A Simple Current Limiting Circuit

Power supplies are always prone to having their output rails shorted to ground, especially when circuits are hooked up on the bench. Screwdrivers that have been laid down, or small lengths of wire always end up in just the wrong place. To prevent any damage, a simple current limit circuit can be very easily incorporated into the circuit. It can consist of just three components – a resistor and two diodes.

The circuit can be added into many different circuits, but in this case it is easy to add it into the simple emitter follower circuits that have already been described here.

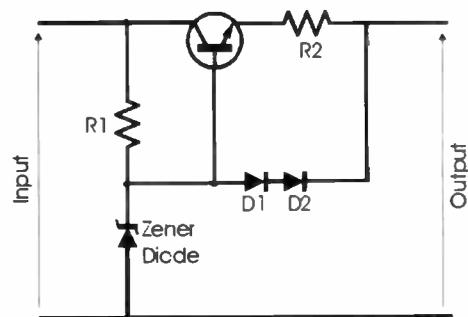


Figure 4 Simple regulator circuit with current limiting

The way in which it operates is quite simple. Under normal operating conditions there is a voltage drop of 0.6 volts between the base and emitter of the transistor, and in addition there is a small drop of less than 0.6 volts across the resistor R2. The actual voltage across R2 is dependent upon the current being drawn from the circuit.

As each of the diodes needs 0.6 volts across it to turn on, they do not conduct under normal conditions. However, as the current flowing out of the regulator circuit rises, so the voltage across R2 rises. As it reaches 0.6 volts, both diodes start to conduct and pull the base voltage down. In turn, this reduces the output voltage and hence the current.

The circuit does have one drawback. As R2 is in series with the output, it will cause the output voltage to fall slightly, dependent

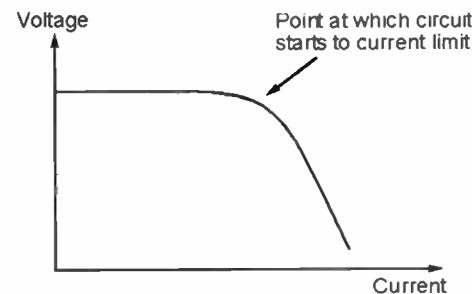


Figure 5 Output characteristic of the regulator with current limited incorporated

upon the level of current drawn.

When used with the two-transistor version of the regulator circuit, three diodes are required in series, because the circuit has to operate with two base emitter drops. The series diodes should be connected to the junction of the series zener supply resistor, the zener diode, and the base of the first transistor.

❖ Summary

Simple regulator circuits are easy to build and give satisfactory performance. While they may not provide the best performance, they are more than adequate for many applications. As they are also very easy to build from components that are likely to be in the junk box, they are ideal solutions to a very common problem found when constructing and experimenting with a circuit on the bench.

A whole variety of free information, articles and tutorials on radio and electronics topics is available at the author's website, Radio-Electronics.Com (<http://www.radio-electronics.com>)

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.

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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AOR SR2000 FFT Frequency Monitor

By Bob Grove W8JHD

Is it a scanner? Is it a spectrum analyzer? For untold decades of radio manufacturing, the industry still awaits the first wide-frequency-coverage communications receiver with a wide-span spectrum display. There are spectrum analyzers with audio recovery, and service monitors with spectrum displays, but nothing that combines a high-quality receiver with a spectrum display that spans more than 10 megahertz, all in one box.

Several manufacturers have made noteworthy attempts: ICOM's R9000 was a high-performance, wide coverage receiver, but only had a 2 MHz spectral span; Standard's AX-700 VHF/UHF scanner had only a 1 MHz span; Grove Enterprises tried to produce their cutting-edge SR1000, but cancelled it after a six-year, half-million-dollar development effort.

Several high-end scanners now include "spectrum scopes" which show a narrow band of signals above and below the tuned frequency, but these are relatively crude devices, and none spans more than 10 MHz. A few manufacturers like WiNRADiO offer computer-hosted "black boxes" with wide frequency coverage and a broad spectrum display observable on the computer monitor (up to 100 MHz for the WiNRADiO). But no one has it all in one box...yet.

❖ Enter the AOR SR2000

This newest entry, named the "FFT (Fast Fourier Transform) Frequency Monitor," boasts a 25-3000 MHz (3 GHz) frequency range for reception, and a 10 MHz-span spectrum display. While it doesn't cover shortwave, nor does it offer SSB reception, it is a powerful scanning receiver for AM and FM signals in the VHF/UHF spectrum.

A stand-alone receiver, the SR2000 can alternatively be computer-hosted by a PC, either through its serial (RS232C) port or an optional USB interface. Serial port speeds may be selected as 9600, 19.2k, 38.4k, 57.6 k or 115k bps (default). A full command set is printed in the manual for all computer functions.

❖ Scan and search

The 1000-channel memory is divided into ten 100-channel banks. Up to 12 alpha characters can be inserted to identify each channel. Any one channel may be chosen as a priority channel, and sampling intervals for that channel to check for activity can be chosen anywhere from 1 to 99 seconds.

For the memory-channel scanning func-

tion, scan delay may be selected for any period from 0.1 to 9.9 seconds after signal dropout. If desired, a hold option may be selected so that scanning won't resume after the sequence stops on an active channel even after the signal drops out.

A search feature allows any swath of spectrum to be automatically swept for active frequencies which will then be displayed on the screen as hits are found. For faster search, an FFT function may be elected to sample a 10 MHz span six times per second. To avoid unwanted or previously-identified frequencies, up to 1600 of them may be entered as "pass" frequencies so that the search sequence won't look for them during the search routine. All this activity as well as command functions are displayed on a five-inch, full-color, TFT LCD display.

❖ A first look

The SR2000 is compact (8-3/4"W x 4-3/4"H x 7-3/4"D) and lightweight (7.4 lbs.), making it pre-eminently portable. It is powered by 12 VDC at 1.4 amps. A tilt bail lifts the front of the receiver so that the control panel can be comfortably viewed from a desktop, and threaded holes (two on each side) invite mobile mounting.

Curiously, although the SR2000 is entirely self-contained for portable convenience, there is no internal speaker; attachment of an external speaker or headset is required for signals to be audibly monitored.

❖ Specifications

A tuning knob allows rapid frequency slewing (there are nine independently-selectable VFOs), and doubles as an option selector in the menu mode. Tuning steps may be selected as 0.1, 0.5, 1, 2, 5, 6.25, 8.33, 9, 12.5, 25, 50 and 100 kHz; a non-standard step may be entered anywhere between 0.1-100 kHz via the keypad. Any keypad press is confirmed by a soft beep which can be muted in the software command set, but the amplitude can't be changed.

The SR2000's high-stability receiver employs triple conversion (255.3/744.3 MHz, 10.7 MHz, 455 kHz) to reduce image response and, for single-signal selectivity, wide (300 kHz), narrow (15 kHz) and sharp (6 kHz) FM modes as well as conventional 6 kHz AM may be selected.

Sensitivity is an impressive 0.35 μ V, but this ability to detect weak signals comes with a price: dynamic range. The third-order inter-mod

(IP3) of the SR2000 is only +1dBm, making the receiver vulnerable to strong-signal overload unless the attenuator (10 or 20 dB) is used – which reduces the sensitivity. Still, in remote monitoring areas where all signals are weak, the sensitivity is important and, in dense signal environments, it makes sense to invoke the attenuator.

A frequency offset function allows the operator to choose any second frequency that he can immediately select to check repeater input/output pairs, two-frequency simplex, or other requirements for rapid dual-frequency switching.

❖ That big LCD

The bright, busy, backlit, color LCD is very informative, reporting the frequency currently selected, the VFO in use, upper and lower span limits, demodulation mode, resolution bandwidth (RBW), operational function, step increment, attenuation, volume and squelch (noise or level) settings, signal strength, and more.

A waterfall mode allows a dynamic representation of signals in the spectrum over time; their relative signal strengths are color coded for identification.

Spectrum-display resolution bandwidth (RBW) may be selected as 4, 32, 64 or 125 kHz, accompanied by a sweep rate as fast as 10 MHz in only 0.2 second to assure real-time signal capture. But this digitally-triggered sweep shows signal spikes as vertical lines, not the sloped envelope familiar to veteran CRT users unless the span is narrower than about 500 kHz.

Marker functions can be chosen to report instantaneous values of signal readings as well as peak readings. The display can calculate maximum, average and medium levels for signals over time. As informative as the display is, there may be times when the operator doesn't want the information to be visible; the display may be switched off for "black" operations.



❖ IF output options

An IF output port (10.7 MHz center frequency, 10 MHz wide) from a BNC connector on the rear panel of the receiver provides a source of raw data for custom demodulation or, as we did here, to drive an auxiliary spectrum display unit, the popular AVCOM SDM42B. With this accessory, the active spectrum under surveillance can be watched remotely or collocated with the receiver.

Since the receiver's IF output port is normally coupled to its own SDU by a short BNC/BNC coax jumper, the disconnection removes the sweep from the SR2000 LCD, leaving only the alphanumeric information on the receiver's integral display. But both SDU applications can be used simultaneously by simply placing a "T" adaptor on the receiver's IF output connector, attaching the original jumper to it and the extension cable to the auxiliary SDU.

❖ Lots of buttons and connectors

The front panel is busy with its 26 multi-function keys, and they aren't all intuitive. The combinations are daunting, demanding the 60-page manual to be kept at hand to master the many functional requirements.

The rear panel sports no less than 12 jacks and connectors, with DB connectors for external computer control, BNC connectors for RF and IF ports, and two mini jacks for audio (speaker and headphones). Jumper cables for the rear panel are provided to interconnect the receiver section

with the control section for stand-alone operation. Although the initial impression may be daunting, experience with the receiver eventually begins to make sense.

❖ General impressions

The dominant display is contrasty and crisp, making viewing easy. The multi-color presentation helps separate the large selection of textual and graphic elements. The waterfall display is addictive – hypnotic and informative as the modulation slowly paints its record in time while the spikes gradually drift down the screen.

When the receiver is first switched on, a loading message scrolls up, then down, followed by an alert message "Initialize....." which continues to flash rapidly for a full eight seconds before the receiver finally activates. This long interval is confusing at first, since it seems to be instructing the operator to do something when it's not.

The presence of a tuning knob invites manual frequency tuning. While the dimple allows rapid spinning with the fingertip, the sharp edge of the knob is irritating to a finger rotating the knob by its circumference.

While appearance of signal spikes on the trace is in real time, the time lag (backlash) of tracking them by turning the tuning knob results in overshoot by the operator; thus, brief transmissions may not be quickly caught in the manual tuning mode. This sluggishness is visible both on the integrated LCD as well as an auxiliary SDU.

The suppression of "grass" (the noise

pulses on the baseline of a spectrum display) is a welcome relief to traditional spectrum-analyzer users, but, as a result, weak but readable signals are not visible on the display.

Some spurious signal spikes were visible in the 155-156 MHz range, but they are quickly identified by their movement in the opposite direction from the legitimate spikes as the tuning knob is turned.

❖ The Bottom Line

All in all, this is nice receiver with a very informative graphic display. The frequency coverage extends clear through the busy 2.4 GHz wireless band, making it a natural for locating and identifying sources of interference as well as intrusive wireless cameras, microphones and other clandestine devices in that band.

Its small size and independence from external control devices invites its use in mobile applications, while its ability to be computer controlled suggests a host of custom applications.

At present, the AOR SR2000 is a continuous-coverage version (including cellular frequencies), so its availability is limited to government and military agencies, laboratories, radio and cellular service shops, and foreign export.

The AOR SR2000 is around \$3000 in the US; check <http://www.aorusa.com> for contact information for AOR dealers in the U.S.

The AOR SR2000 (RCV-20G) is \$2995 plus shipping from Grove Enterprises (1-800-438-8155).

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Uniden Raises the Bar Again – BCD396T

By Larry Van Horn, N5FPW
Assistant Editor Monitoring Times

Bob Grove says it's "the most advanced scanner ever designed." And when you look at all the scanning capability built into this small package, truer words have never been spoken. The new Uniden BCD396T handheld is truly a marvel of modern scanning technology.

Released hot on the heels of the extremely popular Uniden BC246T scanner, many of the innovative features included in that scanner can be found in this new release. Some of the features have been expanded and updated, and new features have been added. You can read our complete review on the BC246T in the December 2004 *MT First Look*, pages 79-80, or on the *Monitoring Times* website at: <http://www.monitoringtimes.com/html/mtuniden246t.pdf>.

❖ Case, Controls and the Antenna

The BCD396T is a descendant of the popular BC296T scanner. However, other than sharing some of the same frequency coverage and the same basic RF and trunk capability, there is very little similarity between them.

The 396 case is much smaller than its 296 predecessor, measuring 2.40 (W) x 1.22 (D) x 5.35 (H) inches and weighing in at 9.6 ounces with batteries, four ounces without.

There is a cobalt blue backlight system for the 1-5/16 by 1-3/16-inch liquid crystal display.

There are four user selectable menu options for display backlighting: backlight on for 10 or 30 seconds (push button selectable), squelch (backlight illuminates when the squelch opens and stays on for five seconds), keypress (backlight turns on when any key is pressed then stays on for 10 seconds), and infinite (backlight turns on when you press the multi-function power on/off key, then stays on until you press it again). The keyboard is also backlit using the same color and control features that the LCD screen uses.

There is only one knob (scroll type) on the top of the unit that controls a variety of the scanner's functions. Depending on which other controls are depressed, the multi-function scroll knob is used to set volume and squelch levels, adjust menu settings, enter text, change channels in the hold mode, resume scanning, and change display screens.

There are two push buttons on the side of the 396 that perform the same operations as the buttons on the side of the 246 – function and menu selections. These controls are the heart of the scanner's menu, display, and additional control functions, in conjunction with keys on the front

of the scanner.

In a major departure from previous Uniden scanners, the 396 uses a flexible antenna with an SMA connector. They have included a BNC to SMA adapter for additional antenna connection options. Antenna jack impedance is 50 ohms.

❖ Checking under the hood

Looking inside the radio we found a world of scanning capability. Here are some of the features that BC246T owners will be familiar with.

- Close Call™ RF capture technology can set the scanner so it detects and provides information about nearby radio transmissions. In a head to head test we performed between the 246 and 396, the Close Call® function was much improved in the 396 due to the increased sensitivity figures that the 285/296/396 scanners have over the 245/246 series of radios.
- Dynamically allocated channel memory was first introduced in the 246 (see our review mentioned above for a detailed description of how this works). This type of scanner memory can be organized so that the scanner operation more closely matches how radio systems actually work, making it easier to program and use the scanner, and to determine how much scanner memory is being used and how much is left. The 246 has a total of 2,500 memory locations used for frequencies, talkgroups, and

alpha tags. The 396 has a whopping 6,000 memory locations for programming for the same uses mentioned above.

- Searches – There are over 160 preprogrammed systems covering police, fire, and ambulance operations in the most populated counties in the U.S., plus the most popular digital trunk systems. The unit also has a custom search feature that lets the user program any of 10 custom search ranges simultaneously.
- 100 Quick keys let the user quickly select systems and groups by using the keypad. This makes it easy to listen to or quickly lock out those systems or groups to scan or not to scan.
- 12 Service Searches – Frequency ranges are programmed for searches of the following radio services: public safety, news, amateur radio, marine, railroad, civilian air, CB radio, FRS/GMRS, racing, TV broadcast, FM broadcast, and special searches.
- Personal computer (PC) control allows the user to transfer programming data to and from the 396 and a PC, or actually control the scanner's operation using a computer. Uniden will be supplying 396 owners their free UASD PC control and programming software on their company website <http://www.uniden.com>.
- Cloning over-the-air and wired – User can clone all data over-the-air (frequency is selectable by the user) from a PC to one or more 396 scanners (a new feature from Uniden). Cloning includes all programmed data, the contents of the scanner's memory, menu settings, and other parameters. Cloning is also possible from one 396 to another 396 using a serial computer cable, null modem adapter, gender changer (not included), and the computer interface cable included with each unit.
- Like many of the recently released Uniden scanner models, the 396 will perform a NOAA weather band search, SAME weather alert, and weather priority scan. There is also a very fast CTCSS/DCS tone search capability. This feature has been much improved over earlier Uniden scanners that included this capability.

There are a lot of other BC396T features that BC246T users will recognize – far too many to include in this review. You can get more information on these features by viewing a copy of the owner's manual on the Grove Enterprises website at: <http://www.grove-ent.com/bc396tman.pdf>.

❖ New Trunk Tracking Capability

The BCD396T is a Trunk Tracker IV® model scanner. Like its 246 sibling, this lets the user follow unencrypted conversations on analog Motorola, Motorola mixed mode (3600



4-3/4 Stars



MT First Look Rating (0-10 scale)

Audio Quality.....	8
Audio Levels	9
Backlight/Display	7
Battery Life ..	8
Ease of Use ..	8
Feature Set ..	9
Keyboard/Button/Control Layout	8
Overall Construction	8
Overall Reception	8
Owners Manual	8

baud) systems, Motorola Astro 25 (APCO 25 9600 baud) systems, EDACS (wide and narrow), EDACS SCAT, and LTR trunked radio systems. Trunk systems in VHF, UHF, the new 700 MHz public safety band, 800 MHz, and 900 MHz bands can be programmed. This includes trunk systems now being installed by the Department of Defense in the new 380-399.9 MHz LMR subband. This makes the 396 the first scanner capable of following trunk systems in all the bands where trunk systems are operational. The scanner can also scan both conventional and trunked systems at the same time.

In addition, the 396 does Motorola control channel trunking: If the scanner is set to scan Motorola trunk frequencies, the user sets it so it tracks the trunk system using only control channel data. In this mode, as long as all possible control channels have been programmed into memory, you do not have to program the system's voice channel frequencies.

❖ What's New

There are several new features and innovations in the 396. This is the first Uniden scanner that has the APCO digital card built in (no extra card to purchase).

Other noteworthy new features include:

- Adaptive digital threshold – Automatically sets the digital decode threshold for APCO digital systems. User can also manually adjust or reset to default digital reception levels.
- Analog and digital audio automatic gain control (AGC) – Helps automatically balance the volume level between different radio systems, both digital and analog.
- Fire tone-out standby – Lets the user set the scanner to alert you if a two-tone sequential page is transmitted. You can set up to 10 settings (transmit frequency, tone frequencies, tone duration and tone gap) then select one of the programmed positions for standby monitoring and alerting.
- Broadcast screen – Sets the scanner so it ignores Close Call' or search hits on FM/TV broadcast frequencies, including known pager frequencies.
- Custom screen – Lets you input up to 10 frequency ranges that the scanner will ignore during Close Call' or search operation.

❖ What's in the box?

In addition to the BCD396T scanner, accessories included in the box include a PC interface cable, three "AA" 2300mAh rechargeable batteries, wrist strap, AC adapter/charger, swivel belt clip, rubber duck antenna, BNC/SMA adapter, owner's manual, Bearcat frequency guide, and a National Public Safety Trunk System frequency

guide.

Unfortunately, the two printed frequency guides included in the box are out-of-date. If you are looking for current information I recommend you visit the Radioreference.com website or purchase a current *Police Call* book for your area.

❖ Overall Rating and Final Thoughts

Most of the complaints about the Uniden BC246T I penned in my review last December have vaporized with the release of the BCD396T. Overall, I am very impressed that Uniden has packed so much into such a small package.

Milair enthusiasts are the big winners with the release of the 396 and they are going to love this scanner. Imagine going to an airshow not knowing any of the frequencies being used, and being able to find most of the active frequencies using the 396 Close Call feature in the 225-400 MHz band. That is a huge plus for milair monitoring.

I do have three minor complaints with the BCD396T: audio quality, backlight of the display, and keypad durability.

While the scanner's audio quality is very good, it falls just a notch below the audio delivered by the BC246T. The addition of the analog and digital AGC circuitry is a big plus for audio levels, however.

The cobalt blue color of the backlight doesn't impact keyboard usage nearly as much as it does the display portion of the unit. Even with maximum contrast dialed in, the screen can be difficult to see in certain lighting situations. While the overall display has improved over the BC246T, the blue backlighting still makes viewing difficult.

Finally, I am concerned about keypad durability and the permanence of the keypad button printing. Some have complained of the imprinting wearing off the buttons on the BC246T, and this could still be an issue with the BCD396T. Only time will tell.

Bottom line, Uniden has raised the scanner market bar again. No one in the marketplace currently offers a scanner – whether handheld or base/mobile – that equals the frequency coverage plus listening capability to be found in the BCD396T.

Table One: BCD396T Frequency Coverage

Freq Range Default (MHz)	Modulation	
Step (kHz)		
25.0000-27.9950 AM	5.0	
28.0000-29.6800 NFM	20.0	
29.7000-49.9900 NFM	10.0	
50.0000-53.9800 NFM	20.0	
54.0000-71.9500 WFM	50.0	
72.0000-75.9950 FM	5.0	
76.0000-87.9500 WFM	50.0	
88.0000-107.9000	WFM	100.0
108.0000-136.9750	AM	25.0
137.0000-143.9875	NFM	12.5
144.0000-147.9950	NFM	5.0
148.0000-150.7875	NFM	12.5
150.8000-161.9950	NFM	5.0
162.0000-173.9875	NFM	12.5



174.0000-215.9500	WFM	50.0
216.0000-224.9800	NFM	20.0
225.0000-399.9500	AM	50.0
400.0000-512.0000	NFM	12.5
764.0000-775.9875	NFM	12.5
794.0000-805.9875	NFM	12.5
806.0000-823.9875	NFM	12.5
849.0125-868.9875	NFM	12.5
894.0125-956.0000	NFM	12.5
1240.000-1300.000	NFM	25.0

Note: The scanner's frequency coverage is not continuous and does not include the cellular telephone, UHF TV bands, or the 956-1240 MHz ranges.

Table Two: Miscellaneous Specifications

Dynamic allocation capacity	
Systems: 400 maximum	
Groups: 20 per system	
Channels: up to 6000 (3000 typical)	
Channels (talkgroups) per trunk system: Up to 200	
Operating temperature:	
Normal -20°C to +60°C	
Close Call -10°C to +60°C	
Scan rate:	
100 channels per second (conventional mode)	
Search rate:	
300 steps per second (5 kHz step only)	
Scan delay:	
0-5 seconds	
Audio output:	
400mW nominal into 24 ohm internal speaker	
30 mW nominal into 32 ohm headphone	
6 mW nominal into 64 ohm earphone	
Power Requirements:	
3 AA Alkaline batteries (4.5V DC),	
or 3 AA rechargeable batteries (3.6V DC),	
or AC adapter (6 VDC 800mA regulated)	
(Model AD-1001)	
External speaker jack: 3.5mm	
DC power jack (EIAJ TYPE-2 center positive):	
5.5mm	
Remote jack: 4 pin mini	
Note: Features, specifications, and availability of optional accessories are all subject to change without notice by the manufacturer. Information presented above was based on the test unit provided by the manufacturer.	

The Uniden BCD396T (SCN 47) is available from Grove Enterprises (1-800-438-8155 or <http://www.grove-enterprises.com>) for \$524.95 plus shipping.

Vintage Radio Software, Part Deux

In the May issue we looked at seven pieces of vintage radio software that were twelve years old and older. However, they still provided useful monitoring functions and operated under Windows 98. These programs were about to be thrown in the garbage as old and useless. After another look, I was glad I hadn't tossed them.

This month we will look at more "oldie but goodie" programs for radio monitors. Let's start with a fourteen-year-old program that has a unique method of displaying its radio data.

❖ DX Comm

This 1991 version of DX Comm, version 3.2, provides a host of useful features for us lucky owners of the classic Drake R8 receiver.

DX Comm V3.2 by Eric Svenson has four sections: Drake R8 Control, Shortwave Broadcast Database, TNC Control & Display, and finally, Propagation Condition Forecasts. Figure 1 displays the simple, yet comprehensive approach of DX Comm. This single screen is where most of the action happens.

Notice the how the details in the database entries are displayed. A time span is stored along with the type of station, station name and frequency. The "days" column is unique in that it gives the days of the week which the broadcast can be heard.

Although DX Comm's original database would be outdated, it is completely modifiable by the user. Stations can be defined as active, inactive, utility, shortwave or special. Since it is written in Microsoft Quickbasic version 4.5, one could probably import other current database formats, though I did not try it.

The last entry on the right of the line allows the user to view propagation conditions at time of monitoring. MUF is the maximum usable

frequency, while LUF is the lowest usable frequency.

This program is well behaved when run under MS-DOS in Windows 98SE and contains a comprehensive operating manual in an included text file.

❖ Do You Remember?

The year is 1992 and the summer Olympics are being held in Barcelona, Spain. It's also the year that Ron Baker released DATA-COMM version 4.15. DATA-COMM is really a number of different programs stitched together. In fact it is a bit older, having its first origins in 1989. The program modules include Data Terminal Control, Logbook, Data Acquisition, Note Pad, Ham Call Sign database and ICOM radio control program.

Operation is via keystrokes and takes a little time getting use to. Pressing F1 key displays the Function Key Help List, Figure 2. As can be seen, each module is accessed via Function keys. Hitting the Escape key brings the user back to the main control menu screen. DATA-COMM also includes a very comprehensive "On-Line" Help file (it's not really on-line, just in the program) that is accessed directly from the startup screen.

This DOS based program seems to behave nicely under Windows 98SE. A well-written operating manual is in an included text file. If you own an ICOM radio, as I do (R-71 and R-7000 to name just two), the receiver control module still makes all of DATA-COMM very useful in a 21st century shack.

❖ Communications Manager

Version 4.0 of this circa 1991 DOS program by Datametries is a logging database, receiver control program, a stored frequency scanner, a frequency range scanner and a bit more. My versions only control an ICOM R-71 and the R-7000. Communications Manager is so intuitive that it is one of the easiest programs I've ever used. Just about everything happens on one main screen, Figure 3. All commands are accessed via the Function keys.

Editing an entry is via the



Figure 2 – What were you doing in 1992? DATA-COMM was doing a lot including controlling ICOM radios ...and still can-do.

F9 key. You can enter a new mode, frequency, comment, or select to lock out the channel even during scanning.

While in the frequency scanning mode, the functions at the bottom of the Main display, Figure 3 can be accessed using point-and-click. The program's operation can be paused by either the use of the F5 key or left clicking the mouse when the cursor is outside of the function blocks. Press F6 and the program resumes scanning.

The F4 key (LOCKOUT) lets the user review and edit the lockout status of all frequency records. The F7 key (DISPLAY) displays the last generated graph of received signals. It also allows the user to restart scanning and therefore signal graphing. The Scan Graph (shown in Figure 3) can be used to display either a signal received in the user definable frequency range, or active channels while scanning a user created frequency file. In the latter case, channel identifiers (New York Radio) are displayed along with the frequency.

Communication Manager's multi-tasking ability was unique to programs of its time. F9 displays frequency records for editing. However, during this editing, scanning is not interrupted. This allows for the user to add notes and details to files as they are received without losing new scanning opportunities.

After seventeen years this program is still very, very useful if you have an ICOM R-71 or R-7000. One radio interface was supplied with each program. However, I thought I remembered seeing this program capable of controlling other radios. If you have a Communications Manager that controls radios other than the ICOMs mentioned drop me an email. I remember first reviewing this program back in the early 1990s. I liked it then and I like it now.

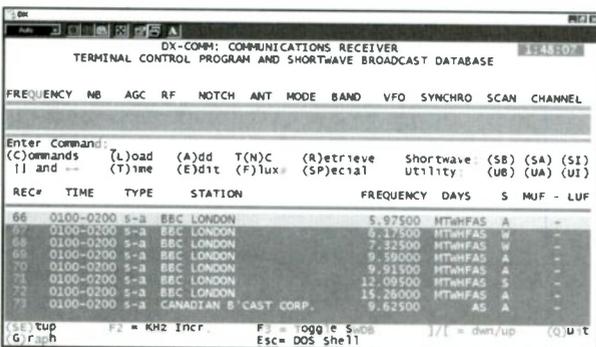


Figure 1 – DX Comm's main screen. All that's needed for monitoring with the Drake R8

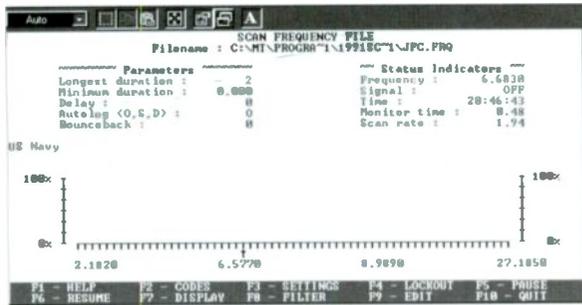


Figure 3 – Elegant Simplicity – Main screen of Datametrics Communications Manager circa 1988!

❖ The Rise of Digital Modes

Many years ago it took a special “box” to decode digital signals such as RTTY heard on shortwave. This was the golden era of utility monitoring when you could decode an Interpol signal that reported a shipment of drugs being shipped in re-welded beer cans. Or read the daily list of international fugitives, usually robbers.

This was before powerful PC sound cards could do the tone decoding. It was before widespread data encryption, which makes messages unreadable. And it was also before global terrorism.

❖ SOS TNC

Advanced Electronic Applications, AEA, was leading the pack of commercial decoder units, called TNC’s, with their PK-232. This unit was (is) popular with amateur radio operators since it is capable of receiving and transmitting various digital modes. A software program to control such TNC’s was Solutions Oriented Systems, TNC.

Originally written for use under DOS 3.0 or Windows 3.1, the program is shown in Figure 4 running nicely under the DOS Prompt of Windows 98SE. Here it is controlling an AEA PK-232 MBX, a later model of the PK-232. However, it is also capable of controlling AEA PKT-1 and KAM KPC-2 TNC’s.

TNC’s screen is broken into three regions. The top of the screen is where received data is displayed. The next section down is for the message being transmitted. As can be seen in Figure 4, the “Echo” command is on and it echoes, or writes, the transmitted message in the upper “receive” section.

The Commands are shown at the bottom section of the screen. They are accessed

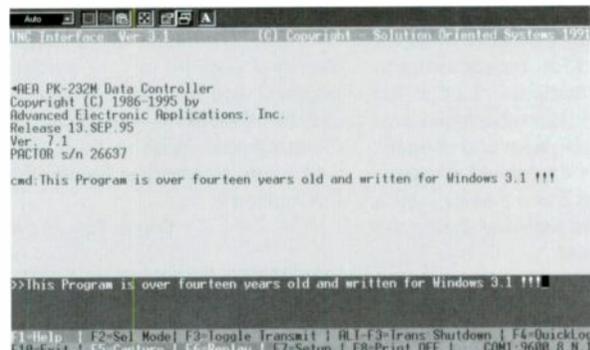


Figure 4 – A terminal control program from Solutions Oriented Systems, circa 1991. Seen controlling an AEA PK-232MBX and displaying its output.

using the “F” keys. For example, F2 selects the decoding mode to which the PK-232 is set. TNC still works quite well; however, today many monitoring programs include a TNC module. If you are looking for a standalone, very, very low PC system requirement TNC program, this 1991 Solutions Oriented Systems program fits the bill.

❖ PC Pakratt

AEA’s PK-232 was king of the TNC’s, and among the dedicated programs created specifically for controlling the PK-232 was AEA’s own PC Pakratt for Windows – Windows 3.1, that is.

Figure 5 shows the 1995 version 2.0 of PC Pakratt’s Main Screen running under Win98SE. However, when PC Pakratt is run, a screen is displayed saying, “The program may not run correctly on Windows 98 ...” However, I encountered no problems.

Version 2.0 of the program is a real Windows program with a Command Line, drop down menus and point-and-click. Pretty advanced for Windows 3.1. If I remember correctly, Windows 95 was not yet released when PC Pakratt version 2.0 made its appearance.

PC Pakratt can control and display the text from two PK-232s. The decoding modes included in the PK-232MBX are Morse, Navtex/TDM, PACTOR, Baudout, ASCII, AMTOR, VHF Packet and HF Packet. To explain the operation of the PK-232 and PC Pakratt could take a whole issue of *MT*!

Instead, to give you a feel for the program, Figure 5 is the PC Pakratt’s RTTY screen. The mode is chosen from a dropdown menu at the upper left of the screen. Notice all the function buttons on the upper right of Figure 5. The functions of the buttons change with the selected mode.

The combination of PC Pakratt and the PK-232MBX is still very powerful in 2005. Sadly, neither of the original products is being made. After AEA “bit the dust,” another company purchased the rights to their products and currently produces a DSP-upgraded version. Check ham shows and eBay for used PK-232s, which sometimes come with the PC Pakratt program. Try to get the MBX version of the PK-232 and version 2.0 of PC Pakratt for Windows.

❖ Do You Like Fiddling?

I started sorting through almost seventy “vintage” disks. Many made it to the round file (garbage can). In part 1 and here in part 2, we have covered a number of useful programs that still worked

easily under Windows 98SE.

There are other vintage programs which are worth a look, but may need some “fiddling” with to work under Windows 98SE. These include: 801HF and 801SCAN, two excellent programs by Terzon Systems; ICOM Programmer V2 by Rod Borsella for receiver control; HAMLOG, a 1985 program from RJ Martin; DX Log by Data Designs; and NZ8P’s Logbook by Morlan Software. The latter one has lots of interesting and useful features and was introduced when dinosaurs roamed the earth – 1987.

No doubt I’ve missed some goodies and would like to hear about your list of favorite vintage programs. They must be over twelve years old and must still work under Windows 98SE. Did I hear someone ask, “How many

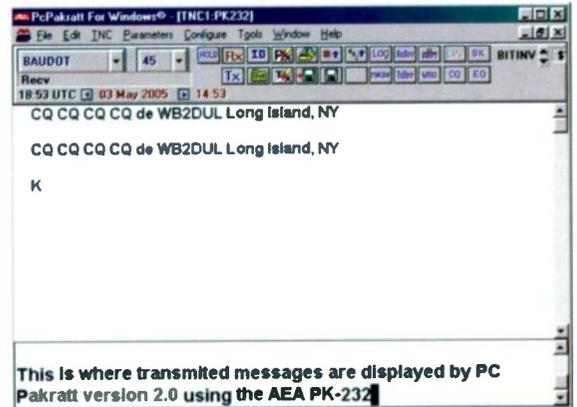


Figure 5 – AEA’s PC Pakratt’s main screen – Dedicated to the control of the venerable PK-232 TNC.

of these programs work under Windows XP?” Good question, and the possible subject of a future endeavor.

❖ Learning from the Past

Looking back has been interesting. It has shown us that talented programmers can create programs that will perform useful tasks for many years. Old is not synonymous with useless. And time passes quickly.

Let’s leave the past, learning lessons from the bad times, while remembering and savoring the good times. Now on to whatever “times” the future brings. Till next time.

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What's NEW

Tell them you saw it in *Monitoring Times*

New Uniden NASCAR Scanner

Uniden America has announced a new radio in their long series of NASCAR scanners – the BR330T.

The BR330T is the first wideband scanner built by the company. It is a TrunkTracker III (no digital) scanner that includes a combination of features present in the BC246T (analog trunking), the SC230 (race track), plus extended frequency coverage. It also has Uniden's latest innovation, fire tone-out, only available in one other scanner – the BCD396T.

Major features of the BR-330T include:

- 100 kHz to 1.3 GHz continuous coverage, excluding cellular. This scanner covers the AM, FM, shortwave and TV broadcast frequencies as well as all scanning bands.
- TrunkTracker III technology that can track Motorola, EDACS, and LTR analog only trunk systems.
- 2500 Dynamically Allocated Channels
- Close Call RF Capture Technology
- Uniden's race track operation makes it easy to scan and select drivers at races.
- Fire Tone-out Operation - can operate in a standby mode and respond when a user



programmed fire tone-out is issued.

- Extended Quick-Key Operation - systems can be assigned to any of 100 quick keys for rapid selection

As of this writing, the BR-330T has not been FCC type accepted and no release date has been announced.

ON4UN's Low Band DXing

Now that the sunspot cycle is approaching minimum, I keep hearing a familiar refrain among my ham radio colleagues, "DXing won't be worth a darn for the next few years until the next maximum."

I, for one, do not subscribe to that philosophy. When the sunspot numbers go down, I move down – in frequency. While the high bands may not be in good shape, the low bands are, and that is where the true DXers – amateur and shortwave – prowl for new ones.

Just in time for the low-band DX portion of the sunspot cycle, famed low-band DXer John Devoldere, ON4UN, and the ARRL have released a new edition of his extremely popular radio reference ON4UN's Low Band DXing.

John is one of the most recognizable figures on the DX scene. He has spent more than 1,500 hours rewriting and updating ON4UN's Low-Band DXing, known far and wide as the "low-bander's bible," says R. Dean Straw, N6BV, Editor.

This new edition includes antenna designs, operating guidelines, and an insider's scoop on low-band DXing. This edition is thoroughly updated with entirely new material on low-band antennas and high-gain transmitting arrays. It also includes new insights and new design techniques for receiving antennas and vertical arrays.

This edition is bundled with the fully searchable and complete book on CD-ROM for Windows®



and Macintosh® systems. (Also contains additional ON4UN software and over 2000 quality photographs.)

There's something in here for every active low-band operator, contester, ham DX chaser, and even shortwave broadcast listeners who chase rare DX in the tropical radio bands! John Devoldere is the master of the low-bands and this new edition of ON4UN's Low Band DXing is his masterpiece.

Published by the American Radio Relay League, Inc. This new fourth edition with CD-ROM (ISBN: 0-87259-914-0), © 2005 can be purchased at ham radio dealers or ordered from the ARRL website (<http://www.arrl.org>), on their toll-free telephone line 1-888-277-5289 (Outside US +1-860-594-0355), or via snail mail at ARRL Publication Sales Department, 225 Main Street, Newington, CT 06111-1494 USA. Order ARRL catalog number 9140 for \$39.95 plus shipping.

– Larry Van Horn

Domestic Broadcasting Survey

The *Domestic Broadcasting Survey 7* (DBS-7) recently became available, just in time for hobbyists planning their upcoming prime listening season.

This 7th Edition, edited by DSCWI Chairman, Anker Petersen, is divided into four distinct parts. Part 1: all active broadcasting stations 2300-5700 kHz. Part 2: Domestic stations on international shortwave bands above 5700 kHz, broadcasting to a domestic audience. Part 3: All active Clandestine shortwave stations with schedules and identifications. Part 4: deleted frequencies between 2 and 8 MHz which have not been reported during the past four years.

Data for this excellent hobby publication is gleaned from experienced DXers' monitoring, official sources and worldwide DX bulletins. As in past editions, information is easy to follow, arranged by frequency, kW power,

country, station, and operating schedule. Parallel frequencies are included as well as identifying slogans or operating format.

As a result of this dedicated pursuit of the most current material, 70% of the frequencies have been confirmed as being active in 2005. Active stations are listed in the DBS-7 as A (Regular), B (Irregular) C (Sporadic) or D (likely inactive)

The Last Log column advises the listener of the last month and year the station was heard prior



to the DBS publication deadline. Those deleted may be found in Part 4. The DSWCI plans a web-based feature, Tropical Band Monitor, to provide those who purchase DBS-7 with updates.

A free sample page, viewed in pdf format, is available at <http://www.dswci.org/>. The survey is available in electronic pdf format, via email for \$7.00 US dollars, 5.00 Euro or 6 IRCs. The 44-page printed edition is available for US \$15.00, 10.00 Euro or 11 IRCs. Either may be ordered from the club Treasurer (as follows). For additional postage rates and guidelines, please consult their website or write: DSWCI, c/o Bent Nielsen, Egekrogen 14, DK 3500 Vaerloese, Denmark.

The *Domestic Broadcast Survey-7* remains a very useful, accurate and valuable reference aid that should be in everyone's listening post. With its help, this will likely be another successful DX season!

– Gayle Van Horn

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.

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