Monitoring for the VOA's "Dream Team"

Also in this issue -
Experiments with Radio in Education
MT Goes to "Area 51" with TLC
Kennedy Space Center Update
Tactics of Successful Scannists

Shortwave is back

(and this time you'll love it even more)

A Shock to the System

When Short Wave Magazine reviewed the WiNRADiO G303i receiver, they called it "a shock to the system". Other reviewers seem to agree. What is it that makes the WiNRADiO G303i receiver so special?

The WiNRADiO G303i is the first commercially available software-defined shortwave receiver. As the entire last IF stage and demodulator are performed in software running on a personal computer, this brings about significant improvement in performance and flexibility compared to conventional receivers - as well as extraordinary sensitivity, very low phase noise, and impressive spurious signal suppression.

And there is more: The software-defined radio concept makes the G303i exceptionally well prepared for new, exciting communication technologies, such as DRM broadcasting.

What's Included?

The receiver comes as a complete hardware/software package, which installs in minutes. Just plug in the PCI card, connect its output to your sound card using the provided cable, install the supplied software, and let the world's most innovative shortwave receiver surprise you with its performance and amazing new features.

The Hardware

This elegant PCI card represents a culmination of many years of our experience with PC-based radios, designed with maximum reliability and performance in mind. No adjustable parts have been used in the design. There are two high-performace DDS units, and thousands of ultra-miniature surface-mount components delivering a performance comparable to receivers costing many times more. A custom-made gold-plated SMA connector complements the picture of quality - and as you would expect from a WiNRADiO product, an SMA-to-BNC adapter is also supplied, for your convenience.

The Software

The G303i control panel features seven different methods to tune the receiver. There are additional features such as a real-time spectrum analyzer, three scanning options, a highly accurate S-meter displaying signal strength in user-selectable units, sweeping wide-band spectrum scope, powerful memory facilities, and many others.

The optional Professional Demodulator expands the receiver capabilities yet further, by introducing additional innovative features: continuous selectivity setting (1 Hz to 15 kHz in 1 Hz increments),

interactive demodulator diagrams with real-time audio spectrum scopes and vector voltmeters, built-in performance test facilities (it even lets you measure the receiver's own sensitivity), and many others.

Additional demodulators for various applications are progressively becoming available, including the DRM demodulator.

WiNRADiO®

For detailed information visit:

www.winradio.com
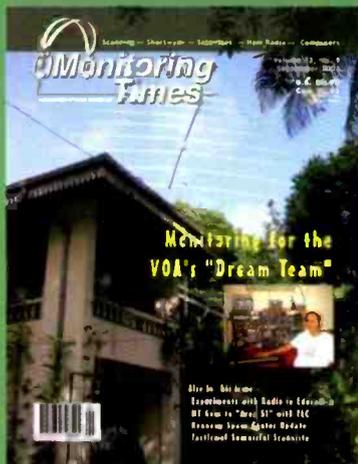
Cover Story

Monitoring for the IBB

By Victor Goonetilleke

In this modern day of remote monitoring stations and automated broadcasting, is there really a need for human monitors? Yes, indeed, says this member of the crack monitoring team employed by the International Broadcasting Bureau – the Voice of America's parent organization. But the best system is a combination of the two.

Working in conjunction with the Remote Monitoring System, the Technical Monitoring Team ensures that each scheduled broadcast is reaching its target audience. If it's not, then the monitors analyze the problem (adjacent interference, possible jamming, transmitter problems, inappropriate frequency...?) and suggest solutions based on their knowledge of the area and spectrum usage. It's a DXer's dream job!

Cover photo: Victor Goonetilleke and the log periodic he uses for low band.

C O N T E N T S

Reviews:

Larry Van Horn put the **PAR End Fed Z EF-SWL antenna** head-to-head with the best he had on his antenna farm and the results were "fantastic." If you are looking for a good broadband, pas- sive shortwave wire antenna for use in restricted space, then the EF-SWL is your ticket, he says (p.82).

The **Icom PCR1000** "black box" wideband radio doesn't really shine un- til paired with software. John Catalano reviews a new package designed espe- cially for the PCR1000 – **Datafile's PROBE1k** - and finds it a well-ex- ecuted program equally well-suited to professional or casual monitors (p.80).

The Gadget Guy revisits a couple of worthy items already reviewed: the **Icom IC-706** transceiver which has been in almost daily use in his shack for two years, and the **Minelab Explorer II** metal detector reviewed last month, which has now fully proven its "mettle" with a unique find (p.86).

This month the "Scanner Equip- ment" column covers "Tactics of Highly Successful Scannists" – not a review, but some really great advice on making the most of your equipment (p.78).

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Jorge Rodriguez
jorgerodriguez@monitoringtimes.com

Monitoring and the Law

P is for Privacy
Monitoring Rules Apply to Police

The Indiana Court of Appeals ruled in June that illegally intercepted cordless telephone calls cannot be used as evidence in Indiana's courts, even when police play no part in intercepting the calls.

In two decisions – one of which is for publication, which means it can be cited as legal authority in Indiana – the court held that Indiana would not recognize a "clean hands" exception which allows the government to use evidence that falls into its hands. The State of Indiana had urged the court to adopt such a holding from a federal 6th Circuit Court of Appeals case U.S. v. Murdock.

In Murdock, the federal court recognized such an exception to the Electronic Communications Privacy Act (ECPA = also known as Title III) – the federal law that regulates electronic monitoring and surveillance by police and the public. The Indiana Court of Appeals, however, was more persuaded by three other federal appeals courts which have refused to create or adopt such an exception.

The purpose of the federal law is to protect an individual's private communications from disclosure, regardless of whether a private party or the government intercepts the communication, the court said. "Congress' primary concern when it passed Title III was the protection of privacy and section 2515's importance as a protection for 'the victim of an unlawful invasion of privacy' could not be more clear." In contrast, the primary purpose of the Fourth Amendment exclusionary rule "is to deter future unlawful police conduct and thereby effectuate the guarantee of the Fourth Amendment against unreasonable searches and seizures."

"Therefore, while we agree with the State that suppression of the evidence in this case would have no deterrent effect on future police conduct," the court went on to say, "Congress' dominant concern when enacting Title III was not deterrence of unlawful police conduct, but rather, protection of the privacy of communication."

"The objective of Title III," the Court continued "is to shield an individual's private communications from disclosure, regardless of whether a private party or the government intercepts the communication. As other cases have held, the protection of privacy from invasion by illegal private interception as well as unauthorized governmental interception plainly play[s] a central role in the statutory scheme. Furthermore, an invasion of privacy is not over when an interception occurs, but is compounded by disclosure in court or elsewhere."

Returning to the language of Title III the court wrote " … the language of section 2515 is unambiguous: [w]henever any wire or oral communication has been intercepted, no part of the contents of such communication and no evidence derived there from may be received in evidence in any trial, hearing, or other proceeding in or before any court, …if the disclosure of that information would be in violation of Title III. The literal application of section 2515, which requires the exclusion of illegally intercepted communications from being admitted into evidence in court proceedings, is consistent with the intent of Title III, protection of privacy."

The court's decision in June stems from an attempted murder conviction in which the illegally intercepted telephone calls were introduced as evidence. In September of 2001 Timothy Henson and his girlfriend were engaged to be married and living together in the same apartment. Later that month, Henson's girlfriend ended the relationship. On the day she moved out of their apartment, she obtained a protective order against Henson, but it was of little help in keeping him away from her. Shortly after she ended the relationship, Henson began to follow her, call her at work, and even page her; Henson also left voice messages for her saying that he wanted to make-up; and that "he couldn't live without" her.

On November 9, 2001, at approximately 8:00 p.m., Henson's ex-girlfriend was in the parking lot of the American Bandstand restaurant on the northeast side of Indianapolis when she saw Henson drive up behind her. She quickly drove out of the parking lot and headed home. As she waited for a traffic signal, Henson pulled up along side her vehicle and starting yelling at her to pull over. She became upset and when the light changed, she drove west onto 86th Street past the Fashion Mall towards Keystone Avenue. After she passed Keystone Avenue, she turned onto Woodfield Crossing which leads to an office park and stopped. Henson caught up with her, and when he arrived at her vehicle, he reached in through her open driver's side window, grabbed her, and stabbed her in the neck. Eventually, Henson's ex-girlfriend was able to drive away and get help.

After she was admitted to the hospital, she stated Henson was responsible for the stabbing. Henson was charged with attempted murder and aggravated battery, but he was not arrested because he could not be found at the time. Marion County Sheriff's Deputy Scheid was assigned to investigate the case.

During the course of his investigation, an unidentified individual contacted the hospital to inquire about Henson's ex-girlfriend. The hospital contacted Deputy Scheid and gave him the caller's telephone number from their caller-id system.

On November 27, 2001, Deputy Scheid, accompanied by another detective went to the caller's residence to speak with him about the calls. When Deputy Scheid arrived, Paul Carey, the homeowner said, "Thank God you're here, he's on the phone again, come with me." Carey then grabbed his arm and dragged the deputy into his kitchen. Carey explained that he had a police scanner, which "was on all day long," that was intercepting telephone conversations, and that he "knew all of the frequencies for [the phone numbers] of all of his neighbors." Deputy Scheid and Mr. Carey then listened to a telephone conversation between Henson and his sister on the police scanner.

During the conversation, Henson's sister warned him that the police were looking for him. Henson also told his sister that he needed clean clothing and money, and arranged to meet her. Deputy Scheid and the other detective remained at Carey's residence for over two hours listening to Timothy's various telephone calls over the police scanner.

As this issue went to press, Deputy Attorney General Ellen Meilaender, who argued for the Indiana Court of Appeals to adopt the "clean hands" policy regarding the intercepted phone conversations, said the state had not decided whether to appeal the ruling.

Monitoring and the Law would like to thank Spurgeon Geisten for writing and telling us about the Henson case.

❖ Corrections and Omissions

Monitoring and the Law would like to recognize and thank Kenneth Koenitzer who, along with Attorney Frank Terranella. and John Norton, helped change the old New Jersey state scanner law discussed in the July issue.

Disclaimer: The column is provided for its news value and nothing here should be construed as legal advice. Persons seeking specific legal advice should consult an attorney licensed in their jurisdiction about the specifics of their matter.

For Love of a Radio

"Just picked up my May copy of *MT*, and the pic of the Realistic DX-66 in your article (Beginner's Corner) caught my eye right away! I also am the owner of a 66 (I've had to take it off my wife's rummage table three times in as many years). Yours looks much better than mine. I wanted to share a couple items with you.

"First, I think I saw the light on mine work once...I remember thinking 'That's the dimmest light I've ever seen!' It must have taken my thoughts as an insult, since that's the only time it worked.

"Second, on battery life...I put a set of Energizers in this thing I believe three years ago this July (it's a great portable for 4th of July picnics). It now resides in the almighty throne room (bathroom). I listen to the morning news and weather about 30 minutes a day 5 days a week, and I am still on the same set of batteries! I know of at least one occasion that I inadvertently left the darn thing on, and didn't discover it until the next morning.

"I believe you and I may have the only two radios left that actually may generate their own power to replenish the batteries! (It's either the radio, or those Energizers that are worth their weight!). Maybe we can patent that claim ;)

"All kidding aside, it has been a great, dependable radio. It has been superceded by at least six scanners and a two or three other shortwave radios (my wife likes to remind me of that fact also) since the '80s. Heck, who counts radios anyways?! (Besides my wife :))

"I also like the very directional ferrite antenna built in; you can almost point the radio directly at the city you are listening to on the AM band.

"I'm laughing at myself right now...I was looking for a serial number on it to share with you...heck, we're lucky it's got a zip code on it from that long ago!

"Enough on the 66...lets talk about my Heathkits now, then I'll show you my home movies...

"Thanks for the article...hmm...toothbrush, linen cloth and vacuum got yours looking that good? I hope my wife doesn't get the wrong idea when she sees me with that vacuum cleaner..."

Ken Kruska, Saginaw, MI

GPS Jamming?

"I read Perry's problem with phantom loads and noisy sources with interest (June *Ask Bob*). In the January '03 issue of *GPS World*, there's an article that tells of two engineers trying to track down jamming interference to GPS signals. It all came down to two VHF/UHF powered antennas used for pleasure boat TVs. Once unplugged all was okay."

Ed DeFreitas W1WEA

Monitoring Times Express

"I can't begin to tell you how pleased I am with *Monitoring Times Express*. Since its inception I have labored under the misconception that it was available only to those who already subscribed to the print version of *Monitoring Times*. I have no clue where this idea came from, but I found the price unreasonable when added to the cost of the print version. Imagine my surprise when I renewed my subscription on your web page only to receive confirmation via email for *Monitoring Times Express*. I called on the phone the next day to correct the problem and the nice lady on the phone informed me that yes I could get *Monitoring Times Express* by itself for just $19.95. This, in my opinion, is a very good deal. *Monitoring Times* in machine-readable form fits me quite well.

"Now one of the few sore points my wife has with my various hobbies is that each comes complete with its own magazine or magazines. She has claimed for years that my only REAL hobby is reading. Being a true ham I just can't bear to part with any of the magazines that I collect. Never know when you will need that one paragraph or letter that tells how you can replace a 6SN7 with a P2N222. :-)

"Seriously, though, I have found that anytime I explore a new facet of any of my hobbies be it ham radio, scanners, SWL, hand loading or photography, my back issues of magazines are a good starting point to bring myself up to speed on something new.

"So when she found out that I would continue to receive *Monitoring Times* but that all of the issues would reside on the hard drive in my computer, she was ecstatic. Her only question was 'Why I don't get all of my magazines in this format?' to which I replied, I wish I could."

Ken Sprouse / WA3FKG Oakmont, PA

Kommercial Kudos

"This electronic delivery of *MT Express* is simply awesome. My high-speed broadband connection meant I went right for the high-res version, and it is as shiny and bright as any graphics I've seen on the web anywhere. Great E-Zine technology!

"For reasons I can't completely explain (operator error most likely), this is the first issue I have successfully downloaded and examined. Many kudos to all of you!

"Keep up the great work.

Jesse Rotman, Marketing Director, Midland Radio Corp.

"I just got back from a training course with Federal agents on our DC Live Forensics software (May "Computers & Radio") and one of the agents had *Monitoring Times* with him. I saw the article as did the whole class!

"Thanks a lot for the great press and I hope you're doing well with the product."

Curtis Crowe, Tracer Technologies, Inc.

MT History Buffs

"Mac" wrote on the ScanAtlanta listserver -

"John Mayson wrote a good article on conventional monitoring on I-75 through the state of Georgia in the May 2003 *Monitoring Times*. It's a great article and definitely one to file away for future use; it gives you not only frequencies, but background and usage info. If you don't subscribe to *MT*, you might want to hunt down this month's issue at a bookstore and get a copy for the article."

The same John Mayson wrote to Gayle Van Horn -

"I loved your article on *Colonial Scanning* (July *MT*). I'm a history buff of sorts. I was a little worried I included too much history in my *Georgia I-75* article last month *(see above)*. Apparently it interests someone else besides me.

"Now here's a little interesting tidbit. I have traced some of my ancestors back to Westmoreland County, Virginia. I have an ancestor who served in the House of Burgesses along with Larry's. Imagine, almost 400 years later their descendants are still crossing paths."

John Mayson, Austin, TX

"Reading *Colonial Scanning* by Gayle Van Horn brought back a lot of great memories. My wife and I visited Williamsburg a number of years back (before I started scanning) and it was a great learning experience. I'm proud to say that I was asked to serve on the jury of the Colonial Court. The thrill of being a part of the past was exuberating.

"If you close your eyes and use your mind's eye while visiting Yorktown ... the thrill. It would have been that much more exciting if I was scanning at the time. Next time I will be prepared.

"Great magazine."

Joe Grisafi, KD5VJW

Pancakes, Anyone?

Reader Wilson asked for more information about the "pancake" antennas mentioned by John Treadgold in his February feature on *TV Rovers*.

"*Monitoring Times* asked me to send you info on what I called pancake antennas. These are low profile antennas mainly for receive purposes that have a coiled antenna inside. I believe Max rad and others offer them in their catalog. they are mainly 450 MHz UHF and 800 MHz. They also make them with 3 db gain.

"The flat rounded shape seals them against moisture and allows them to go under parking garage low clearances. Many news cars have switched to them and police use them for their MDT (Mobile Data Terminal) units and on undercover cars. They come in white or black to match your car and cost around $60.00 each. Except for data transmission I have not seen them used for transmit purposes."

J Treadgold

On with the Show

Glen Childress asked for airshow frequencies for the Thunderbirds. Larry Van Horn chided him that if he'd been a subscriber he would have already had them in our annual March airshow issue. He added, "We actually put that online after a few months so it is always worth checking the *MT* website for the stuff you are looking for." (http://www.monitoringtimes.com/html/mtairshows.html)

Glenn sent a picture from (we assume) the Greenville, SC, show April 26 -

"I enjoyed the show. Here are a few pictures I thought you might like.

"These are not of the T-birds, though. I am sure you have seen enough of them. This is of the largest US Flag ever flown under a parachute. At least that is what they said at the show."

A. Glen "Glennie" Childress, Lake Hartwell, GA

Some websites Glen recommends:
http://www.baddude.com - great military aviation shirts.
http://www.vfa203.navy.mil/photos.htm - here are some of my pictures of VFA-203.
http://www.av8rstuff.com - great source of military aviation patches.
http://www.robertlundquist.com - great aviation art work

More on Michigan

"Just read your short paragraph in the July 2003 *Communications Column* re: 'Michigan Doubles Fine.' Be advised that I just downloaded an application (http://www.michigan.gov/documents/com-022_8561_7.pdf) MSP COM-022 - Application for Short Wave Permit in a Vehicle to Monitor Police Frequencies

"You mentioned that "Free Mobile Scanner Permits" are still available from Michigan State Police.

"I wanted to inform you that the application requires the applicant to write an explanation for the need for such a permit. Persons reading your paragraph may think that the State Police are simply giving these away. That is not the case. The applicant has to show a need and/or reason for having the scanner in the car. If the State Police are not satisfied with the explanation, the application will be rejected."

Ira Paul, Royal Oak, MI

NJ State Police

"This is a follow up to the article that I recently published on the New Jersey State Police Radio System (July *MT*). Since the article was written, the following changes were uncovered. First, a new transmitter in the Hudson County area of Northern NJ will greatly enhance the 800 MHz coverage of a few dead spots.

"Secondly, all North Jersey talkgroups (Troop B), will be Type II trunking by Labor Day. The fleetmap has yet to be released. Once the new talkgroups are fully operational and all units have been converted, then the talkgroup simulcasting will be turned off, thus greatly reducing the amount of radio failures.

"Due to the cost of the equipment, these upgrades have to be done gradually. Over the course of the next three years, the NJSP System will be a mixed analog/digital type II trunked system."

Michael J. Coppola, Police Officer, Firefighter, EMT
http://www.metrofireradio.com

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!
-Rachel Baughn, KE4OPD, editor

◆ Radio for Peace Under the Gun

On Monday, July 21, 2003, a University for Peace representative delivered an eviction notice to Radio For Peace International (RFPI) which has been operating since 1987 by mutual agreement on the University campus in El Rodeo, Costa Rica. The radio station's access gate was locked with chains and patrolled by armed guards employed by the University for Peace. In addition, the radio station was advised to vacate its facilities in two weeks.

By the time you read this, the immediate situation will have evolved, and it is unknown whether the station will have been able to remain on the air (as it is at presstime). RFI is appealing contributions to help with its legal defense. According to General Manager James Latham, the action was unexplained and legally questionable. Latham said, "What is most shocking and sad is that this action comes from an international peace organization."

University for Peace co-founder, former Costa Rican President Rodrigo Carazo Odio, invited RFPI in 1985 to build and manage its own office and studios on the university's Costa Rica campus. Consequently RFPI constructed studios and transmitters, and has been broadcasting peace and social justice programs, such as "Peace Watch," Middle East Radio Project," "Disability Radio Worldwide," "Honoring Mother Earth: Indigenous Voices," as well as daily United Nations programming. RFPI is a longtime carrier of Glenn Hauser's programs, "World of Radio" and "Continent of Media." RFPI is the only listener-supported shortwave radio station.

"The university is just defending its rights to its property," said Luís Alberto Varela, the university's lawyer, who says the station actually received notice in 2002 that the university would be terminating the agreement with RFPI's Oregon-based umbrella organization, World Peace University, Inc., and they were given 90 days to leave by July 2002. Some reasons given by the university are issues of money owed for telephone and internet access and illegal use of radio frequencies (which are registered with the international coordinating body, HFCC).

The Committee for the Defense of Radio For Peace International encourages you to write Kofi Annan in support of the radio station at: annan@un.org or sg@un.org, and/or to leave a message of concern with the Public Inquiries office at 212-963-4475. Contributions may be sent to: RFPI, PO Box 3165, Newberg, OR 97132, earmarked for "Legal defense fund."

◆ Congress Poised to Overturn FCC Ruling

MT reported last month on the controversial move by the FCC to raise the cap on the number of stations a network may own from 35 percent to 45 percent. The FCC said the move was in response to its mandate from congress, the courts, and the president. Apparently, however, congressional members from both parties have taken note of the storm of vocal protest from the public (including the National Rifle Association and the National Organization of Women). The House of Representatives overwhelmingly passed legislation (included in a spending bill) to return the cap to 35 percent. The Senate, which was already working on similar legislation, is expected to agree. President Bush has stated he would veto the bill, but this is doubtful since it appears Congress will have the votes to override it.

◆ Record Radiocommunications Conference

The World Radiocommunications Conference (WRC-03), the tri-annual meeting sponsored by the International Telecommunications Union (ITU) to revise the global radio regulations and spectrum rules, concluded in July, after four weeks of negotiations. The ITU's World Radio Conference

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allocates and manages the radio spectrum on a global basis for a variety of wireless uses, products and technology.

A number of landmark decisions were taken by the conference to deal with the increasing pressure placed the radio frequency spectrum, which is a limited natural resource. The demand for spectrum was reflected in the more than 2,500 proposals from Member States. The conference agenda was the largest ever, resolving 48 major issues.

Topping the agenda were the frequencies governments and industries will use for services such as Wi-Fi (wireless broadband), spectrum for the European Union-backed Galileo satellite navigation system, Internet access for airliner passengers, digital broadcasting below 30 MHz, global positioning and dozens of issues of lesser importance.

The 189 countries affiliated with the ITU sent delegations totaling more than 2600 participants to the conference armed with their national, regional and global priorities and proposals for spectrum use. In addition, regional telecommunications organizations and standards bodies lobbied behind the scenes.

5 GHz Wireless LANs Go Global

WRC-03 successfully established new frequency allocations to the mobile service in the bands 5.150-5.350 MHz and 5.470-5.725 MHz for the implementation of wireless access systems including RLANs. Delegates worked hard to accommodate new allocations into an already tightly packed 5150-to-5725 MHz band, which is also used by radar, aircraft navigation systems and earth-sensing satellites.

World telecom conference delegates agreed on 455 MHz of new global wireless LAN spectrum at 5 GHz. The lower part of the 5 GHz spectrum will be predominantly indoor, with the first 100 MHz (5.150-5.250 MHz) restricted to indoor use. Member ITU states may choose whether they want to restrict the 5250-to-5350 MHz portion of the band to indoor use only.

Global Positioning Satellite issues

Allocation of frequencies for the EU-backed Galileo satellite navigation system in the 1164-to-1214, the 1260-to-1300 and the 1560-to-1595 MHz bands, as well as rules for power output from new Global Positioning System (GPS) satellites the U.S. plans to launch, emerged as another contentious issue.

Although the Galileo system got a green light at the WRC event three years ago, a number of follow-up items remained. This includes a new generation of higher-powered GPS satellites that the U.S. plans to launch to defeat enemy jamming.

A test Galileo satellite will be launched from Russia in 2005 and tested at an attitude of 22,000-km, to ensure the technologies for the $3-5 billion project will work. The system, which will consist of 30 satellites, is

due to be in operation by 2008.

Satellite-Based Broadband

Another key item for the U.S. delegation was the gaining of additional frequencies in the 14.000-to-14.500 GHz band so airlines may offer their passengers e-mail and other Internet services as they fly. The Boeing Company currently operates "Connexion," a satellite-based broadband Internet service under an experimental license. Lufthansa, Japan Airlines, and Scandinavian Airlines System have committed to installing the service on future long-haul flights.

Amateur Radio Issues at WRC-03

Although Amateur Radio matters were but a small part of the conference, several items on the conference agenda were of great importance to radio amateurs. The two high profile agenda items that were especially important to ham radio are: Realignment of 7 MHz allocations (Agenda Item 1.23) and the revision of the regulations governing the amateur and amateur-satellite services (Agenda Item 1.7).

Following is a recap of final conference action on the various WRC-03 agenda items impacting Amateur Radio:

Agenda Item 1.7: (Article 25) It had been predicted that the need to master Morse code as a requirement to obtain an amateur radio operators license, would be coming to an end. However, it was resolved to leave this to the discretion of the individual countries whether it would be necessary to demonstrate knowledge of Morse code in order to be granted an amateur radio operators license.

Agenda Item 1.72: (Article 19.68) A modification was approved that permits an Amateur call sign suffix of "...not more than four characters, the last of which shall be a letter..." A provision was made for temporary use of more than four characters on special event occasions.

Agenda item 1.7.3: (Article 1): No changes were made to the definition of the Amateur Services.

Agenda Item 1.23: (7 MHz realignment): The conference took a major decision to add 100 kHz of bandwidth to the Amateur Service on a global basis.

There will be a dramatic improvement in the 40-meter band! The conference agreed to shift broadcasting stations in Regions 1 and 3 out of the 7100-7200 kHz band and to reallocate the band to the Amateur Service in those two regions. The allocation in Region 2 of 7000-7300 kHz remains exclusively amateur.

The HF Broadcasting band in Regions 1 and 3 will become 7200-7450 kHz and in Region 2,7300-7400 kHz. The change will take effect on 29 March 2009. In Regions 1 and 3 the 7100-7200 kHz band will become exclusively amateur on that date.

Never before in the history of radiocommunication has an HF broadcasting band been shifted to accommodate the needs of another service.

Agenda item 1.36: (HF broadcasting expansion around 4 to 10 MHz): Most WRC-03 delegations opposed additional spectrum for broadcasting. A resolution was adopted inviting the next WRC to consider additional spectrum requirements for broadcasting between 4 and 10 MHz.

Agenda item 1.38: (70-cm SARs ...satellite-borne synthetic aperture radars at 432-438 MHz.) A SARs allocation will be secondary and subject to ITU Recommendations that are designed to provide protection to, among others, the Amateur and Amateur-Satellite Services.

WRC-07

HF matters will again be on the agenda for WRC-07, subject to the approval of the ITU Council, but the band 7,000 to 7,200 kHz will be excluded from this study. It does, however, give the opportunity to realign the 40 meter Amateur allocation in ITU Regions 1 and 3 with that of Region 2.

Excerpted from the *W5YI Report*

◆ *W5YI Report* Ceases Publication

The familiar pink sheets of Fred Maia's bi-monthly *W5YI Report* have long been a fixture around the *MT* headquarters. Many bulletin subscribers have been with it since its inception, when all you had to do was to mail Fred a batch of stamped, self-addressed envelopes. The report was originally started more than 25 years ago for the benefit of the Richardson (Texas) Wireless Klub, but it got out of hand when a handful of mail-outs turned into thousands.

Also being discontinued is *The New RTTY Journal*. Fred sold his company in 2000 but agreed to keep the publications going until July 15, 2003. He is retiring from the twice-monthly schedule he has kept for 25 years, but will continue to write his monthly column for *CQ Magazine*. Unfulfilled subscriptions of the two newsletters will be honored by *CQ*.

Thank you, Fred, for so many years of concise, cogent, and in-depth reporting on amateur radio and emerging technologies. It's a retirement well-deserved, but your insights will be missed.

Monitoring for the
International Broadcasting Bureau

By Victor Goonetilleke 4S7VK
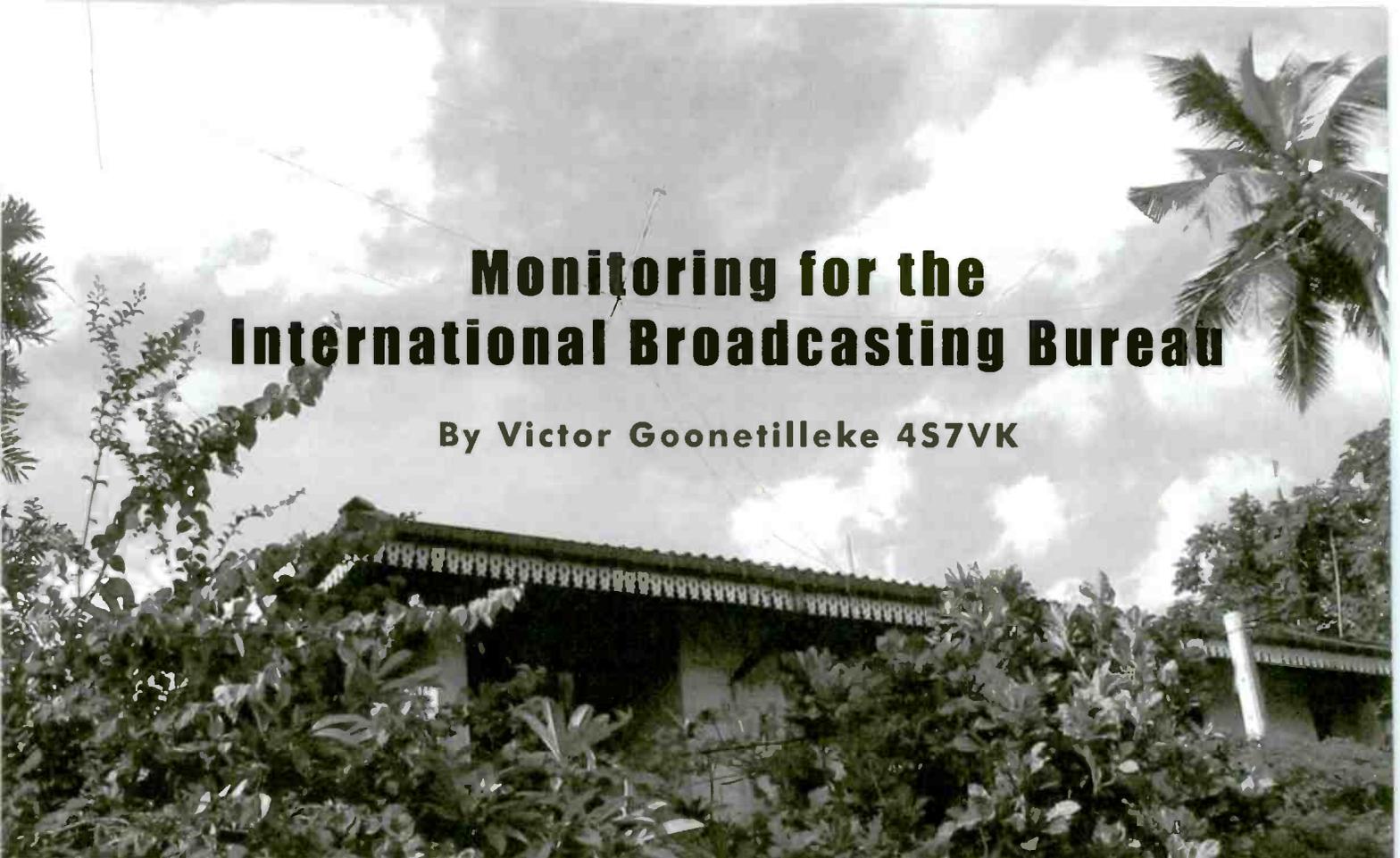
The author's low band Yagi antenna at his home in Sri Lanka

With 60 Remote Monitoring Systems and 40 experienced human monitors located in five continents, the International Broadcasting Bureau's (IBB) Monitoring Service is a state of the art technical operation, blending the best in man and machine to achieve the highest standards possible in Technical Monitoring.

What is Technical Monitoring and what is its role today in International Broadcasting?

Technical Monitoring, to put it plainly, is keeping a constant ear on the technical quality of radio broadcasts to give the highest possible reception quality to listeners in the target areas of the broadcaster.

Do stations need reception reports in this age of remote monitoring systems scattered in many parts of the world? Aren't stations using state of the art systems to analyze their reception quality? Do broadcasters need listener reports anymore? It is obvious that many shortwave listeners and almost every DXer would wonder about these questions.

The IBB, like any major international broadcaster, spends large sums of money making programs. Gathering news and information, conducting interviews, writing scripts, editing, traveling, and finally getting the finished product to the studio control room cost a great deal of money and human effort. Above all, it is the task of the IBB to carry the message of the American people to all corners of the world. If the transmitted signal which carries the finished product doesn't reach the listener at a useful level, that effort would all be in vain. Therefore, it is evident that the IBB must deliver a

satisfactory signal to people all over the world, be they Afghans high up in the Kyber, Iraqis demonstrating on the streets of Baghdad, or even the casual listener in the comfort of his bedroom with a portable radio. It is the constant evaluation of the technical quality of IBB's broadcasts that will enable it to succeed in that task.

Traditional Method of Collecting Reception Information.

Most stations depended on listeners to inform them about reception quality. However, sporadic letters from listeners were not sufficient on which to base their judgment. Therefore, some stations went to the extent of even printing special reception report forms so to enable listeners to fill them up easily over a period of some days or a month and send the reports to the stations. The SINPO code (Signal, Interference, Noise, Propagation, Overall-reception) was invented to facilitate this reporting system.

The major broadcasters even set up moni-

toring panels of selected listeners to report regularly. Listeners were sent gifts from time to time in appreciation of their assistance and some broadcasters even met out-of-pocket expenses. The broadcaster would take necessary measures to solve reception problems in the target areas, taking note of feedback from listeners and their monitoring panel. A few had reciprocal arrangements with other broadcasters to monitor each others' broadcasts. This worked well and still does for many broadcasters. However, for big international broadcasters, sporadic voluntary feedback from such monitoring is insufficient.

The author's monitoring post includes a Lowe HF225, Icom R71A, Icom R70, Sony ICF 2010, National Panasonic 3 band radio, and four HF transceivers.

The International Broadcasting Bureau

Today, without a doubt, the most important international broadcasting network is run by the International Broadcasting Bureau (IBB), which is the parent body of the Voice of America, Radio Free Europe and Radio Liberty, Radio Free Asia and Radio Marti. These stations use transmitting sites located all over the world to get the strongest possible signal and the clearest possible reception in its many target areas. Millions of dollars are spent to operate these transmitting stations.

The IBB also owns and operates many relay stations. In addition, it also hires airtime from other broadcasters. Ironically, some of the transmitters in the former Soviet Union and Eastern Europe which jammed the VOA and RFE/RL transmissions, now carry IBB programs to their people today.

The IBB's goal is to carry the voice of the United States to every corner of this world. The IBB thus needs a very efficient monitoring service to achieve this task.

IBB Monitoring System

The IBB runs a network of *Remote Monitoring Systems* in almost 60 locations, and this number is steadily growing. In addition, the IBB employs some of the finest human monitors in very important target areas. Together, the *RMS* and the *Technical Monitors* form a state of the art monitoring system unparalleled in the history of international broadcasting.

Remote Monitoring System (RMS)

The RMS consists of a communications receiver with a ground plane (nondirectional) antenna, connected to a computer. The computer, through specially designed software, is controlled and programmed from Washington and from designated Technical Monitoring Offices (TMO) to do many tasks. These include scanning a complete frequency range and recording frequency occupancy in a graphic format. This is an invaluable tool which helps to find unoccupied frequencies to replace frequencies that are interfered with, or to locate clear

A typical IBB remote monitoring system

frequencies for new transmissions. The RMS also sets the receiver to record a sampling of any program transmitted on any number of frequencies.

The system is so effective and fast that it is possible to tune in to more than a hundred different frequencies within a span of thirty minutes and record sound bytes in the computer. These are then transmitted to Washington via the Internet.

The data thus collected goes into a master server. These sound samples in turn can be listened to by frequency managers, program producers and even members of the public. The system – the brain child of IBB Monitoring Division Chief, Bill Whitacre – is such an incredible tool that many international broadcasters depend on it to manage their frequencies and check their reception.

The RMS revolutionized technical monitoring and frequency management. A detailed description of the IBB's Remote Monitoring system complete with sound samples can be accessed at **http://monitor.ibb.gov/rms/**

Technical Monitoring Offices (TMO)

With a worldwide network of RMSs and human monitors, it is important for the IBB to have regional Technical Monitoring Offices (TMOs). These are located in *Vienna, Helsinki, Hong Kong, New Delhi, Bahrain* and *Accra.* Technical Monitoring Offices carry out live monitoring of IBB broadcasts as well as running and maintaining the network of RMSs and coordinating monitoring with the IBB's human monitoring force.

Each TMO is responsible for a number of RMSs and monitors. With the advent of the Internet the old mail system became obsolete and has been replaced by connecting all technical monitoring locations, RMSs and TMOs via the Internet with Monitoring Headquarters in Washington DC.

The Super DXers/SWLs

Perhaps the most interesting part of the IBB's monitoring force for hobby radio enthusiasts (DXers) might well be the human monitors scattered all over the world. The IBB uses the services of around 40 monitors who tune in to every broadcast on every frequency that the IBB broadcasts almost 365 days of the year. What do these monitors do?

They are equipped with simple receivers that are considered to be typical of the region that they live in. Using simple antennas and, in some instances, only the built-in telescopic whip antenna, they record reception of IBB signals beamed to their area. Every reception observation is entered into a Newton or a Palm V handheld computer using specially designed applications. A technical monitor checks reception of every frequency of every broadcast specified by the TMO, at least once every 30 minutes.

This data is then sent via the internet to a central database known as Frequency Monitoring Data System (FMDS). The data is tabulated and is available per broadcaster frequency, time, language and location within a matter of hours of the data being transmitted from the monitoring locations in far flung outposts.

In addition to simple domestic receivers, professional communications receiving equipment and excellent antenna systems are also used by the Technical Monitors for specialized work. This may include frequency measurements, finding clear frequencies, and also identifying interference – be they other broadcasters or other man-made sources. The monitors occasionally carry out extensive manual "bandscans" from time to time to determine frequency occupancy.

The monitors also listen to the broadcasts to find any irregularities, such as modulation problems, transmitter breakdowns, spurious signals and anything which should not be happening to spoil the listening pleasure of the IBB audience. There are times that the wrong program could get on a frequency which should be carrying a different language. Suddenly a previously unjammed language service could get jammed or even the type of jamming might change.

Depending on the nature of the irregularity, the monitors immediately contact either the regional TMO office, the transmitting station

IBB Remote Monitoring Systems

◆ Remote Monitoring Systems
◎ Technical Monitoring Offices
◆ Remote Monitoring Systems
[temporarily inactive]

The author's high band log periodic antenna

or the Network Control Center (NCC) in Washington, to rectify the problem as fast as possible. Some problems can be solved in a matter of seconds while some knotty and intermittent problems can take many days to sort out.

The moment a problem is spotted, it is also reported to an E-mail network that connects the chain of monitors and TMOs, so that the entire network starts to work on it. Often monitors from outside the target area can be of invaluable help in identifying interference due to the overbearing strength of the IBB signal within the target.

Bottom line: The work of the monitor is to determine whether a broadcast is good enough for average reception. If not, then to do everything possible to make it satisfactory.

The monitors are also an invaluable source of information to the broadcaster due to their knowledge of the target areas, including listener habits and the regional culture of the different regions to which the IBB broadcasts. They are not tied to one location, but can move out from urban to remote areas to check on reception and can communicate with listeners to seek their opinions about reception. Therefore, these monitors are a flexible, intelligent human resource for the IBB. Some of them even conduct listener surveys and gather other feedback useful to program producers as well as to frequency managers.

Why Human Monitors in this Age of Automation?

This is a question that is often asked, not only by listeners but also at the higher echelons of the IBB. Do we need human ears when we could have automated systems to listen, record and send back data? In fact, there is an incredible amount of data that the

RMS system records and sends back. It is possible for program producers and frequency management personnel from Washington to listen to the program quality in far distant targets of the world just minutes after the broadcast or even while it is still on the air. It doesn't require much stretch of the imagination to realize what a tremendous tool the RMS is.

Yet, all this data wouldn't make sense unless humans evaluate them. The simple fact is that all the data that is gathered, even if sorted and tabulated for easy dissemination, needs to be viewed by humans. A whole team of technical people to listen to the technical quality of the recordings and disseminate that information will be absolutely necessary so that programmers and frequency managers can use the information.

Often there are times when the data itself calls for human input from the target areas. The RMS still cannot identify on its own whether an interfering source is a broadcasting station, jammer or a problem of a technical nature. A bandscan can show spots not occupied, but *ideally*, real listening is needed to verify whether the free channel is really free and that another broadcaster is not occupying a channel adjacent though weak in strength to the same area. Sometimes, frequency registrations are not as accurate as the industry would like them to be. Radio stations change frequencies according to their needs. Some don't even inform their usage to the High Frequency Coordinating Committee (HFCC).

Bill Whitacre receives a plaque of appreciation from senior Technical Monitors in Asia Umesh Shenoy and the author. In the background (l to r) IBB Frequency Managers Dan Ferguson, Frank Dunn, Ed Wickenhofer, Steve Bracher.

Therefore, on the one hand we realize that a machine can go on and on as long as there isn't a breakdown. Given human limitations, one cannot expect a monitor to carry out tasks at all odd times of the day or night, with that same monotonous regularity that a machine can. Likewise, in locations that may be life threatening

Marina Gukasova, IBB monitor in Georgia

or financially not viable to have a human monitor, it is easy to have an RMS. There are areas very important to the IBB where it cannot find a suitable monitor technically competent or willing to do the task.

At the same time there are locations where the IBB would greatly value an RMS or a human monitor, but finds it impossible due to lack of proper technical support such as Internet connectivity, stable electricity and a non hostile location for a US facility to be located. Or, where freedom is too restricted to allow a monitor, such as in North Korea, to mention but one.

The simple truth that has surfaced from "on the job experience" is that there are tasks that a machine can do better than a human. There are also tasks that a human can do which a machine cannot. There are also tasks that both machines and humans can do, but one can do better.

Therefore, the basis of the best system is to get a machine to do what it can do best and a human to do what he can do best, so that together they may do the job better than ever before.

Alok Dasgupta, Calcutta Monitor

This fusion has eliminated the need to have hundreds of humans to do the task. A small core team in Washington with monitors out in the field has been the formula for success – in short, a blending of the best in technology and human resources. This fusion of man and machine was the vision of Bill Whitacre, Chief of IBB Monitoring. It has been so successful, a state of the art operation, that today even the BBC and many other broadcasters solicit the services of IBB Remote Monitoring System and its network of human monitors to keep their frequency management and reception levels at the competitive levels needed by discriminating listeners all over the world. A visit to any RMS site on the Internet will show the amazing number of International Broadcasters who seek this service from the IBB.

Who Are IBB's Human Ears?

The IBB's monitors come from all walks of life and from all over the world – reflecting IBB's global nature. These monitors could be termed super DXers, if you like to put them in that class. Most are top DXers and Amateur Radio Operators. Take TMO Helsinki, headed by Arto Mujunen, well known in European DX circles for his many years in the hobby and services to the European DX Council, and top medium wave DXer Mauno Ritola, and Ham operator Timo Toru.

Anurag Parashar at the Technical Monitoring Office (TMO) in Delhi

Then there is Bogdan from Poland, who amazes everyone in the team by being able not only to identify any language and broadcaster, but often the name of the announcer of East European broadcasts – such is his dedication and expertise. In Oceana there is Craig Tyson, who needs no introduction – one of the best DXers in Australia, contributor to *Passport* and *WRTH* for many years. In Japan, the IBB's man is top DXer and computer wiz-kid Sonny Ashomori. In South Asia, Alok Das Gupta and Victor Goonetille, along with some of the better known DXers in the region, have been IBB monitors for decades.

Alexander Beryozkin, UA1AEB, monitors in Russia

Charles Danyer has been VOA's man in Central America for a long, long time. Vladimir Titarev and Alexander Beryozkin are well-known names in DX magazines. The Hong Kong Bureau, Vienna, Bahrain and New Delhi are manned by a collection of amateur radio operators and computer experts, and all of them are as good as any DXer you could find. Accra, Ghana and Bahrain perform invaluable monitoring in Africa and in the volatile Middle East.
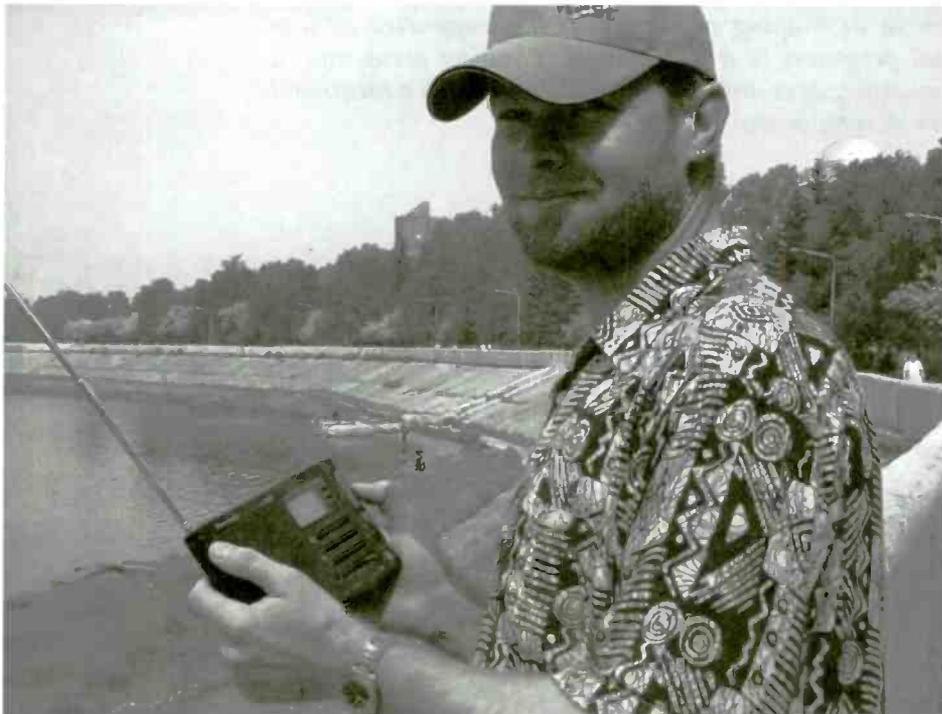
IBB Monitor Feodor Brazhnikov from Irkusk

The IBB also has a fine network of monitors in the former Soviet Union, stretching from Vladivostok to Leningrad, Estonia, Latvia and Lithuania in the Baltic to Georgia and Uzbekistan in Central Asia.

These are only a few of IBB's men and women. Each one of these monitors is a very experienced professional radio person, either a technically competent DXer, radio amateur and/or computer expert. They all share one thing in common, and that is a love for their work.

Unlike before the advent of the Internet, all these monitors are interlinked through many internal e-mail lists and form a very close knit family. Every day, Monitoring Chief Bill Whitacre communicates with the monitoring team, coordinating operations and sending information of use to the monitors. These include the latest changes to IBB's frequencies, requests for monitoring from broadcasters, schedules of other broadcasters, information snippets from DX bulletins, newspapers and the Internet.

For their part, TMOs and Technical Monitors keep a stream of information flowing that is of use to other monitors – even DX tips! It is, however, no DX club or weekend radio extravaganza. For the many monitors in the IBB team, it is a virtual home of a family of radio experts from five continents, who have a job to do and believe in doing it better than anyone else. It is a way of life that they (we) are proud of, and a service that is invaluable for the International Broadcasting Bureau.

Radio has been used extensively as an educational medium in developing countries. It has supported educational programs in a wide range of subject areas and in many different countries. This article explains educational radio developments in India.

"Distance Learning" in India

By D. Prabakaran

The educational system in India is being reorganized to changing needs and realities. It has undergone several assessments in order to improve and to become responsive to the challenges of modernization and goals of national development. Educational content/curricula/teaching-learning materials are becoming more functional and less academic, more diversified and less universal, and more operational and less disciplinary.

Educational methodologies are also undergoing substantial changes due to correspondence education, computer-assisted instruction, educational technologies, microteaching, distance learning, informal education, programmed instruction, personalized instruction, radio-vision, systems approach, ungraded schools/units, video-education, work-experience, instructional television and open school education. Radio as an electronic media has been a part of this modern evolution in India, and it still has a vital role in bringing education to areas and individuals with special needs.

Though sometimes overshadowed by television, radio represents a medium capable of reaching a wide geographic audience at a low production cost, with proven educational results. Studies by the U.K. Open University have demonstrated that radio has a greater value for weak students who benefit from radio as a supplementary learning tool. The Agency for International Development has shown that radio is more cost-effective (when compared to results) than textbooks or teacher education.

Radio has the advantage of teaching subjects in which classroom teachers are deficient or untrained. In multigrade classrooms it provides instruction for one group of students while the teacher works with another group. Radio can also bring new or unavailable resources into the classroom. To summarize three main advantages of radio for education: it can improve educational quality and relevance; it can lower educational costs; and it can improve access to educational resources, particularly for disadvantaged groups.

Some of the limitations of radio for education are that interaction is limited; instructor feedback and clarification is generally unavailable; the instruction is uninterruptible and not reviewable; the pace of the lesson is fixed for all students; note-taking is difficult; and time for reflection on the content is minimal. To overcome these drawbacks, preparation, supporting materials, and follow-up exercises are recommended.

The popularity, availability, and low cost of radio make it a convenient and practical medium for use in programs for learning at a distance and is mostly used in combination with other media.

Setting the Radio Scene

The Radio Club of Bombay broadcast the first radio program in India in June 1923. Later, a Broadcasting Service was set up and began broadcasting on an experimental basis in July 1927 from Bombay and Calcutta simultaneously. This was done under an agreement between the Government of India and a private company called the Indian Broadcasting Company Ltd. In the year 1947 (when India became independent), the All India Radio (AIR) network had only six stations, located at Delhi, Bombay, Calcutta, Madras, Lucknow and Tiruchirapalli, with a total complement of 18 transmitters – six on mediumwave and the remaining on shortwave. Radio listening on mediumwave was confined to urban areas.

As against a mere 2,75,000 receiving sets at the time of Independence, now there are about 111 million estimated radio sets in about 105 million households in the country. Presently the broadcast scenario has drastically changed with 198 broadcasting centers, including 74 local radio stations, covering close
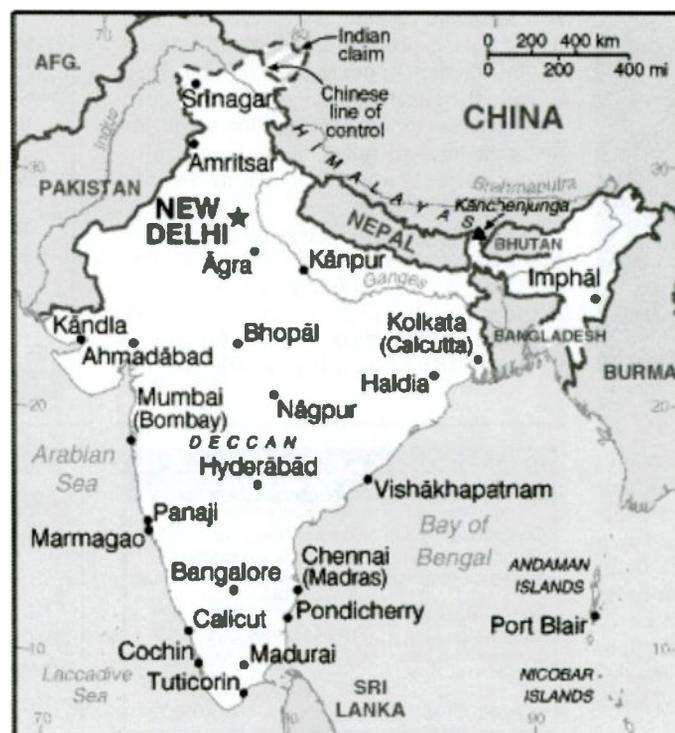
to 100 percent of the country's population and most of the geographical area. (**http://www.air.org.in**). The AIR network broadcasts nearly 2000 program hours every day in 24 languages and 146 dialects.

Trends in Educational Radio

Of late, FM radio has been gaining momentum in the developing countries. Many developed countries, such as the US, have set up specialized FM Radio Stations exclusively for education. The trend is to set up local FM Radio stations, for example, the KQED Education Network Public Radio California; WQED at Pittsburgh since 1921; Connecticut Public Broadcasting Inc. which is the parent company of Connecticut Public Television and Connecticut Public Radio, etc. Radio Cadena enables thousands of Spanish-speaking people in Central Washington State to remain informed about the events around them, and connects them with each other in a radio community.

This movement is now catching up in developing countries, especially in Africa and the South East Asian region. For example, portable, low-cost FM transmitting stations have been developed, and digital radio systems that transmit via satellite and/or cellular are being implemented in many parts of the globe under the COLME project, which includes support for computer-based software systems and networks, radio, and video production models.

Women in a south Indian village monitoring AIR's "women education" programs.

New technologies like Internet streaming audio software technology, wind-up and solar radios have also enabled the global audience to listen to news from around the world. The case of Nepal's Radio Sagarmatha (run by a body of environmental journalists) and the Community Radio Station in Kotmale, Sri Lanka, are used to help villagers to get access to the information superhighway. Also the Bangladesh Coastal NGOs Network for Radio and Communication has attracted the attention of lots of listeners.

Major Educational Radio Projects in India

In India, educational broadcasting is available from 44 stations which originate the programs and 27 auxiliary stations which relay them.

The main projects that describe the growth of educational radio are:

1. School Broadcast Project

This project was commissioned in 1937 and targetted school students. The program started from Delhi, Calcutta, Madras and Bombay. In the beginning, the school programs were not strictly governed by the curriculum. With time and experience, the AIR tried to make its radio broadcasts more curriculum oriented, but in the absence of common syllabi and time tables in schools, even within the same state, it could not succeed.

2. Adult education and community development project (Farm Radio Forum)

One of the most widespread examples of the use of educational radio is known as "Farm Radio Forum." It was started in Canada in 1941 as a radio discussion program and served as a model which was adopted subsequently in a number of developing countries. After ten years, its sponsors, the Canadian Broadcasting Corporation (CBC), the Canadian Federation of Agriculture (CFA), and the Canadian Association for Adult Education (CAAE), invited UNESCO to cooperate in carrying out an evaluation of the program and its effectiveness as an instrument of adult education. The lessons learned from Canada, such as the use of forums, multi-media, printed materials, two-way communication and various production techniques (drama, interview, panel discussion), were then introduced in India early in 1956.

Beginning in 1956, the residents of 144 villages in the vicinity of Poona (in Maharastra state) tried the project, with the help of UNESCO. The "Radio Forums Project" was a great success. The members of the forum could listen to a thirty-minute radio program on some agricultural or community development program, then discuss and decide its possible adoption in their own village. Many action programs were planned and put into practice as a result.

3. Farm and Home Broadcast Project

This project was commenced in 1966 and again targeted farmers and villagers. These broadcasts were designed to provide information and advice on agricultural and allied topics. The aim was to educate the farmers and provide them assistance in adopting innovative practices in their fields as appropriate. The experts also conducted occasional farm radio schools, which proved to be very effective.

4. University Broadcast Project

This project for University students was initiated in 1965, with an aim to expand higher education as widely as possible among the different strata of society. The program consisted of two types: General and Enrichment. The general programs included topics of public interest and enrichment programs supported correspondence education offered by universities in their respective jurisdictions. School of Correspondence studies, University of Delhi, and the Central Institute of English and Foreign Languages, Hyderabad, are well known for preparation and broadcast of their programs through AIR.

5. Language Learning Program

The project, popularly known as "Radio Pilot Project" was started in 1979-80 jointly by AIR and the Department of Education Government of Rajasthan, with an aim to teach Hindi as first language to school-age children in 500 primary schools of Jaipur and Ajmer districts on experimental basis. The project was found useful in improving the vocabulary of children. With its success, a similar project was repeated in the Hoshangabad district of Madhya Pradesh with some modifications but had limited success.

6. IGNOU-AIR Broadcast

In collaboration with Indira Gandhi National Open University (IGNOU), AIR stations of Mumbai, Hyderabad and Shillong started radio broadcasts of IGNOU Programs from January 1992. The main target group of this project were students of Open / Conventional Universities. Shillong no longer participates, so presently it is being broadcast from AIR Mumbai (every Thursday and Saturday from 7:15a.m.-7:45a.m.) on 4840 kHz or 7240 kHz and AIR Hyderabad (every Tuesday, Thursday and Saturday from 6:00a.m.-6:30a.m.) – 7140 kHz only. This program is still popular in the respective regions.

7. IGNOU-AIR Interactive Radio Counseling (IRC)

Started in 1998 for students of Open / Conventional Universities, this project is also very successful. Interactive Radio Counseling is a recent concept in Indian Distance Education. In this scheme various experts at AIR stations provide live counseling across the country. The students, especially those from remote areas, can interact with teachers on the forum and can get their doubts clarified.

With the success of the experiment with AIR Bhopal, the program was extended to eight other AIR stations (Lucknow, Patna, Jaipur, Shimla, Rohtak, Jalandhra, Delhi and Jammu). Presently Interactive Radio counseling is being provided on every Sunday for one hour (4:00 p.m. - 5:00 p.m.) from 186 radio stations of All India Radio. This includes two Sundays on the National hook-up. The toll-free telephone facility is available from 80 cities (effective from February 2001) enabling the learners to interact with experts and seek clarification without paying for their telephone calls.

The first and third Sundays of the month, AIR stations of Delhi (Hindi) and Kolkata (in English) broadcast from national hook-up, and 186 radio stations relay either of them. The 2nd and 4th Sunday are slotted for programs of various regional centers of IGNOU and State Open universities respectively. The slot of 5th Sunday (if any) has also been given to region-based programs of IGNOU.

8. Gyan-Vani (Educational FM Radio Channel of India)

This project was launched in 2001 and again the target group is students of Open / Conventional Universities. The Indira Gandhi National Open University (IGNOU) has in recent times taken a giant step in the area of distance education. IGNOU is the country's most important national-level open university that conducts distance education pro-

grams, mostly via post.

Gyan Vani (Gyan = Knowledge, Vani = aerial broadcasting) is the Educational FM Radio Channel of India, a unique decentralized concept of extending mass media for education and empowerment, suited to the educational needs of the local community. Each station will have range of about 60-km radius, covering the entire city or town plus the surrounding environs with extensive access. Gyan Vani stations will operate as media coop-

Student presenters starting their careers while they are young through Gyan-Vani.

eratives, with day-to-day programs contributed by different Educational Institutions, NGO's and national level institutions.

Gyan Vani's main intention is to take education to the doorsteps of the people. In addition to basic education, it will also deal with awareness programs including those for local administrators, women's empowerment, consumer rights, human rights, health education, science education, vocational and teacher education, education for the handicapped or impoverished, education for the tribals and so on.

The content for broadcast is currently a hodgepodge of what is available (for free), and what a variety of educational institutions around the country can rustle up. In Bangalore several universities and institutes are providing the educational component. The community component is engendered by the NGO VOICES, which has in the past produced community radio programs on All India Radio. Similar arrangements provide educational and cultural programs for the station in Allahabad.

Presently Gyan Vani stations broadcast eight hours a day, 6 a.m. to 10 a.m. and 6 p.m. – four hours of original programming, which is then repeated. One hour is reserved for interactive phone-in counseling by IGNOU. IGNOU contributes one hour from its audio library of 700 programs. One hour is reserved for music related education, and one hour is now contributed by local organizations. Programs for competitive exams are being mounted. Career counseling is undertaken daily. The broadcasts will go up to 16 hours, when more local programs are available.

Presently these stations function using a temporary antenna. The transmitters are collocated with AIR stations. Local steering committees have been

Indian supreme court Judges Sawant and Mohan declared the airwaves as public property in a landmark judgment in the 'Ministry of Information and Broadcasting v/s Cricket Association of Bengal' writ petition -

"————Broadcasting is a means of communication and, therefore, a medium of speech and expression. Hence in a democratic polity, neither any private individual, institution or organisation nor any Government or Government organisation can claim exclusive right over it. Our Constitution also forbids monopoly either in the print, or electronic media.————"

formed and each station will be manned by contract staffs or students, one will be a station manager who is a superannuated broadcaster. He is responsible for ensuring Broadcast code compliance.

Gyan Vani is not only for the conventional educational system but also a primary tool to make the dream of education for all a reality. Gyan Vani's main intention is to take education to the doorsteps of the people.

Gyan Vani is becoming popular due to the mixture of programs aired on it. It's not just a drab list of boring lectures but a judicious mix of educational, cultural and musical programs to lift up the mood of the listener as well as fulfilling his or her educational needs.

Besides, one of the unique selling propositions of the programs on Gyan Vani is the interactive session where a student sitting anywhere in the country can ask questions of experts, who participate in the programs. Thus, a student is able to talk to an expert on education in a chosen field and get guidance

from him or her, at no cost whatsoever. At present, the course material of IGNOU and various other institutions is disseminated through these channels. The main advantage of these channels is that students just have to tune in to their FM or television sets and the course modules are within their reach – free of cost.

9. Radio-Vision (Multimedia through Digital Radio)

Pioneered by the BBC, the technique of radio-vision allows the subject matter to be presented through two channels – the audio and the visual. The visuals are presented in the form of still filmstrips, charts, slides, models, etc, while the explanation is given through recorded narration. Educational institutions use this as a substitute for educational television. Radio-vision has its own advantages:

- It is economical
- It can cater to different categories of learners
- It is easy to produce such programs at the institutional level or at the learning centers
- It provides visual support to the concept that is taught.

A small experiment in the use of the radio-vision technique was carried out by The National Council of Education Training and Research, India, in 1975-76 using it as one of the components of the multi-media package for in service teacher training program. A series of charts and picture cards were presented to about 24,000 participating teachers in 2,400 centers along with verbal explanation provided through specially prepared radio broadcasts. The results were found to be encouraging.

A pilot project was carried out in IGNOU in 2001 under UNESCO support for testing the feasibility of using the new digital technology for cost effective transmission of audio-visual courseware. The project proved that FM Radio transmitters and Satellite Radio transponders can be used successfully to transmit, downlink and download multimedia courseware, in this case using the Asia Star of WorldSpace Satellite radio.

10. Radio-text

Radio has been used simultaneously with textual data transfer via computer networks to create a "radio-text" environment. The teaching end is normally an FM radio station having data broadcast facility through a computer network. The main points of the radio broadcast are sent in textual mode to the receiving end via the network.

The learning end has a radio as well as a computer screen to receive the text. Since both audio and text are broadcast simultaneously, the learner at the receiving end gets high quality and low cost teaching.

An experiment using radio-text at Yashwant Rao Chavan Maharashtra Open University, Nasik, India, was rated a success by more than 80 percent of the students. It also used for peer group discussion at the receiving end after the broadcast, which indicates radio-text could be used for varieties of objectives (Chaudhary, 1996).

11. Low power FM radio for educational institutes

Recently the Indian Government has allowed well-established educational institutions and organizations recognized by the Central or State Government to set up their own low power FM radio stations. These will include the universities and institutes of technology/management and residential schools and universities across the country. These stations will beginning airing at the end of 2003.

Licenses will be granted for FM transmitters of 50 Watts or less, and will be issued in the shared frequency band from 87.5 to 100 MHz. However, in the event of frequencies not being available in this band, the exclusive broadcast band of 104 to 108 MHz may also be considered, as in case of private FM broadcasters. The frequency band from 100 to 104 MHz, earmarked exclusively for the use of AIR, may not be used.

The decision has been welcomed by many universities previously unable to get licenses. The government will not charge any license fees for the new radio stations which will be created at a time when India is opening up radio frequencies for the private sector. Radio broadcasting in India began in 1927 – but it is now seen to be time for the country's university students to tune into something closer to their hearts.

The university stations will be amongst a number of FM radio stations which are soon going to be launched with educational and entertainment programs. The Indian Information and Broadcasting Minister, Sushma

Swaraj, said all universities, Indian Institute of Management, Indian Institute of Technology and residential schools would be granted permission.

AIR will offer total turnkey solution to these institutes by providing transmitters, transmission towers, antenna, cable, playback facility and helping them get licenses. The institutes will of course have to shell out some amount for the facility. To popularize the concept in India, AIR is planning seminars and exhibitions over the next few months.

12. Used medium wave and tropical band SW transmitters for education and community radio

Old transmitters belonging to All India Radio (AIR) are being turned into money makers. With the state broadcaster on a phase-out drive, as far as mediumwave and shortwave are concerned, time on the old AM transmitters is up for rent. The idea to turn old transmitters into a source of revenue struck AIR when advised by the government to phase out and hand over shortwave and mediumwave transmitters to education and community broadcasters and focus on FM instead.

Although the educational-community radio program was launched with much fanfare a few months ago, it has yet to pick up in a big way. Instead, many organizations are seeking a wider area coverage than what is being offered under the community radio scheme. And this is where old mediumwave and shortwave transmitters can come in handy.

In the first case, it was decided to give 8-10 hours of airtime on a mediumwave transmitter to a Hyderabad-based institute (National Institute of Agricultural Extension Management) for one year. More MW stations are likely to follow. While the operations at the stations would be handled by AIR, content will be provided by the organization taking time on the mediumwave transmitter.

AIR Resources (a division of AIR) had already entered into a pact with private FM operators for co-locating their transmitters on the AIR towers in Delhi, Chennai and Kolkata. While that has been a good source of revenue for AIR Resources, the arrangement to rent out time on old mediumwave and tropical band shortwave transmitters will add to the pot. Out of the 39 mediumwave stations, only 11 are left. The remaining have been shifted to FM.

13. Distance Education Through WorldSpace - under development

Broadly defined, distance education is the communication between teachers and students who are physically separated and must rely on technology to facilitate the educational process. The common delivery systems include print, voice, video and data. The technologies for transmitting distance education include broadcast TV, broadband cable, terrestrial links, satellite, CD-ROM interactive discs and the Internet. Given that definition, one criterion for distance education systems is obvious: technologies must reach students

who cannot or would not be able to physically access a classroom.

The WorldSpace System meets the requirements of providing distance education to vast stretches of the developing world, the very areas that face the greatest need. Because the system employs digital transmission,

School students learning with Worldspace Direct Media

it can deliver information in the form of audio, text, images and even streaming video. WorldSpace Radio employs satellite technologies to reach a geographic area (or footprint) of 14 million square kilometers. All users within this area can receive digital sound and digital data with a 10 cm wide satellite antenna.

WorldSpace offers Direct Media Service (DMS) which can deliver huge amounts of web-enabled data to a user's PC directly from satellite. The user's PC is connected to a WorldSpace digital receiver coupled with a PC Adapter or is provided with a PC Receiver Card. Data is loaded directly into the hard drive of the user's Pentium-class PC, without the need for a telephone line or connection to an Internet Service Provider. DMS is a one-way broadcast system and is not an interactive Internet system.

DMS supplements traditional Internet services by offering gigabytes of popular, educational and informative web-style content without "per-minute" telephone line charges. It is like getting a CD-ROM filled with web content delivered right to your PC every day. The download rate can be as high as 128 kbps and, since it's automatic, may take place while the user is at work or otherwise engaged. Access to cached content, therefore, seems virtually instantaneous, like a high-speed connection or a CD-ROM.

Because reception terminals are small, easy to use, and inexpensive, it should be practical and economic to distribute receivers to a considerable number of people. No, this is not a dream. All these possibilities could soon be a commercial reality with the WorldSpace CLASS (Combined Live Audio and Slide Show) initiative. WorldSpace France with the support of an Indian software company, Sankya, is developing a prototype instruction tool that has already been successfully tested and demonstrated in Delhi, Nairobi and Johannesburg. The listener benefits from *real time* audio and simultaneously has full access to the slides as well as the speaker's annotations. The CLASS approach combines the advantages of Instructor-led Learning with the visual effects of the slides. Best of all, this approach is readily scalable, making it possible to add features as they are needed.

The advantages of transmission over World Space satellite radio are that the transmission is via satellite and therefore its footprint covers all of India. Sound quality is far superior to what is experienced over mediumwave or shortwave transmission.

There is no signal attenuation. Secondly, text and images also can be uploaded and downloaded as the transmission is digital. Particularly, Internet content can be downloaded offline. This cannot be done on AM or FM Radio.

14. Radio for Schools Movement

"Radio for Schools," launched in select schools in Delhi and Bombay by some non-government organizations like "media arc," give the students basic familiarity with broadcasting, and, more importantly, put them in the drivers seat by way of editorial leadership for a series of radio programs. This movement uses local AIR MW stations.

Depending on the response, the movement will be extended to other Indian metros and capitals of neighboring South Asian countries. The facilitators conduct broadcast workshops in schools to give the students basic orientation to radio and help them feel comfortable with *"Radio for Schools" movement in a school in New Delhi* equipment and studios and encourage them to unleash their creative energies. The professionals, after giving the students lectures and demos, play assistant producers to the student "bosses."

15. The Satellite Instructional Television Experiment in India

The Satellite Instructional Television Experiment in India (SITE) was the result of an agreement signed in 1969 between India's Department of Atomic Energy and the National Aeronautics and Space Administration (NASA) of the United States. This experiment provided India an opportunity to stimulate national development and gain experience in satellite broadcasting. The primary objectives are to demonstrate how satellite technology can be used for mass communications, undertake instruction in the fields of family planning, agriculture, national integration, education, teacher training, etc. SITE developed and transmitted various programs, such as a series on science for children, and a series on cottage industries aimed particularly at landless laborers. Science programs for schools formed an important dimension of SITE activity. Altogether 150 science education programs for schools, each of 10-12 minutes' duration, were broadcasted.

ATS-6, a powerful satellite sent into space by the United States, was used for the SITE program. The satellite was capable of receiving signals from earth transmitters and broadcasting directly to antennae located in remote villages. These 3m antennae were part of earth stations that fed signals from the satellite to large television sets in schools across a large geographical area.

In addition to the satellite television, which served as a dominant technology, printed materials were also used to a moderate extent. As with most broadcasts and communication channels, the delivery configura-

tion was mostly point-to-multipoint, with a very limited point-to-point and face-to-face support.

16. Indian National Satellite Project (INSAT)

The INSAT series of satellites were a landmark in the history of Indian Educational technology. Educational Television broadcasts were inaugurated through the INSAT series of satellites on 15th August 1982 in Orissa and Andhra Pradesh. Today INSAT covers the whole country. One of the stated objectives of the INSAT scheme was to bring the rural population into the national mainstream. The topics covered include most of the areas of interest to these populations.

Like Gyan Vani, The Gyan Darshan educational television channel is a collaborative effort with IGNOU. The Electronic Media Production Centre (EMPC) is the coordinating and transmitting agency for the programs. Regular transmission of programs from EMPC started on January10, 2000. Cable operators are being encouraged to make available the programs of Gyan Darshan to all their customers to ensure a countrywide reach. Currently Gyan Darshan is available for viewing both in India and abroad.

Community Airwaves Still Blocked

The airwaves in India so far are under the central government's control. The right to manage and regulate airwaves is solely the responsibility of Government of India. The airwaves so far have not been opened to the public. Non-profit and development organizations have been lobbying for more than five years to get permission to broadcast information that could help the "information poor" to get an understanding of issues critical to their lives.

Recently, neighboring countries like Nepal and Sri Lanka edged past India by allowing non-profit community radios to be set up. Asian countries like the Philippines have already shown the beneficial impact of such locally-managed, non-profit initiatives taken up by citizens themselves. Some universities and NGOs have applied for licenses to run low-powered radio stations with a range of few kilometers, for educational or development purposes. These include Shantiniketan, Deccan Development Society, VOICES, National Law School of India, etc. Only government-owned universities like IGNOU have been granted the license so far.

India is one of the few democracies in the world to disallow community radio, in which local communities own and operate radio stations. When the government decided in 1999 to open up FM radio to the private sector, it chose not to open up frequencies for the community to use. Privately, officials cited nervousness about it falling into the wrong hands (i.e., militants and terrorists). Though it has opened up its radio airwaves to the commercial sector, but a democratization of the airwaves still hasn't reached the grass roots level.

The government argues that AIR's low-powered stations in semi-rural areas could offer one-hour time slots to panchayats [village administration] or bonafide representatives of the communities. Of course, it is difficult to ascertain which non-profit or voluntary organization is a true representative of the community. Also the government fears that the medium could be hijacked by separatist groups in the country (in Kashmir and in the Northeast, for instance) for propaganda.

In a country like India where most people are literate or semi-literate, community radio *could* play a key role. Very poor people can, at best, afford only one electronic device, like the simple radio which could cost as little as $2 in India. Low-powered transmitters for FM are available for less than $200, but the Indian government does not allow their use for broadcasting. Non-profit organizations were hoping that they, too, would benefit from the opening up of radio in India. But the benefits went largely to the commercial sector.

Conclusion

Although many viewers are using television or internet for education, news and entertainment, radio as an educational tool has not been abandoned. Various agencies at the level of conventional and distance universities are making use of radio for broadcasting for their educational content as a cheap, local, supplementary alternative. The above-described educational radio projects indicate that radio can be an effective medium in extending quality education and training to those in need of it.

Radio is a very powerful technology that can allow information to reach large sectors of the population quickly and economically. Yet, due to national broadcast regulations in countries like India, this potential could not be fully realized in the past. Neither did community radio stations develop as they should have. In addition, the cost of transmitters, infrastructure, and equipment, has placed most potential community broadcasters at a disadvantage, especially those in remote rural areas. Despite significant government efforts to initiate eduational radio, the rural corners of India – where even national broadcasters may be heard with a weak or non-existent signal – still experience a distinct information gap.

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My New Old Hallicrafters S-38C

By Brian Rogers

My pulse and breathing quickened when I walked into Jerry's garage. I was still dealing with his sudden death the week before and felt like I was trespassing.

"Help yourself to anything you want," his widow said.

I was looking for musical instruments. Jerry and I had played together in bands for several years, and he was one of the best trombone and euphonium players I've known. He repaired and sold instruments, too, and had quite a collection. His weekends were filled with trips to garage sales and flea markets to search for fixable clarinets, French horns or saxophones.

I took a clarinet out of its case and began popping keys down to make sure they covered what was supposed to be covered, when something on a shelf across the garage caught my eye and held it as if in a vise.

There, looking as it might have looked half a century before, was a Hallicrafters S-38C shortwave receiver exactly like the one I'd bought as a high school student in 1953 and regretfully sold three years later to finance a college prom date.

It could have been the same radio.

I wrote about the first Hallicrafters radio in an article headed "My First Radio" that appeared in the September 1999 *Monitoring Times*. Finding a photograph of that radio when we were cleaning out my mother's house prior to sale had unleashed a torrent of pleasant memories that found their way to paper.

Jerry once told me he owned a shortwave receiver, but he couldn't remember the manufacturer or model number.

"Pat," I shrieked to Jerry's widow, "how much do want for that radio?" She jumped when I hollered her name, but I was so eager to take the receiver down and hold it and look at it, I ignored her startled reaction.

"I don't know," she said, gradually calming after my yelling, "give me whatever you think it's worth."

The prospect of again owning a Hallicrafters radio identical to the one I'd parted with 45 years earlier stimulated generosity I've felt only rarely, and I gave her a fair price plus more.

I tried to return to looking at clarinets and trumpets, but the effort was hopeless. I had to get my new/old radio home and give it a place of honor on my desk alongside my other shortwave receiver, a Drake SW8.

My shack is in the basement, and my only antenna is a piece of insulated wire running the length of the ceiling, about 30 feet. I'd had the wire connected to the Drake, but quickly switched it to the back of the S-38C.

All the articles I've read about finding old radios say resist the temptation to plug them in and turn them on until you're sure of their conditions, but at that moment I didn't remember reading any of them. Besides, Pat had said Jerry listened to the radio several times a week.

What a thrill to again hear the click of the on/off switch of a tube-type shortwave radio and feel its mass! Just like my first S-38C, the dial light flared when I turned the switch, then faded while the set warmed up.

The tubes began glowing as I sniffed the air and looked for smoke wafting up from under the chassis. But there was no smoke, just a brighter orange glow from the tubes.

I made sure the "speaker/phones" switch was set to "speaker" and slowly rotated the volume control clockwise.

Recalling how I'd operated my first Hallicrafters set, I put the "bandspread" dial in its mid-range and tuned across the 31 meter international broadcasting band. My excitement grew as I discovered the band was alive with signals. My new old radio worked!

But through my excitement, I realized a major limitation of old tube sets: I didn't know the frequencies on which the signals were being received.

Without the digital frequency readout found on most good shortwave receivers built in the last 20 years, the listener can only make an educated guess regarding the frequency to which his or her radio is tuned.

It was around 9:00 pm local time (0100 UTC) when I heard the familiar "0, Canada" tuning signal of Radio Canada International. My RCI schedule told me the station had an English language transmission to North America then on 9,755 kHz. But the schedule, not the radio, told me the frequency.

I recalled how I used to report the frequencies on which I heard stations operating when I wrote for their QSL verification cards. When I listed the date, time in UTC, frequency, reception details, program details, and equipment necessary for a verification, I gave the source of the frequency in my report if I could.

Sometimes I just told the station I had heard them in the 31 meter band, or the 25 meter band, or whatever the band was. But, if possible, I would write that the frequency I was reporting had been found in their printed schedule, a club bulletin, a magazine article, or another source.

Today, reporting a frequency as found in the "Shortwave Guide" section of *Monitoring Times* would be an excellent source for those using old radios.

I love having another Hallicrafters S-38C and I've promised myself I'll never sell it to pay for a prom date or any other reason. The thrill of turning it on and watching its tubes warm glow is renewed every day.

But, as much fun as it is, its use is confined to listening to stations strong at my location near Detroit, broadcasters such as Radio Nederland and Deutsche Welle in the evening, Radio Canada International in both morning and evening, and Radio Australia in the morning. Trying to dig weak stations out of interference and determine their frequencies is simply too cumbersome on the Hallicrafters set when compared to modern ones.

I've started prowling the garage sale circuit and checking local classified ads for other Hallicrafters sets. There are three books available from *Monitoring Times* advertiser Universal Radio and other sources that have contributed greatly to my knowledge of the value and rarity of old communications receivers, along with their histories and where along the continuum of shortwave lore they left their marks.

They are "Shortwave Receivers Past and Present," by Fred Osterman; "Communications Receivers/ the Vacuum Tube Era: 1932-1981," by Raymond S. Moore; and "Radios by Hallicrafters," by Chuck Dachis.

While some material overlaps between the volumes each is unique in some way. For example, the Moore book begins with an excellent history of the tube-type communications receiver era.

Now that I own another S-38C, I hope that I can add to my collection of old radios.

But I'll keep a modern one with digital frequency readout around for digging out those weak and rare DX stations.

The Hallicrafters S-38C sits in a place of honor now that it has been recovered.

The author's basement monitoring post and recreation room.

Avenue-of-States, Budweiser-Hitch, Flag In Parade, and Fair-Mascot "BiggieE"

On Scene at the "Big E"

By Ken Windyka

The "Big E," Eastern States Exposition in West Springfield, Massachusetts, is held annually in mid-September for a 17 day period. It is one of the oldest and largest fairs in the United States. Last year more than 1,165,000 visitors came though the gates. The exposition offers a wide range of activities for every age group's enjoyment, including amusement rides, agriculture exhibits and competitions, arts/crafts exhibits, competition and sales; musical entertainment encompassing rock, pop, R&B, '50/'60s, and country; circus; dare devil driving, 19th century museum; a daily 'Marti Gras' parade; and consumer "gadgets" information, demonstrations, and sales.

Additionally, ach of the six New England states has a separate building with information/exhibits pertaining to tourism, public safety, and cuisine specific to that state. Furthermore, many nonprofit volunteer community service organizations such as Amateur Radio, Coast Guard Auxiliary, 4-H, Scouts, emergency medical, Red Cross, etc. also have separate buildings for their informational exhibits and potential recruitment of members/donors.

"On Scene" radio communications monitoring, as well as family radio/personal communications, can be a challenge because of the sheer number of events, radio systems, and people attending this event. I would classify radio communications into four distinct areas: internal administration and security, public safety support and operations, vendors, and personal communications.

Internal Administration, Operations, and Security

The following systems support the "within the fence/gate" operations:
Security and Parking Control Primary: 152.90 Repeater

Security and Parking Control, simplex secondary: 154.60
Administration, Maintenance, and Operations Primary: 462.70 Repeater
Administration, Maintenance and Operations alternate/phone patch: 461.8125

There are approximately 100 portable units being utilized, and radio discipline is strictly maintained. Since there are about 35 buildings within the exhibition grounds, lengthy communications are usually transferred to a landline telephone extension within the buildings the communicators are located in. Key operations/management personnel also have cellular telephones.

Public Safety Support and Operations

The sheer magnitude of vehicle traffic and people requires a well-coordinated effort by local and state law enforcement. West Springfield and Massachusetts State Police, West Springfield fire department, and emergency medical all have facilities within the Big E grounds. Uniformed officers are stationed at all entry parking/exhibition entry gates and engage in roving

Connecticut State Police Officer with K9

patrols. Also, undercover/plain clothes teams utilize primarily cell phones with radio backup. Additionally, other communities nearby are affected by the exhibition and influx of visitors.

Maine State Police Cruiser 1940's

Local Law Enforcement and Major Roadways
West Springfield Police Repeater/Simplex: 867.7875
Massachusetts State Police Troop B simplex: 42.46, 42.50
Massachusetts State Police Troop B Trunking System (Type II Motorola): 852.2625, 857/858/859/860.7875
Massachusetts State Police Troop E (MA Turnpike Interstate Route 90): 42.42 (simplex), 159.225 Repeater
Massachusetts State Police, simplex (mobiles/portables): 868.9375, 868.95, 868.9625, 868.9875
Law Enforcement Area Coordination Nets: 155.475, 460.225, 858.7375
Local and State Law Enforcement ITAC (simplex): 866/867/868.0125, 866/867.5125

Fire Department and Emergency Medical Services
West Springfield Fire Department Dispatch: 866.475R

Connecticut State Police Dive Team

W. Springfield Fire Department Emergency Medical Response

West Springfield Fire Department fire ground: 866.675
Area Fire Coordination Net: 154.28
Area Fire Coordination Net (repeats 154.280): 453.4125
Emergency Medical Disaster Coordination: 155.28
Ambulance to Hospital direct/phone patch: 155.34
Local private ambulance service/paramedic backup support: 159.4125
Ambulance Emergency Medical Calling/coordination (MED 3): 463.075
Ambulance Phone Patch to Area Hospitals (MED 1): 463.000
Ambulance Phone Patch to Area Hospitals/Paramedic supervisors coordination (MED5): 463.100
Ambulance Phone Patch to Area Hospitals (MED 6): 463.125
Other Medical Emergency Frequencies: 463.025, 436.05, 463.15, 463.175

Other Adjacent Communities
Agawam Massachusetts
Police dispatch: 154.0925 Repeater
Police secondary 153.98 Repeater
Fire Dept Dispatch: 151.055 Repeater

Springfield Massachusetts
Police Dispatch: 460.10

Connecticut State Police Dive Team

Massachusetts State Police Cruiser
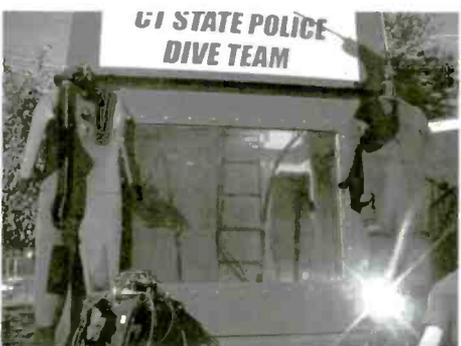
Rhode Island State Police Cruiser

Police Records checks: 460.45
Police (various uses) repeater/simplex: 460.0375, 460.1625, 460.30, 460.3375, 460.3625, 460.3875, 460.50, 460.975
Fire Dept Dispatch: 154.175 Repeater, 154.40 Repeater
Fire Dept fire ground: 153.80, 153.83

Aeronautical Coordination
Westover ARB Tower/CTAF: 134.85/348.4
Barnes MAP/ANGB Tower/CTAF: 118.9/251.1
Bradley International Airport Approach/Departure Control: 125.35/325.8
Air to Air "On Scene": 123.05, 123.45

Transportation and Utilities Support
Peter Pan Bus Lines (shuttle service from outlying parking areas): 452.725
Northeast Utilities/Western Mass Electric Dispatch: 47.98
Bay State Gas Dispatch: 159.855 Repeater

Vendors/Exhibitors/Peformers Support Communications
With over 700 exhibitors, amusement ride operators, and performers, there is great potential for intermittent radio communications, such as wireless microphones, low power business

Volunteers Husband and Wife Team, Emergency Medical Savoy (MA) Fire Dept

band VHF/UHF portable usage, Coast Guard Auxiliary, Civil Air Patrol, and amateur radio repeaters/simplex. Please refer to past editions of *Monitoring Times, especially* "'Scanning Report," "Who's Who in the Spectrum (9 parts)" and "Fed File" for hints on what frequency ranges to search for action.

Family and Personal Communications
All major cellular/wireless carriers have a presence in the Springfield Massachusetts area, but you should expect to experience a busy signal at times when attempting to use your cell phone. Another option is to bring your Family Radio Service portables. Your range will vary on the fair grounds depending upon your location inside an exhibition building or outside. There appeared to be quite a few people using FRS and GMRS simplex frequencies (in most instances without any CTCSS or DCS enabled), especially FRS channel #1.

Charlie Belknap's Hollywood Stunt Show – stunt truck

Conclusion
This year's "Big E" will be held September 12th through September 28, 2003. Additional information can be found at the official website: http://www.thebige.com . I've attended this event almost every year for the past twelve years and am amazed at the information that can be obtained (plenty of "take home" brochures/information) as well as the excitement of monitoring.

I use an ICOM R2 wideband portable scanner/receiver, with a Comet SMA 501 "short stub" antenna (see photo). The new ICOM R5 available from Grove would be another excellent choice. I also use a Motorola Talkabout T6400 GMRS/FRS portable (can instantly find CTCSS in use as well as scan all FRS/GMRS frequencies). I highly recommend visitors plan to arrive at the vehicle parking area by 8:30 a.m. any day to ensure on site parking and easy return to your vehicle with all those informational brochures!
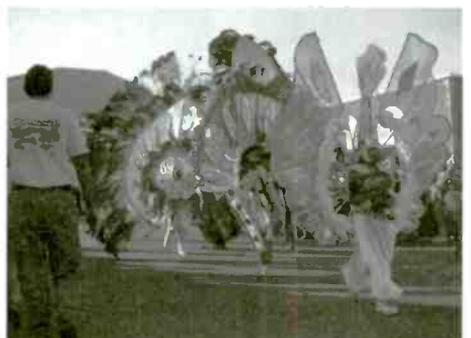
Colorful Costumes

The Learning Channel "Studies" Area 51

By Bob Grove

Bleak Beauty: A imposing mountain range near our camp adds to Area 51's securi

In June I was invited by producers of The Learning Channel's "Mysterious Places" to serve as a technical resource and on-air guest for the production of a special investigation of an intriguing scientific complex in Nevada popularly known as "Area 51." Of course I went: How could I say no?

Our crew met in Las Vegas and set out the next morning for Rachel, Nevada, a tiny population explosion of 98 in the middle of the desert, some 200 miles north of the big city. It was originally an old mining town named for the first child born there. (I wonder what they called it before she was born?)

I brought a variety of test equipment – a Geiger counter, Bearcat scanner, WiNRADiO notebook-computer-hosted receiver, AVCOM spectrum analyzer, an infrared detector, two-way communications equipment – just about anything to detect physical phenomena that we might encounter on this fact-finding expedition. And for intercommunication between our field parties, I brought Midland FRS transceivers for the car caravan and ICOM radios for longer links.

It's in Rachel where you can get any of a wide variety of cute, if over-priced, extraterrestrial souvenirs at the Little A-Le-Inn, and talk to residents who will fill your ears with eerie stories – sort of dinner theater over hamburgers.

This is the border-town home of super-secret Area 51, also known colloquially as Groom Lake, the Skunk Works, Dreamland, and perhaps more historically accurate, a section of Nellis Air Force Base near the old nuclear flats of the Nevada Test Site where the U-2 spy plane was developed.

Leaving the Little A-Lee-Inn, we settled down for the night in the sands along a lonely desert road just outside of the restricted area. We couldn't see beyond the intervening mountain ridge, but we knew we would be able to hear activity if it should occur.

Another team selected a more ambitious venue – a mountain climb that would provide a lookout point where they could mount a telescope to get a better view inside the restricted area. It was a long, steep climb but, as we were to learn later, well worth their trouble.

Keeping a Sharp Lookout

The first night I found out that despite the summer-solstice daytime heat, the temperatures plummeted as soon as the sun set. Even protected by a tent, I could only stay warm by sleeping fully clothed, wearing an additional jacket, wrapped with yet a blanket and an opened down jacket on top of that.

Although the skies were clear, revealing a spectacular stellar light show, the winds began to gust; at several points my sleep was interrupted by my tent walls flapping so violently, I imagined that I was about to depart as an ultra-lite!

We worked in shifts around the clock, rarely getting more than two to three hours of sleep.

The crew readies for the morning shoot.

We saw some non-descript lights – perhaps distant car lights from the sparse residents, or even security patrols – but no suspect activity, and no radio traffic on the military and government frequencies variously reported.

The following morning at 7:30, a little forlorn by the quiet, and daunted by the sheer logistics of trying to see, hear, or even experience – who knew what – we began to pack up our gear to leave. I was narrating the scene of silence on-camera when suddenly the heavens exploded, and we were rocked by a thunderous sonic boom! We heard, but could not see, what had soared at lightning speed over our heads in the blinding morning sun. It wasn't until later that we discovered the identity of our invader.

Our radios came alive with communications from military traffic and base security. Apparently an aerial test was being readied and the pilots were getting anxious – one pilot teased control operators by feigning rapid breathing into his open mike. About a dozen radio frequencies – some that had never been previously reported – barked commands for aircraft, ground control, security posts, range controllers, and others involved in the exercise.

Still monitoring our quarry, we re-formed the caravan and moved to a new location for the early-morning video-taping session. As we drove toward our target, we were passed by a phantom bus with dark windows which proceeded into the restricted area with its cargo of technical personnel. Our camera crew taped the passage of the bus which left us in a dense cloud of desert dust.

Access Denied

As we approached the main gate of the restricted perimeter of Area 51, we were halted by an obvious barrier: red signs informing us of what would happen to us if we went past that point. Lethal force is authorized here.

An array of video cameras watched our approach as pulsed signals from unseen sensors were heard on our surveillance gear. An armed security guard, motionless in his nearby pursuit vehicle, studied our moves, ready to give chase if we chose to challenge base sovereignty. This was not a friendly place.

We chose to obey. We also chose to videotape the area, the signs warning "Photography of This Area Prohibited," the video surveillance cameras with their remote-link antennas – and our silent sentry. We also chose not to wave at him as we left.

At lunchtime we met up with our dusty, sweaty, and obviously tired hiking party. But our noisy, overhead intruder was finally identified: "Did you see that Russian MIG fighter race across the sky?" our wide-eyed aircraft expert asked. "Was that at about 7:30 a.m.?" I responded. They all nodded emphatically as I continued, "It nearly knocked us off our feet!" Now we all knew what caused the sonic boom, and what the radio comms were all about.

Although we were weary, and we hadn't discovered the justification for such intense security inside the perimeter, we did learn first-hand that Area 51 is still very much alive,

Warnings about crossing the line left no doubts.

and that whatever goes on in there is protected under a heavily-enforced cloak of secrecy.

Perhaps another trip?

Field Day Fun and More Beginner's Questions

A mateur radio Field Day can be boiled down to one word: Murphy. Field Day is supposed to be a preparedness drill involving ham radio operators and their ability to put a functioning two-way station on the air and make contacts throughout the two day event. For me it usually becomes a graphic illustration of Murphy's Law, in which anything that can go wrong, will.

Some readers may recall this column exactly one year ago in which I issued a terse statement about Field Day not going well and that I would try again next year. Well, this past June was next year and I'm happy to report that things did go better. Just barely.

◆ Preparing for Preparedness

The spirit of Field Day supposes that some event or other may someday make it so that you have to put your ham station on the air without benefit of permanently placed antennas, commercial power, or air conditioning. I say AC because, arriving as it does at the end of June, Field Day generally finds all but the northernmost reaches of this country in the grips of a heatwave, experiencing a line of severe thunderstorms, or suffering infestations of flying, biting insects, the only known salve of which is to sit indoors watching baseball and having an ice cold beer.

The truth is that many amateur radio clubs have Field Day (FD, as it's fondly known by many hams) down to the slick workings of a NASCAR pit crew. With carefully chosen committees of highly skilled individuals these clubs can turn a vacant lot into what looks like a *Star Trek* set in minutes. Erecting circus-sized tents, firing up 5 kW diesel powered generators and manuevering 100-ft crane trucks into place with 6 element 5 band antennas attached is for them the work of an hour. Cooking on gas-fired grills big enough to roast half a pig, part-time ham chefs (no pun intended) keep the cholesterol rolling for these hungry operators. Then, of course, there's the walk-in refrigerator stocked with cases of foreign and domestic beers (you didn't think the 5 kW was strictly for the radios did you?).

As usual, my own experience was considerably different. Unlike last year's fiasco involving dead batteries and operator error, I felt completely prepared. I had contacted my FD friend Bill McCoy, KE4JSU, to participate and we spent a month mapping out our strategy via e-mail. Just days before Field Day, disaster struck. Unexpected houseguests were to spend the week-

end and Bill found out he would be required at his house to help with an ailing family member.

Into the Field!

FD was to start officially at 1800 Z on Saturday June 28. By that time our guests had not arrived and by 1830 I decided to give FD a try. Scrambling around the house, I rounded up the HF transciever, the antenna tuner, a 2 meter HT, a handheld scanner, a length of rope, a couple hundred feet of alumninum electric fence wire, code key, the trusty (and completely charged) tractor battery, the solar panel charger, an aluminum ground rod, a couple of hand tools, the log book and the FD 2003 rules which I had printed off the ARRL web site.

All these items were loaded into a large cooler (leaving no room for beer!) and tossed into a wheelbarrow along with a folding director's chair. I headed out to the back of the property to a cleared, secluded and (most important) shady spot with just enough sun to fire the solar panel. Luck was with me. The wheelbarrow tire did not go flat. Braving the swarming mayflies, trying to avoid the prolific poison ivy, wild roses and blackberry canes, hoping not to be the target of the deer ticks and chiggers which own this part of the property, I staggered to my destination intact.

Lacking a better weight, I tied a crescent wrench to one end of the rope and sent it, old-school sling style, up into a big oak. It took 10 tosses before I managed to send the wrench end of the rope across a branch about 45 feet up. I attached an insulator to the other rope end and one end of the aluminum wire to the other end of

A bucolic scene, indeed, Field Day 2003. Transceiver, tuner, battery, solar charger and everything else needed to make contact using a makeshift antenna and non-commercial power supply. (Courtesy: Author)

the insulator. Pulling on the rope sent the end of my "sloper" antenna to 45 feet.

I spooled out the rest of the wire, a hundred feet or so, and attached that end directly to the random wire post on the MFJ Tuner. I placed the ground rod by the radio and had no trouble driving it several feet into the ground which had been saturated by 15" of rain over the previous 6 weeks. Next I attached a length of ground wire from the tuner and the transceiver to the ground post, fastening them with a hose clamp. I attached the solar panel leads to the battery terminals, the tranceiver's power cable to the battery, plugged in the code key and hoped it all worked.

It took me two hours from the time I decided to give FD a try to my first contact on 20 meters with an FD station from Texas halfway across the country. The bands were not in the best shape. With 10 and 15 meters almost totally dead, it sounded as if all the hams in the country were on 20 meters. It was so crowded that at one point I actually worked two stations simultaneously. Neither of the two contacts could hear the other.

Now, it's your turn. If you're a ham and you haven't done FD, start planning! If you're not a ham, you're still welcome to join in. Many stations use FD as a recruiting tool. It's a time to introduce new hams or those interested in being hams to the local amateur radio community. FD rules allow non-licensed people to participate under the direct supervision of a licensed ham. It's a great way to get some real hands-on operating experience, listen to a lot of tall tales from old FD vets, and maybe get in on a free hot dog! Remember, it's always the last full weekend in June.

◆ Beginner's Mailbag

Tom Deal has been an *MT* reader since the *Satellite Times* days when he had a big dish satellite TV system. Now he lives in South Carolina and has a DirecTV system. He wants to know if he'll need a different receiver to be able to get the HDTV channels offered on DirecTV, how many coaxes he'll need and if there's "...any other hardware necessary after one has the proper dish, receiver and TV set to get HDTV..."

One reason that HDTV has been so slow to catch on is that we're currently in one of those awkward periods of technology where new receivers have HDTV compatibility built-in and old ones don't. What you'll need is an HDTV DirecTV receiver such as the Sony HD100 ($850) or equivelant. There are many other

HDTV satellite receivers which will receive DirecTV transmissions which are considerably cheaper but which may not have as many features as the HD100.

You will need the 18" x 24" dish (see photo) which allows the receive to pick up the HDTV signals from the adjacent DirecTV satellite. You won't need any more coax or a new feed horn. If you want to feed up to four separate receivers you can add a second feed horn and run a total of four coax cables to the dish. However, you will need an HDTV TV set and that could be the biggest expense, depending on the size and type screen you want. Better HDTV screens still sell for $3,000; the best sell for twice that.

With price tags that high it really pays to do some investigating. Some of the best HDTV screens are also satellite and terrestrial HDTV tuners as well. But, do you want all three integrated together? And, don't forget the audio. You'll want a separate audio system with at least five speakers and Dolby AC-3 digital decoding.

David Harden, from Atlanta, GA, writes: "...What about the 'big ugly dishes' that used to prevail before DirecTV and the DISH Network?

I live in an area blocked by trees to the south, so satellite reception is nearly impossible, but I'm still interested in somehow being able to watch satellite TV. Is there much left to watch on the C and Ku-bands?" David is also interested in UHF 225-400 MHz satellite reception. He said, "...When I was in Germany in the Air Force, some of our guys would hook a UHF air transceiver to a satellite antenna and picked up communications. I have a UHF air band scanner and would like to find out what kind of antenna I would need for good reception and how to position it."

Yes, there are tons of things to watch on the big dish. It's ironic that with the success of the small dish and the collapse of the big dish industry, viewing options on the big dish have never been greater. With a Motorola 4DTV analog/digital C/Ku-band receiver there are literally hundreds of channels to watch. Most of them are subscription channels, but quite a few are in the clear. With the addition of an MPEGII FTA receiver as described in the June issue, there are hundreds more channels. Keep in mind that it's not only video, but radio channels as well.

Just another "ARISS" Day in Paradise!

Hawaii Radio Hams are fortunate to have an ARISS (Amateur Radio on the International Space Station) Earth station in Honolulu. The station is located at Sacred Hearts Academy, an all-girls school, and is an integral part of the Academy's Science and Math related programs.

Exposure to electronics and Ham Radio communications has motivated over three dozen students to obtain Technician Class Licenses. Many have gone on to study science and engineering at college. During the past decade the radio station at Sacred Hearts has participated in over fifty contacts linking astronauts in space to family, friends, and school children here on Earth.

Radio Hams throughout the state are also afforded (via Hawaii ARISS ISS pass predictions) monitoring opportunities of high passes with just a basic 2 meter HT tuned to the 145.800 MHz downlink frequency. I have demonstrated this to interested non-hams on my Kenwood TH-22AT HT to show that one does not need the Socorro, New Mexico, Deep Space Network Antenna farm to hear the (3 watt!) Space Station transceiver!

Dick Flagg AH6NM and Nancy Rocheleau WH6PN operate the station and mentor students interested in obtaining their amateur licenses. Dick keeps a watchful eye on the proceedings as members of the student team go through an elaborate "pre-contact" checklist beginning an hour before the scheduled contact. Nancy generally handles the Kenwood TS-790 VHF/UHF rig for the 10 minute horizon to horizon contact. The students have practiced manually controlling the azimuth and elevation of the 2 meter M2 circularly polarized antenna, in case of a computer failure.

I was fortunate (yes, even at 3 a.m. HST!)

to be at the station on May 27 as an observer for ISS Astronaut Ed Lu's first ARISS downlink contact which was telebridged to his old alma mater, Klem Road South School in Webster, NY, where the obviously excited students asked him some 13 questions. The contact went off without a hitch other than some power line interference at the end of the pass. The session illustrated the enormous educational and inspirational benefits of the ARISS program to young minds, even at a time when many people are "blase" about space.

Ed is somewhat of a "favored son" here in Hawaii, having completed post-doctoral work at the University of Hawaii's Institute of Astronomy. He was also a wrestling coach at Punahou School. This very personable and communicative astronaut (check out the NASA Human SpaceFlight web site) considers Hawaii his second home and has planned to be married on the lovely isle of Maui when he returns from space. Ed has a selection of local Hawaiian goodies in the ISS such as Kona coffee, dried mango fruit, macadamia nuts and some Hawaiian slack key guitar CDs for entertainment. He obviously loves the Island lifestyle and understandably so.

Kudos are due to Dick Flagg AH6NM (a NASA SAREX/ARISS vet and radio astronomer who runs the Windward Community College Solar and Jupiter Radio Observatory) and Nancy Rocheleau WH6PN (Sacred Hearts Academy science chairperson)) for their long dedication to Hawaii's ARISS program operations.

73 and Aloha!
Paul Perretta KH6/G3SEA

Terk TRK-S22 18" x 24" DirecTV multi-satellite dish antenna is the least you'll need for HDTV reception. You'll need an HDTV satellite receiver, an HDTV TV set and an audio system capable of decoding Dolby AC-3 audio. (Courtesy Terk Technologies, Inc.)

The really amazing part is that you can get a complete C-band system for next to nothing or even free for the asking from the tens of thousands of people abandoning their big dishes every month to switch to the small dish. Even if you appear to have the view blocked, it may better than you think. The only way to find out is to try it.

And, finally, I put the second part of your question to MT's assistant editor and resident milcom specialist Larry Van Horn. Here's what he had to say, "...Actually, for the cost and expense, putting together a system for milsat monitoring is a waste of time and money. Very, very little has been reported in the clear over the last ten years (nothing earth-shattering). Since the new UFO sats have come on line and the extensive use of DAMA for frequency conversion, nothing much is ever heard in the clear. Sorry the news isn't good in this regard, but there are much easier things to hear in the 225-400 MHz range these days."

Getting Started

◆ Going Batty

In our July column we discussed possibilities for listening to the ultrasonic navigational calls from bats. Perry Crabill, W3HQX, of Winchester, VA, remembers attending a demonstration a few years ago in which an officer of the American Bat Conservation Society (http://www.batcon.org/catalog/batdetectors.html) demonstrated simple electronics that could allow guests to hear those sounds as the pet bats flew around the room. Perry suggests several web sites for more sources for bat detectors:

http://www.econvergence.net/batdet.htm
   (Do It Yourself Kit)
http://www.batbox.com/Page3.htm
   (Stag Electronics-UK)
http://www.magenta2000.co.uk/kits/861.htm
   (Magenta-UK)
http://pw1.netcom.com/~t-rex/BatDetector.html
   (Building Your Own)

Perry suggests that readers interested in building their own should simply do a Google search under the topic, "bat detectors" for loads of references on the subject, including modifying an inexpensive AM radio by replacing the ferrite loop with a microphone along with some other changes. Let us know what you hear!

Thanks, Perry.

Q. *What is the simplest way to build an effective shortwave receiving antenna? (Jason Sullit, email)*

A. The simplest, most effective, general purpose, popular, all-band shortwave antenna is the 40 meter half-wave dipole. It consists of roughly 66 feet of wire, cut at the center for an insulator, and fed with RG-58/U coaxial cable (shield soldered to one side of the wire at the insulator, the center conductor soldered to the other wire).

The ends are supported by insulators or simply ropes and stretched loosely between trees as high and distant from the dwelling as practical, and away from power lines. If power lines are near, the dipole should not run parallel to them, but as close to a right angle as possible to avoid electrical noise pickup.

The antenna can be configured to match your requirements, such as a sloper (one end high, the other close to the ground), inverted L (one end horizontal, the other vertical), or inverted V (center insulator high, both ends sloped toward the ground at an angle not less than 45 degrees).

This is the principle behind the popular Grove Skywire antenna, although it is fed about 14% off-center for slightly smoother impedance match over its wide frequency coverage.

Q. *I bought an AM/FM radio and the salesman said I could increase the distance on my AM reception by hooking the antenna connection to my telephone cable; is this true? (Mike Borton, Youngstown, OH)*

A. This is an old trick to improve radio reception, and sometimes it actually works! You are far better off running a length (50 feet or so) outdoors for this, but if you can't put anything outside, and can't put a long wire in the attic crawl space, or between one outdoor window sill and another, then the telephone wire might work.

Since you have to attach the antenna wire directly to one of the telephone wires, you MUST use a DC blocking capacitor to prevent voltages from being transferred to and from the phone line. You can use most any capacity from .001-0.1 microfarads, and any voltage above 100 volts for this.

Simply put the capacitor in series between the antenna wire and the telephone wire. If you have a choice among four wires in the phone cable, don't use red or green; these are the signal lines to the phone. The other two are spares and should work for the antenna.

Q. *If the Grove Skywire antenna (ANT02) doesn't contain an impedance-matching transformer, how is the coax matched to the antenna's feedpoint impedance over the range of 500 kHz to 30 MHz? (Ed Dubinsky, email)*

A. Even an impedance-matching transformer like a balun won't work over the entire frequency range. As with any dipole, the Skywire has high- and low-impedance feedpoint characteristics periodically throughout its effective range. A transformer would offer a close match only periodically when its design impedance matches the feedpoint impedance at those specific frequencies.

For receiving purposes at these low frequency ranges, tight impedance matching is unnecessary. For transmitting, a transmatch at the rig takes care of the mismatch to avoid damage to the transmitter.

Grove has selected an off-center feedpoint which is a useful compromise between high and low impedance excursions. The length of the Skywire provides enough signal capture to more than make up for any perceived mismatch loss, which is minimal at these low frequencies.

Q. *I need to hear an AM broadcast station about 100 miles from here, but can't put up a long wire antenna. What are your recommendations? (David Leonard, U.S. Navy)*

A. For most requirements, one of the following should improve medium-wave broadcast listening:

1. A longer antenna
2. A directional outdoor antenna like a Beverage
3. An active antenna like our H800 Skymatch
4. An indoor loop antenna with or without an amplifier like the Select-A-Tenna

If it's a clear-channel station, you won't need directivity on the antenna, so I'd recommend either solution 3 or 4. An active antenna is omnidirectional, so it will amplify everything (signals and noise) from all directions. It is best mounted outdoors.

The indoor loop can be adjusted either for maximum signal from a specific direction, or to minimize interference from co-channel broadcasters or electrical appliances from specific directions. But an indoor antenna of any type is vulnerable to both signal reduction because of indoor shielding (especially metallized Mylar insulation as well as aluminum siding) and wiring.

If your receiver (you didn't mention the model) is equipped with an internal loop antenna for AM listening, you can acquire the Select-A-Tenna and simply bring it near the radio, using its signal-concentrating capability to couple stronger signals to the radio's internal loop without an actual electrical connection. If you do have an AM antenna connector, then I'd use the direct coupling technique.

74 If you enjoy this column, then you would probably enjoy the new 16th edition of the ARRL's book *Hints & Kinks*, well worth the $16 at dealers and the ARRL online store. They also have a new book for those just entering the ham hobby, entitled *On The Air With Ham Radio*. Don't have your license? Keep putting it off? Well the *new* question pool for the technician class license is available at http://www.arrl.org/arrlvec/pools. And the new study book is ARRL's *Tech Q&A* for $13 at http://www.arrl.org/hamradio.html. Go for it!

75 Another new ARRL publication is the *2003-2004 Repeater Directory*. What *Police Call* is to the scanning world, this book is to the amateur radio community. This edition also lists the newest IRLP stations. The Internet Radio Linking Project are ham radio stations set up to allow users to connect to similar stations around the globe. Is it the mother of all repeaters? I won't comment except to say this new mode will undoubtedly change ham radio for better or worse. Check it out at http://www.irlp.net.

76 Radio manufacturers Alinco, and Kenwood have free computer cloning programs for many, but not all, of their radios. Try http://www.kenwood.net, and http://www.alinco.com/usa.html (at the bottom of the webpage.) I had the bright idea of checking to discover if Kenwood had some new versions of their software. I decided to download all the new versions. I keep these in a new separate folder, and did not remove the old version until I was sure they worked better.

The same strategy applies to scanner software. With my GRE Scanner Data Manager software, the newest version did not work on my computer/radio setup. I went back to an earlier version. I refuse to waste time tweaking new beta type versions. If you bought software from RT systems, they sometimes have new updates, but you need to ask them to email the latest version. Before you buy a new radio, you should check to see if someone makes the software. With hundreds of memory channels, it is the only feasible option.

77 I recently taught a ham radio class and mentored some of our local Red Cross volunteers through the process. All of them passed and now have their ham ticket. I also held a half day workshop on the importance of the correct power source (voltage and polarity), the best antenna setups, and programming ham radios (VFO, then writing to memory, etc.) I even made them create and solder, new mobile radio power cords, complete with Anderson connectors, fuses and "T" terminators.

I taught them all the usual tricks with their HT, including the use of tone alert, or bell paging. Works great when you need to contact someone, but they don't want to hear all the usual chatter. We picked a simplex channel (147.420), and an unusual PL tone. We then enabled the CTCSS Bell feature, and wrote this setting to a memory channel. Works great for keeping everyone in the local chapter "in the loop." My congratulations to Director of Emergency Services John, KD7VRQ, and all the others that are now licensed.

78 In a recent column, I extolled the wonders and low prices of FRS radios. A reader sent me a note reminding us that these **FRS/GMRS radios are legal only in Canada, US, and Mexico**. The rest of the world, specifically Europe, has different frequency allocations. Want an interesting web surfing project? Research "Common European Union radio frequency allocations."

79 In the April issue of *MT*, fellow columnist Jock Elliott announced a new experiment from radio manufacturer Midland. Called "Midland I Listens" it proposes some new voluntary rules for monitoring CB, FRS, and GRMS radio frequencies. The new proposal uses channel one CB (26.965) and channel one on all FRS and GMRS radios (462.5625) for use as an emergency monitoring channel. I suggest you plug these frequencies into the scanner's guard/watch bank. You might just catch a plea for assistance. See Jock's closing comments on page 92 of the April Issue. The price for these radios has dropped through the floor at about $30. Everyone should have a pair. We pay more than that for just a new battery for the HT.

80 If you enjoy surfing the net, try this one out. Go to http://www.rigpix.com/index.shtml. This site features pictures of 98% of all the scanners, radios, and transceivers made by the major manufacturing companies. It is easy to select a brand, then click through their entire line of products. I got interested in this, and built a little scrapbook of pictures of the various manufactures.

I also got the urge to start a collection of the radios themselves. I can't afford to buy one of everything, so I concentrated on the last 15 years. I still have few gaps, but I have quietly built up quite a collection. How did I do it on the cheap? I searched on eBay, eham, as well as the classifieds at StrongSignals.net, and other sites. Several major ham dealers carry an extensive inventory of used radios. Usually, I find the dealers want top dollar, because they gave top dollar to the person trading, or selling their used rig.

I did not collect any HF, nor large desktop models, nor mobiles. Just the handheld radios. Mind you, some don't even work; they are just for display. It is hard to find any pre 1990 radios. They either long since bit the dust, or they are being held by the original owners as a collectible or memento.

81 At the SEAPAC hamfest, I found the BX2 Speaker Level mixer, aka SCAN-A-MIX. Check it out at http://www.bdenterprises.com/. The makers from B&D Enterprises were there in person. I bought one and already have it hooked up I added some rubber feet to give it some gripping traction. When the phone rings or there is important traffic on another radio, I can quickly silence my bank of scanners. Perhaps they could offer a optional finger toggle flip switch. It think it would make for a better table top application. I think I smell a bench mod project. The BX2 is a solid product, but at $139, the price is way too high. **SEE PHOTO.**

82 I found a good bargain at SEAPAC in the form of a Kenwood mobile. Only $60 bucks. I tried it out, and it works and sounds fine. No mounting bracket nor manual, but I have brackets at home. Hint: check out http://www.kenwood.net/indexKenwood.cfm?do=SupportFiles. (Check out the items labeled "Other Helpful Documents.") Long ago I ordered a mobile mounting bracket from Kenwood. When I heard how cheap they were (I think it was about $5) I ordered several. Of course these fit most other brands as well.

Palm Beach County Transitions to Trunked

Covering 2,578 square miles from the Atlantic Ocean to Lake Okeechobee, Palm Beach County encompasses everything from luxury beachfront high rises and mansions to tiny fishing camps and farm-worker homesteads.

The county hosts over 540,000 acres of agricultural land, the 221 square mile Loxahatchee National Wildlife Refuge, 47 miles of beachfront coastline, and unique attractions and industries such as exclusive shopping areas, polo grounds, equestrian centers, sod farms and sugar cane fields. Historic and famous municipalities are also located here, including the City of West Palm Beach and the City of Boca Raton.

Palm Beach County local government authorities must be able to handle any circumstance, and such a diverse area certainly has its share. Consider these typical public safety responses:

- A 2:00 AM vehicular crash and fatality on a very lonely, very dark, very remote railroad crossing in the heart of "sugar cane country," many miles away from suburban developments and civilization
- An oceanfront rescue as rip-currents catch some swimmers off-guard, carrying them dangerously far from the shoreline
- A criminal investigation at a Lake Okeechobee marina, 50 miles and a world apart from the contemporary urban environment of downtown West Palm Beach
- A high-rise fire in a "Lifestyles of the Rich and Famous" neighborhood where the life that's saved may be a well-known personality and their property may be worth millions
- Law Enforcement and Fire-Rescue staffing at dozens of fairs, festivals, concerts, sports and cultural events
- Annual hurricane emergency planning and evacuation contingencies that require resources from the Sheriff's Office, Fire-Rescue Department, Emergency Management, Transit and other local agencies

Palm Beach County has also seen its share of sensationalized events and incidents, including recent criminal trials, the 2000 election debacle and the American Media, Inc. building Anthrax incident in 2001.

Mr. Mark Filla is the radio equipment engineer in Palm Beach County. Officially recognized as the 800 MHz System Administrator within the Electronic Systems and Security Division, Department of Facilities Development and Operations, Mark oversees a complex network of radio towers, microwave links, repeaters and radios.

Mark has been a Palm Beach County employee for 15 years, spending the first ten as a radio technician in the Sheriff's Office and the last five as engineer and administrator of the 800 MHz system. He's been a licensed Amateur Radio operator for ten years, and is well-suited to also serve as the County's RACES Officer. His "spare time" is often consumed as the owner and operator of the 147.99 2-meter repeater.

Mark Filla
Network Administrator / Manager

◆ Palm Beach County System

According to Mark, "Palm Beach County's system is composed of a 28 channel, 10 tower site simulcast Motorola Radio System that is designed to provide seamless portable and mobile radio coverage throughout Palm Beach County. The system provides better than 97% County-wide, in-building portable coverage throughout the 2,500 square mile county."

The system replaces a mix of bands and channel assignments that had been in service for over twenty years. Palm Beach County Sheriff's Office (PBSO) formerly operated on VHF High and more recently a mix of VHF High and 800 MHz channels. Over at Palm Beach Fire Rescue (PBFR), VHF High and UHF channels were utilized. Rounding out the County's allocation of licensed channels were local government agencies that used VHF Low and UHF.

County officials first realized their radio system was deficient over ten years ago, as housing developments and population growth pushed the county's surburban zone farther and farther into former agricultural lands and new communities were built at the edge of the Everglades.

Although recent news stories in *MT* and elsewhere discuss the wide variety of technologies and bandplans now available to public safety agencies, Palm Beach officials did not have the luxury of such choices. In the late 1980s and early 1990s, long before 700 MHz, narrowbanding, and spectrum-efficient digital systems were being marketed, the 800 MHz public safety band was the only expansion location available…and only two [main] vendors were providing equipment for this new frequency band.

After a thorough evaluation, the diverse needs of PBSO, PBFR, and local government agencies were combined into a system specification that Motorola easily satisfied. Furthermore, use of Motorola's product also allowed County units to communicate across jurisdiction lines with other municipalities and adjoining counties that had previously or concurrently selected Motorola as their radio vendor.

"The old radio systems were not balanced," Mark advised during our meeting and interview. "Mostly on the west side of the county, along the development line, in-building coverage was lacking."

The current system includes ten, full-time, local subscriber agencies and 15 other jurisdictions that utilize the system. Sixteen common talk groups have been established for interoperability among all users, plus interoperability with adjacent, independent systems, such as one shared by the cities of Boca Raton, Boynton Beach and Delray Beach in the southern half of the county. NPSPAC [National Public Safety Planning Advisory Committee] Mutual Aid Tactical Channels #2, #3 and #4 are also available.

Mark reports that while the entire planning, budgeting, design and implementation process required a decade to complete, the system was delivered as advertised and operates as expected. "It was a pretty straightforward installation," Mark recalled. Except for the construction of one new tower, all of the County's previously-installed sites were simply upgraded with the new equipment. "Structural reinforcement was needed at four of the ten towers to bring them up to the 120 MPH wind loading standard for hurricane conditions," Mark continued. "Tower sites also have backup generators and three days of fuel if an emergency requires self-sufficient operation."

PBSO was the first agency to switch over, with units beginning the transition about two years ago. The Fire Rescue Department followed with their switch last year, and local government agencies completed their move during June of this year. Although Mark's policy is not to "sell" the merits of the system to other

agencies and jurisdictions, it nevertheless is off to a good start…and he certainly has the capacity to host more users. During the summer of 2003, the county's public transportation agency, Palm Tran, also agreed to sign-on, and their radio migration is currently being implemented.

"The Sheriff's Office was the first to go on the system. Their VHF High band channels were hard-patched to the 800 MHz system until all users were on board. Operator training consisted of classroom instruction on mobile and portable radios, plus the significance of tower site locations, simulcasting, trunking, channel selection and the specific features of each radio."

No significant issues have developed since the system went on-line, although some Nextel-related interference was found. "Nextel fixed those," Mark advised with a wide grin, "and my system puts out enough ERP [Effective Radiated Power] that their towers are not a problem."

Regarding Nextel's nationwide proposal to reallocate the 800 MHz band in an effort to eliminate wide-spread complaints of interference by agencies across the country, Mark expects a rocky road ahead. "If the FCC makes us move, it will be a lot of work. Each radio will have to be handled twice for reprogramming…the first time to establish the new control channels and frequencies, plus a second time to deprogram the old channels once migration is completed."

Nextel's proposal, though, hasn't stopped Mark's planning process for system upgrades on existing and new frequencies. Mobile data technologies are being explored as a possible follow-on to voice communication circuits.

Mark's radio inventory includes approximately 3,000 mobile and portable units. Models include Motorola MCS2000, MTS2000, XDS3000, SPECTRA, and Johnson 7780s. A three-loop digital microwave system connects tower sites north and south along the coast and west into the Belle Glade area near Lake
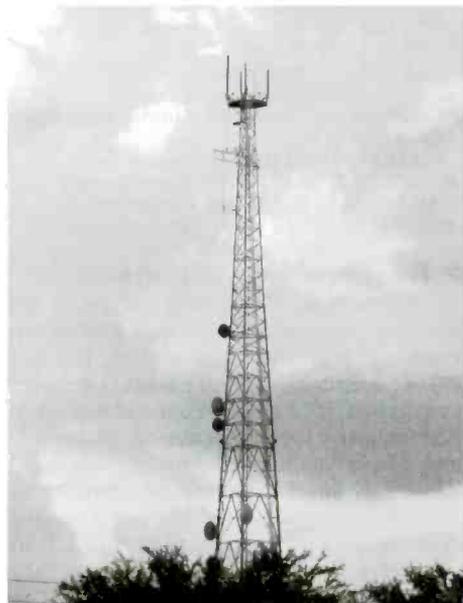
Okeechobee.

MT sincerely thanks Mr. Mark Filla for his time and hospitality during our interview. Obviously proud of his system, and rightly so, Mark's smiling face may be seen on his departmental website. A link follows at the end of this column.

❖ **Monitoring Palm Beach County**

Although Mark Filla is bound by his agency's confidentiality policies against disclosing specific radio frequency and talk group information, he readily acknowledges that much of the data is available in public records and Internet databases for individuals willing to research the subject.

Luckily for *MT* readers and hobbyists in South Florida, frequent *MT* contributor Brian Cathcart has assembled an enormous collection of system-related notes. Brian publishes this and other extensive frequency data in his *South Florida Frequency and Trunking Guide*, now in its 7th Edition. Palm Beach County radio information, as compiled and published by Brian J. Cathcart and used with permission, appears in Table One.

❖ **Websites of Interest to this Column**

Mark Filla's 800 MHz Radio System Information Page, including system coverage maps:
http://www.pbcgov.com/fdo/ESS/800MHz.htm

Mark Filla's e-mail:
Mfilla@co.palm-beach.fl.us

Palm Beach County, Florida:
http://www.co.palm-beach.fl.us/

Palm Beach County Convention and Visitor's Bureau:
http://www.palmbeachfl.com/

Loxahatchee National Wildlife Refuge:
http://loxahatchee.fws.gov/home/default.asp

Brian Cathcart's *South Florida Frequency and Trunking Guide*: E-mail Brian at *scannerdude@juno.com* for ordering and pricing information

Table One: Palm Beach County

Palm Beach County			22416 Town of Palm Beach Police
(Motorola Smartzone digital and analog)			22704 Town of Palm Beach Fire Rescue
Courtesy Brian Cathart			
			City of Boca Raton
856.3125	856.3375	857.3125	(Motorola Smartzone digital and analog)
857.3375	858.3125	858.3375	
859.3125	859.3375	860.3125	852.5625 852.5875 852.6125
860.3375	866.1000	866.1250	853.6375 853.6625 853.7875
866.3250	866.3500	866.6000	853.8125 854.5875 854.6625
866.6250	866.7500	866.8250	854.6875
867.1000	867.3250	867.3750	
867.5750	867.7625	868.2250	Selected IDs
868.3750	868.6500	868.7000	5840 Police dispatch
868.7250			6192 Florida Atlantic University
			6480 Fire Rescue dispatch
Selected IDs			55952 Lifeguards
26704 PBSO District 3			
26768 PBSO District 1			**City of Delray Beach**
26832 PBSO District 4			(Motorola Smartzone digital and analog)
26896 PBSO District 7			
26928 PBSO District 5			866.375 866.775 867.075
26960 PBSO District 2			867.675 868.150
34192 PBFR dispatch			
39632 Palm Beach Int'l Airport			Selected IDs
39984 Emergency Mgmt			3216 Police dispatch
40080 Beach Patrol north			3760 Fire Rescue dispatch
40112 Beach Patrol south			
40208 Mosquito Control			**City of Boynton Beach**
40336 Traffic Engineering			(Motorola Smartzone digital and analog)
41040 Parks			
41296 Palm Tran			856.2875 857.2875 858.2875
			859.2875 860.2875
City of West Palm Beach			
including dispatch for Riviera Beach and the			Selected IDs
Town of Palm Beach (Motorola Type 2)			7120 Police dispatch
			7760 Fire Rescue dispatch
853.5375	853.5875	854.9625	57328 Lifeguards
856.4375	856.7125	856.9625	
857.4375	857.7125	857.9625	**North Area Mutual Aid Consortium**
858.4375	858.7125	858.9625	(Municipalities of Lake Park, North Palm
859.2125	859.7125	859.9625	Beach, Mangonia Park, Palm Beach Shores);
860.7125			LTR System (see Brian's book for channel designations and talk groups)
Selected IDs			153.920 154.340 154.875
1616 Police north			155.175 155.415 155.535
1648 Police south			155.775 155.955 156.090
3216 Fire Rescue dispatch			156.120
16016 Riviera Beach Police			
17616 Riviera Beach Fire Rescue			

Scanning Report

Scanning the Ottawa Valley

This month *Scanning Canada* returns to the national capital region with a contribution from *MT* reader Randy Leclaire of Renfrew, Ontario. Randy is a very active scanner operator and also serves as the list moderator of the Yahoo Groups LiveScannerAudio, ScanRenfrewCounty and OttawaScan. Randy wrote to *MT* to offer a good selection of frequency hunting data from the Ottawa area.

Randy told *MT* that eastern Ontario is not yet affected by the new digital Government Radio System that is currently being implemented throughout the Province of Ontario. He uses a Uniden BC760 XLT Scanner into which he has programmed the channels listed in the table below.

MT Reader Randy Leclaire.

Bank 1 (Police)
Ch. 1 413.5375 OPP BEAT Repeater
Ch. 2 411.3125 OPP Portables
Ch. 3 412.8875 OPP UHF Mobile Repeater (Unconfirmed)
Ch. 4 410.8625 OPP UHF Mobile Repeater (Unconfirmed)
Ch. 5 142.770 OPP Common
Ch. 6 140.970 OPP Sim. 1
Ch. 7 148.765 OPP Sim. 11 (Unconfirmed)
Ch. 8 141.195 OPP 1A Base Mt. St. Patrick Tower (PL tone 107.2)
Ch. 9 139.185 OPP 1A Mobile
Ch. 10 141.390 OPP 1B Base Mt. St. Patrick Tower (PL Tone 107.2)
Ch. 11 139.470 OPP 1B Mobile
Ch. 12 141.435 OPP 2A Base Barry's Bay/Kanata Tower (PL tone 107.2)
Ch. 13 141.690 OPP 2B Base Barry's Bay/Kanata Tower (PL tone 107.2)
Ch. 14 141.405 OPP 3B Base Galehouse/Balderson Tower (PL tone 107.2)
Ch. 15 141.705 OPP 4A Base Denbigh Tower (PL tone 107.2)
Ch. 16 141.360 OPP 5A Base Pembroke Tower (PL tone 107.2)
Ch. 17 141.450 OPP 6A Base Bancroft Tower (PL tone 107.2)
Ch. 18 141.555 OPP 7A Base Town Of Arnprior OPP (PL tone 107.2)
Ch. 19 Spare
Ch. 20 142.845 Pembroke City Police
(OPP = Ontario Provincial Police)

Bank 2 (EMS - Ambulance)
Ch. 21 410.8375 Ministry of Health Prov. Comm. (PL tone 203.5)
Ch. 22 410.8375 Ministry of Health Prov. Comm. (PL tone 162.2)
Ch. 25 149.440 Ministry of Health Paging and Fire Paging
Ch. 26 419.475 Renfrew EMS (PL tone 186.2)
Ch. 27 150.100 Ministry of Health Prov. Comm. - Air Ambulance 7791
Ch. 28 149.725 Renfrew EMS (Input-Mobiles) (PL tone 118.8)
Ch. 29 154.540 Renfrew Co. EMS (PL tone 118.8)
Ch. 30 413.7625 Renfrew Co. EMS UHF (PL 118.8)
Ch. 31 129.275 Air Ambulance (AM Mode)
Ch. 32-35 Spare
Ch. 36 419.2000 Renfrew Co. EMS UHF (PL Unkn)
Ch. 37 415.3375 Renfrew Co. EMS UHF (PL Unkn)
Ch. 38 410.3375 Renfrew Co. EMS UHF (PL Unkn)
Ch. 39 410.8875 Renfrew Co. EMS UHF (PL Unkn)
Ch. 40 419.475 Renfrew Co. EMS UHF (PL Unkn)

Bank 3 (Fire Service)
Ch. 41 410.8375 County of Renfrew Fire Dispatch Paging & EMS Paging (PL tone 186.2)
Ch. 42 415.8375 Fire Dispatch and Ministry of Health Paging (PL tone 186.2)
Ch. 43 154.665 Renfrew Co. Fire Dispatch is in the Ottawa Valley which stretches from the outskirts of Canada's Capital, Ottawa, in the east along the shores of the Ottawa River to the northern tip of Algonquin Park's wilderness in the west.
Ch. 44 155.250 County of Renfrew Fire Dispatch O/S Ch. Strategically located on the TransCanada Highway, approximately 100 km west of Ottawa (as well as most communities in Renfrew Co.)
Ch. 45 154.070 Renfrew County Various Fire Depts. (Fire Marshall)
Ch. 46 153.845 Horton Township Fire Dispatch is situated between the Ottawa River and the Town of Renfrew /Village of Eganville, Bonnechere Valley Township Fire Dispatch.
Ch. 47 154.130 Admaston/Bromley Township.and Village of Douglas Fire Dispatch is in a unique municipality situated approximately 100 km. west of Ottawa./Campbells Bay Quebec. Fire Dispatch.
Ch. 48 154.235 Admaston/Bromley Township Fire Dispatch is in a unique municipality situated approximately 100 km. west of Ottawa.
Ch. 49 154.310 McNab-Braeside/City of Pembroke Fire Dispatch fronts on the Ottawa River, has access to White Lake and is crossed by the Madawaska River.
Ch. 50 154.570 The Township of Whitewater Region Fire Dispatch.
Ch. 51 155.910 Town Of Arnprior Fire Dispatch Is Less than 30 minutes from Canada's capital city, Ottawa, the Town of Arnprior is located where the Madawaska River meets the Ottawa River.
Ch. 52 - Spare
Ch. 53 154.695 North Algona Township. Fire Dispatch
Ch. 54 154.175 Village of Bristol, Que. Fire Dispatch
Ch. 55 150.860 Municipality of Shawville-Clarendon Que. Fire Dispatch
Ch. 56 47.070 Ministry of Natural Resources Fire Ch. 19 - Pembroke Dispatch
Ch. 57 – 60 Spare
Ch. 61 169.320 Renfrew Hydro
Ch. 62 49.070 Ontario Hydro
Ch. 63 49.330 Ontario Hydro
Ch. 64 143.850 Ministry of Transportation, Ontario Roads (PL tone 156.7)
Ch. 65 143.955 Ministry of Transportation, Ontario Roads (PL tone 162.2)
Ch. 66 143.970 Ministry of Transportation, Ontario Roads (PL tone 156.7)
Ch. 67 154.460 Township of Whitewater Region
Ch. 68 411.6875 Ministry of Transportation, Ontario Enforcement (Unconfirmed)
Ch. 69 157.650 Town of Renfrew Roads/Works
Ch. 70 159.030 Horton Township. Roads/Works
Ch. 71 157.710 Renfrew County Roads/Works(156.375-input)
Ch. 72 166.200 Christie & Walters (Road Crews) (Foymount) (PL tone unknown)
Ch. 73 166.320 Whitewater Township Roads/Works (169.410-input)
Ch. 74 166.665 The Message Centre (163.305-input) (Burnstown)
Ch. 75 163.380 Greater Madawaska Township/Village of Calabogie Roads/Works
Ch. 76 171.255 Christie & Walters (166.845-input), Beaumon Recylcing-PL unknown, Road Crews-PL unknown.
Ch. 77 162.240 T.A.S. Foymount (Road Crews?) (PL unknown)
Ch. 78 163.065 Christie & Walters
Ch. 79 163.590 Vincent's Taxi
Ch. 80 167.190 Brad's Taxi

Other Renfrew Frequencies under investigation:
K-9 411.8125 Mhz [107.2] (Unconfirmed)
TRU 411.5125 MHZ [107.2] (Unconfirmed)
CISO 139.5450 Mhz [DES] (Unconfirmed)
CISO 139.5350 Mhz [DES] (Unconfirmed)

❖ Reader Contributions

Although *ScanCan* gets to travel quite extensively throughout Canada, it would be impossible to keep this column going for long without contributions from readers. I am very grateful that *MT*'s readers continue to send in their frequency logs and comments on the column. Thank you to all the readers who have helped make this column a success. If you would like to see your region featured in *Scanning Canada* please send me an e-mail at *johncorby@monitoringtimes.com*.

Utility World

HF Communications

Hugh Stegman
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www.ominous-valve.com/uteworld.html

WRC-03 Wraps Up

After a month's work, 2003's huge World Radiocommunication Conference (WRC-03) ended on July 4th with a treaty-signing ceremony in Geneva, Switzerland. The major change to high frequency (HF) is a partial resolution of the 40-meter (7 megahertz) mess.

As electronic spectrum goes, 7 MHz is prime real estate. At night, it offers global coverage, with amazingly high signal strengths. Especially during low parts of the solar cycle, such as the one coming up soon, everybody wants to transmit there, creating interference and much contention between broadcasters, amateurs, and a few utilities.

Briefly, here's the problem: Current radio allocation treaties divide the world into three regions. In Region Two, which includes North and South America, the whole band from 7000 to 7300 kilohertz (kHz) is for amateur radio. In the other two regions, 7100-7300 kHz is primarily for international broadcasting. This is guaranteed to create chaos, with competing noises coming out of radios worldwide.

This type of "compromise" has long been endemic to international radio treaties. It's a form of consensus-building that avoids favoring particular countries or regions by simply infuriating all of them equally. It certainly worked in this case.

Just as in those gunfighter movies, someone had to leave town. The huge cannon (broadcasting) faced off with the little pistol (amateur). For the first time ever, the little pistol won, sort of. It ran the big cannon out of the good part of town. Yes, 7100-7200 kHz, or half of the original request, will become exclusively amateur in nearly all of the world on March 29, 2009. Sounds like a long time, but by international diplomacy standards, it's sudden.

But how does this affect utilities? A couple of ways. First is that, if the broadcasters are moved out of a band, they'll have to go somewhere else – often into utility allocations. In Regions 1 and 3, broadcasting will shift up to 7450 kHz, and to 7400 in Region 2. Presumably, the tendency for broadcasters to ooze into everything below about 7500 will accelerate.

The second way to affect utilities is via footnote. These conferences always allow exceptions to particular countries that they can't satisfy any other way. Eventually, the non-paying public will get to see the footnotes allowing fixed and mobile utility operation in this band, and we'll know which countries can authorize it. They appear to be mostly in the Middle East.

World radio conferences are gigantic undertakings, and they've already begun planning of WRC-07, the 2007 affair which will include a full review of everything from 4 to 10 MHz. That one should be even more interesting than WRC-03.

❖ Other WRC-03 Changes

Also of interest to the radio hobby is elimination of the international requirement that amateur examinations require proof of Morse Code proficiency for operation below 30 MHz. This does not automatically get rid of "code," but it enables the world's various governments to consider moving in such a direction. Many will.

The other big news was allocation of new spectrum for wireless computer networks. It's a huge boost to this emerging and potentially very useful technology, but at 5 gigahertz it's a bit out of HF.

❖ SHARES Adds Two Frequencies

SHARES stands for SHAred RESources. It's a rather large and loose frequency pooling arrangement that enables over 20 federal agencies to talk with one another. Various gateway stations serve as net controls which pass rosters of available stations and emergency traffic to the appropriate agencies. Messages have a standard format with "This is a SHARES message" at beginning and end. The net gets busy when activated for natural disasters, special occasions, and the exercises that are usually held every four months.

SHARES has long had two primary voice frequencies, where net check-ins can be taken. These are 5236.0 (channel 1) and 14396.5 kHz (channel 2). These are usually upper sideband, but lower has been used as well, often at the same time. These frequencies can get extremely crowded when everyone's checking in at once.

Like many federal networks, SHARES holds an informational net every Wednesday morning, usually at 1600 Coordinated Universal Time (UTC). Recently, it was announced on this net that two alternate voice channels are now in use. These are 4573.5, alternate to 5236, and 14898.5, alternate to 14396.5. Both were given as upper sideband.

This net's other channels still exist. One group is for digital traffic using automatic link establishment (ALE). Frequencies are 4490, 5711, 9106, 11217, 15094, and 17487 kHz, also known as channels 3-8. There is also a bulletin board system. It uses such digital modes as PACTOR (Packet Teleprinting Over Radio) for message storage and retrieval. Connection frequencies are 6800 and 13242 kHz (channels 9 and 10).

❖ A. Geoffrey Halligey 1913-2003

We regret to announce the passing of Geoff Halligey, one of the founders of the utility radio hobby. Geoff had professionally "pounded brass" (worked Morse telegraphy) for many, many years, and seemingly knew just about everything. He remained a steady contributor to this column right up until the very end.

Halligey is best known for editing the first of the big frequency books we've all come to depend on, namely the *Confidential Frequency List*. This book, which is still published, was at that time a labor of love for all concerned. But the original publisher died, and co-editor Tom Kneitel moved on to other things. At one point Geoff got it out pretty much by himself, and it was a monumental job. He kept the standards up, and the content timely.

Not as well known is Geoff's brief stint editing the "Below 30 Megahertz" column in the old, long-gone journal of the Radio Communications Monitoring Association, a real hardcore group. He followed Bob Horvitz, a technically inclined visionary who was very active in the citizen's movement to keep backscatter radars from overwhelming HF. He preceded yours truly, who was therefore coming after a pretty tough act at the RCMA. Scary!

Geoff was the real thing, and he will be missed.

ITU REGIONS

Utility World

Utility Logs

Hugh Stegman
hughstegman@monitoringtimes.com
www.ominous-valve.com/uteworld.html
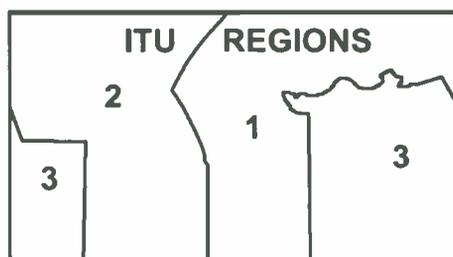
ABBREVIATIONS USED IN THIS COLUMN

AFB	Air Force Base
ALE	Automatic Link Establishment
AM	Amplitude Modulation
ARINC	Aeronautical Radio, Incorporated
ARQ	Automatic Repeat Request teleprinting system
CAMSLANT	Communication Area Master Station, Atlantic
CAMSPAC	Communication Area Master Station, Pacific
Coq-8	Coquelet; French/Algerian 8-tone printing mode
CQ	General call seeking contact: "Hello all stations"
CW	Morse code telegraphy ("Continuous Wave")
DEA	Drug Enforcement Administration
DSC	Digital Selective Calling
E10	Israeli phonetic English female numbers
E10a	Israeli phonetic numbers, callup-only or abnormal
EAM	Emergency Action Message
FAX	Radiofacsimile
FEC	Forward Error Correction teleprinting system
FEMA	Federal Emergency Management Agency
HFDL	High-Frequency Data Link
HF-GCS	High-Frequency Global Communications System
LSB	Lower Sideband
M21	Automated Russian CW, possibly telemetry
Meteo	Meteorological
MFA	Ministry of Foreign Affairs
MWARA	Major World Air Route Area
MX	Russian CW solitary channel markers
MXC	Russian CW "cluster beacon" markers
PACTOR	Packet Teleprinting Over Radio
PR	Puerto Rico
RSA	Republic of South Africa
RTTY	Radio Teletype
Selcal	Selective Calling
SITOR-A	Simplex Teleprinting Over Radio, ARQ mode
SITOR-B	Simplex Teleprinting Over Radio, FEC mode
UK	United Kingdom
Unid	Unidentified
US	United States
VOLMET	Aviation weather broadcast ("Flying Weather")

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations (encrypted, usually unidentified, broadcasts thought to be intelligence-related) are identified in () with their ENIGMA station designators, as issued by the European Numbers Intelligence Gathering and Monitoring Association.

2785.4 Unid-Unknown station with plain old RTTY at 850/100, still didn't print, at 2340. (Bob Hall-RSA)

3451.5 0a-Irish Navy, Haulbowline, selcal XSFC, with traffic in offline encrypted SITOR-A for unknown ship "22," at 1448. (Day Watson-UK)

3485.0 New York-Aviation weather VOLMET, at 0505. (Barry Williams-AL)

4271.0 CFH-Canadian Forces, Halifax, NS, with RTTY gale warning, then FAX, at 2354. (Hall-RSA)

4274.0 XSU-Yantai Radio, China, with ARQ marker at 0007. (Hall-RSA)

4280.0 PBC34-Dutch Navy, Goeree, with RTTY channel availability marker at 1254. (Hall-RSA)

4295.0 FUE-French Navy Brest, with usual RTTY test marker at 2045. (Watson-UK)

4451.5 19-Irish Navy vessel, sending offline encrypted SITOR-B traffic to "76," patrol ship *Aisling*, no reply, at 1438. (Watson-UK)

4583.0 DDK2-Hamburg Meteo, with marker "cq de DDK2 DDH7 DDK9 freq 4583 khz 7646 khz 10100.8 khz," then weather at 0957. (Watson-UK)

4601.5 19-Unid Irish Navy vessel working "0a," Haulbowline base, sent to 5254 to pass traffic in SITOR-A, at 1040. 23-Irish Navy patrol ship *Ciara*, selcal CVVD, with offline encrypted SITOR-A traffic for vessel *Aisling*, at 1046. *Aisling*, rogering traffic and

then sending offline encrypted SITOR-A to Haulbowline, at 1054. (Watson-UK)

4650.0 JADE-Mexican Army, calling RM11, Military Region 11, in ALE at 0502. (Ron Perron-MD)

5220.0 Unid-Russian Air Defense "Time Stamp Station" (M21), with usual standard format CW messages 1 minute apart beginning with "9" plus Moscow time (UTC+4), and using "?" for missing data items, at 1914. (Patrice Privat-France)

5465.8 "R"-Russian Navy, CW single letter beacon (MX) at 2018. (Watson-UK)

5505.0 Unid-Unknown VOLMET, sounds like Shannon, at 0442. (Williams-AL)

5598.0 Gander-North Atlantic MWARA, Newfoundland, also Shanwick, Ireland, at 0455. (Williams-AL)

5598.0 Air Comet 940-Airliner in selcal check and position report at 0450. (Privat-France)

5616.0 Shanwick-North Atlantic MWARA, Ireland, at 0440. (Williams-AL); World 173-World Airways MD-11, with position for Shanwick, at 2135. (Privat-France)

5696.0 CAMSPAC Point Reyes-US Coast Guard, CA, working two Air Force Rescue aircraft in a Pacific search, at 0326. CAMSLANT-US Coast Guard, VA, working Air Force Rescue 5822 and Coast Guard Rescue 1790 in a search, also using 8983, at 2031. (Rick Baker-OH)

5708.0 Armor-French Customs, Brittany, calling Wallaby Hotel, no joy at 0915. (Privat-France)

6348.0 FUE-French Navy Brest, with RTTY test loop calling FAAA (General call: all French warships), at 2127. (Watson-UK)

6622.0 Gander-Gander Radio, North Atlantic MWARA, oceanic air traffic control at 0541. (Williams-AL)

6628.0 New York-North Atlantic MWARA, oceanic air traffic control with an Air France flight (during the strike), at 0440. (Williams-AL)

6697.0 Peach Pie (sounds like; maybe Peak Time)-US military, with EAM simulcast on 8992, 11244, and 13155, at 1725. (Jeff Haverlah-TX)

6721.0 ADW-US Air Force control point, Andrews AFB, MD, calling J42, a US Coast Guard helicopter, in ALE at 1651. (Perron-MD)

6754.0 Trenton Military-Canadian Forces, Ontario, VOLMET at 0530. (Williams-AL)

6761.0 Turbo 74-US Air Force tanker, working Shado 81 regarding air refueling tracks, at 0226. (Baker-OH)

6786.0 CGE-Venezuelan Army headquarters, calling CRM4 (Commander, Region 4), in ALE at 0021. (Perron-MD)

6840.0 Unid-Israeli Intelligence (E10), AM 5-letter groups in progress at 0152, then "End of message, message group 216," followed by another brief message and sign off at 0157. (Edward G. Walsh-AL) SYN2-Israeli Intelligence, AM callup only (E10a), simulcast on 6912, at 0250. (Williams-AL)

6930.0 MIW2-Israeli Intelligence, AM callup only (E10a), at 0315. (Williams-AL)

6961.5 CLC43-Venezuelan Army Communications Logistics Center, calling SCLC43 in ALE at 2159. (Perron-MD)

7527.0 Panther-US DEA, Bahamas, working aircraft 25C, at 2244. (Mark Cleary-SC)

7637.0 Sitio14E-Colombian Army, calling Faca2E, Facatativa, in ALE at 0005. (Perron-MD)

7701.5 0a-Irish Navy, Haulbowline, calling unknown ship "22," selcal CVSB, in SITOR-A at 1335. (Watson-UK)

7810.5 CIO2-Israeli Intelligence, callup only (E10a), at 0245. (Perron-MD)

7992.0 Spotless-US military, working Pathology, who sometimes allowed EAM audio from 8992/11244 to leak through, at 0056. (Haverlah-TX)

8056.0 CLS-US Army, Ft. Campbell, KY, calling BGAD (Blue Grass Army Depot), in ALE at 1319. (Perron-MD)

8156.0 C6WWH-Probable Royal Bahamas Police Force, working C6R2066 in heavily accented English, at 2122. (Cleary-SC)

8302.5 WPC-SeaWave, transmitter in NJ, data bursts with a CW identifier every 3 minutes, at 1324. (Hall-RSA)

8337.6 Shark 10-Probable US Coast Guard, telling Delta 02 that his "parrot is sweet," at 2106. (Cleary-SC)

8414.5 Various ships, plus coastal stations Lyngby, Madrid, Tenerife, Olympia, and Iqualuit, sending DSC packets over a 26-hour

period ending at 1952. (Watson-UK)

8500.0 VTH1/9-Indian Navy, Mumbai, running an RTTY test loop at 1850. (Hall-RSA)

8764.0 CAMSLANT-US Coast Guard, VA, with the "Perfect Paul" synthesized weather voice at 0350. (Williams-AL)

8790.0 WLO-Mobile Radio, AL, with Atlantic/Caribbean weather, then calling an unknown vessel, at 0305. (Jeff Seale-KY)

8846.0 New York-New York Radio, MWARA Caribbean-8 net, oceanic air traffic control at 2110. (Williams-AL)

8930.0 rs0016-Allied Command, unknown European location, calling CS00004A in ALE, at 0912. CS0, calling RS0016D and RW5016D, in ALE at 0914. (Watson-UK)

8930.0 Alitalia 644-Airliner making radio and selcal check with Stockholm, at 0800. Delta 117, selcal check at 0845. (Privat-France)

8971.0 Goldfinch 711-US Navy P-3C, calling Fiddle (US Navy, FL), finally getting relay from aircraft Cardfile 02 to Bluestar (PR), at 2146. (Cleary-SC)

8983.0 Rescue 1703-US Coast Guard medical flight enroute to Johnston Island, [a VERY lonely atoll about 750 miles/ 1100 km southwest of Hawaii -Hugh] working CAMSPAC at 0323. (8aker-OH)

8992.0 Spotless-US military, passing coded traffic to Pathology, then went to 7992 kHz, at 0053. Peach Pie (sounds like; maybe Peak Time)-US military, with three EAMs and one other coded message, also Offutt on frequency with a Foxtrot broadcast, all at 2155. (Haverlah-TX)

9025.0 JTF-US Air Force test facility, ALE sounding at 0623. (Perron-MD)

9031.0 Ascot 3458-UK Royal Air Force transport enroute to Iraq, selcal check at 1000. (Privat-France)

9040.7 5YE-Nairobi Meteo, Kenya, with RTTY weather observations at 1727. (Hall-RSA)

9041.0 5YE-Nairobi Meteo, Kenya, RTTY weather at 1940 with a spurious emission on 9048.1, at 1947. (Watson-UK)

9185.0 Unknown-Possible Swiss MFA, 8ern, with link protected ALE and encrypted serial tone data, at 1456. (Watson-UK)

9848.0 Unid-The Singing Man, possibly the Chinese one, at 2115. (Williams-AL)

9982.4 KVM70-US Department of Defense, Honolulu, HI, sending FAX satellite picture simulcast on 11090, at 1240. (Hall-RSA)

10242.0 25C-Aircraft asking CAMSPAC, CA, to contact Panther (DEA, Bahamas), at 0006. (Cleary-SC)

10326.0 Sitio14E-Colombian Army, calling Sitio17E (possibly Colombian DEA) and Sitio12E, in ALE at 2341. (Perron-MD) [Is the war on drugs becoming a war in ALE? -Hugh]

10444.0 M15-Mexican Army, calling Tierra in ALE, at 0301. (Perron-MD)

10493.0 Lions Den-US government, possibly FEMA, exchanging coded messages with American Girl, Little 8eaver, Ajax Cleaner and Alert Lad, at 1620. (Wayne Rankin-CA) [FEMA daytime primary voice frequency, but used by or with other agencies for exercises. -Hugh]

10650.0 SUCRE-Venezuelan Navy Frigate *Mariscal Sucre*, calling BRION, Frigate *Almirante Brion*, in ALE at 0017. (Perron-MD)

11018.0 Sitio12E-Colombian Army, calling Sitio17E in ALE, at 0006. (Perron-MD)

11039.0 DDH9-Hamburg Meteo, RTTY weather at 1447. (Watson-UK)

11110.0 MGJ-UK Royal Navy, Faslane, with RTTY channel availability marker, odd 340-Hz shift, at 1721. (Hall-RSA)

11175.0 Turbo 77-US Air Force, checking with McClellan HF-GCS for traffic, at 0248. Jake 12-US Air Force, calling Mainsail (any ground station), then raising Andrews HF-GCS for traffic, at 1345. (Haverlah-TX) Cape 21-US Air National Guard, getting weather in patch to unheard station, at 0328. (Williams-AL) Tuff 41-US Air Force, patch via Offutt to Mudbug (8arksdale AFB, LA), who also identified as Raymond 06 and Swamp Fox, arranging a low pass for landing gear check, at 2342. (Baker-OH)

11229.0 Big Knife-US military, calling Peak Time, then working Originate at 1942. (Haverlah-TX)

11232.0 Trenton Military-Canadian Forces, working King 21, a US Air Force/ Air National Guard rescue HC-130, at 0006. (Perron-MD)

11243.0 10U-Unknown station calling 12U in ALE, at 1903, and another ALE station calling 14U at 1905. Not the same net as US military on 11244.0. (Larry Van Horn-NC)

11430.0 1501-Colombian telephone net, using ALE in LSB to set up a phone patch via 1901, at 0000. (Perron-MD)

11475.0 MAE-Algerian MFA, Algiers, calling TRP, Tripoli, Libya, in ALE at 1611. (Privat-France)

11494.0 Panther-US DEA, 8ahamas, working aircraft 15C, possibly ALE-initiated, at 2017. (Cleary-SC)

11610.0 SCLC222-Venezuelan Army Communications Logistics Service Center, calling CLC22 in ALE, at 2229, also 10156 at 0035 and 0041. (Perron-MD)

12185.0 CLC43-Venezuelan Army, calling SCLC43 in ALE, at 2159. (Perron-MD)

12190.0 NMG12-US Coast Guard, New Orleans, with clear FAX chart from "Tropical Prediction Center, Miami," at 1246. (Hall-RSA)

12191.0 CLC51-Venezuelan Army, calling SCLC511 in ALE, at 2239. (Perron-MD)

12577.0 UGOR-Russian vessel *Novosibirsk*, calling in DSC, at 1630. (Privat-France)

13031.2 FUF-French Navy, Ft. de France, Martinique, RTTY test loop to FAAA [Group call: all French warships -Hugh], at 2032. (Jason Burnside-MS)

13449.0 CGE-Venezuelan Army headquarters, calling CRC5 (5th Regional Command Center, in ALE at 0136. (Perron-MD)

13510.0 CFH-Canadian Forces, Halifax, NS, with RTTY weather at 2043. (Burnside-MS)

13527.8 "S"-Russian Navy CW single-letter beacon (MXC), Arkhangelsk, at 1613. (Watson-UK)

13528.0 "C"- Russian Navy CW single-letter beacon (MXC), Moscow, at 1614. (Watson-UK)

13530.0 Caldas3-Colombian Navy Corvette *Caldas*, calling Radgena in LSB ALE, at 0025. (Perron-MD)

14000.0 Mochuelo-Colombian telephone net, using ALE in LSB to set up a phone patch via 1901, at 0028. (Perron-MD)

14698.0 "A-3-N"-Probable US Navy exercise, with two EAMs at 2247. (Haverlah-TX)

15043.0 NW1-US military Nightwatch 1, National Airborne Operations Center, working MCCSPR (McClellan AFB secure data network gateway), in ALE at 1825. (Perron-MD)

16135.0 KVM70-US Department of Defense, HI, with FAX tropical cyclone chart at 1625. (Hall-RSA)

16328.5 Unid-PACTOR banking traffic in Kinshasa, Congo, at 1009. (Hall-RSA)

16420.0 Unknown-Military-sounding net, not on long enough to identify at 2140. (Williams-AL) [Global Search & Rescue frequency - Hugh]

16716.5 UICJ-Russian vessel *Pobeda*, SITOR-A message to "novoship.ru" (Novorossiysk Shipping Company) via Novorossiysk Radio, at 1015. (Privat-France)

17463.0 Unid-Russian Department of State Communications, Moscow, with offline encrypted RTTY traffic in 5-figure groups, at 1525 and 1544. (Watson-UK)

17967.0 G-VFOX-Virgin Airlines flight VS251, working ARINC 8ahrain ground station in HFDL, at 1416. (Privat-France)

17982.0 Manaus-Brazilian Air Force, working aircraft 02 and 507 in Portuguese, at 1932. (Perron-MD)

18183.4 7RQ20-Algerian MFA, Algiers, sending Coq-8 traffic in French to embassy in Addis Ababa, Ethiopia, at 1300. Also traffic for Libreville, Gabon at 1314; Maputo, Mozambique at 1321; and four more embassies at 1334. Algiers, relaying Coq-8 Arabic traffic from Khartoum to all embassies, at 1350, and working Nouackchott, Mauritania, in Coq-8 at 1645. (Hall-RSA)

18411.7 Unid-Egyptian MFA, Cairo, with offline encrypted traffic for selcal TVVX, Algiers, in SITOR-A and 8, at 1207. (Watson-UK)

19131.0 Atlas-US DEA, IA, working 934 at 1503. (Cleary-SC)

19945.0 NMY-Algerian Embassy, Niamey, calling Algiers in ALE at 1613.ADZ-Agadez, calling Algiers in ALE, then Skyfax modem traffic at 1614. (Watson-UK)

22403.0 UIW-Kaliningrad Radio, Russia, with SITOR-A traffic at 0725. (Hall-RSA)

23523.0 JMH6-Tokyo Meteo, Japan, with clear FAX chart from "Tokyo Typhoon Center," at 1251. (Hall-RSA)

Utility World

Digital Digest

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Decoding Software Update

This month we take a tour of the latest offerings from the world's major HF digital decoder manufacturers and profile the AX.25 Packet Radio system.

Wavecom

The Swiss experts have been active of late with a number of releases that bring their excellent range of decoders in line with some of the modes and features already available on the high-end Hoka line decoders.

In particular, their W40PC card has now added the ARINC 635 HF DataLink (aka HF-ACARS) system, which will be a welcome addition for aviation listeners. HF DataLink connects aircraft from a growing number of the world's airlines with more than 15 groundstations across the globe in areas where VHF communications are often difficult or impossible. See *MT*'s June and July 2002 issues for a detailed run-down on the HFDL system.

The W51PC card software has also been updated to add the ever-popular MIL-188-110A high-speed modem, adds error correction to the CROWD-36 decoder and allows error correction to be switched off in the FEC-A decoder (probably akin to the Hoka Code30's FEC-A "raw" mode).

The company has also launched the W51LAN. Based on the popular W51PC system, the W51LAN puts the hardware into a stand-alone form for connection to a PC either directly, over a LAN or the internet. PC's with Windows XP can connect to the decoder box using the remote desktop service. The box looks like it could make for some interesting possibilities when used mobile with a laptop, for example.

At about $8000, this is not the system for

Figure 1: WaveCom W51LAN with laptop

the average digital listener, however! Check in with Wavecom (see Resources) for the details.

SkySweeper

This lesser-known software package recently added a couple of useful features:

- SHIP and SYNOP weather forecast decoding has been added to the RTTY

module
- SELCAL (ICAO Annex 10) HF aircraft selcal decoder
- HFDL

Figure 2: SkySweeper decoding SYNOP traffic

Also added is the capability for the program to send decoded text over the internet using a standard Telnet (keyboard to keyboard) connection.

The decoder remains popular with many listeners looking for a reasonable package of modes without any of the complex (and often obsolete) systems carried by the Wavecom and Hoka lines. Price is EU99 for the standard edition.

In addition to those above, SkySweeper includes ACARS, CW, Hellschrieber, MFSK16, MIL-188-141 ALE, PacTOR-1, RTTY, SITOR A and B, Slow Scan TV, Fax and the proprietary SkyBoost mode.

Hoka

Hoka has also been active on the update front with the release of the second edition of the Code300-32 software, which marked the beginning of Hoka's move to a true Windows-native product, allowing, among other features, the ability to open multiple decoder windows on the same audio signal. For example, this would allow one to see, separately, the ALE triggering a MIL-188-110A high-speed modem.
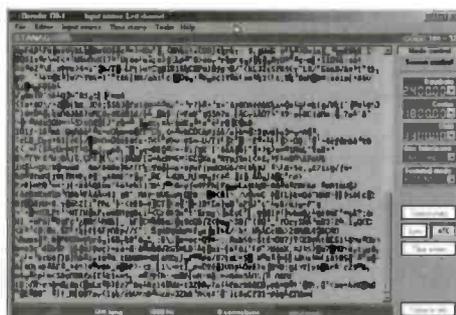
Figure 3: Hoka Code300-32 decoding STANAG4285

The 300-32 is arguably the king of all decoders in terms of capabilities and modes supported and has by far the greatest coverage of modern systems. In particular, PacTOR-II, both the serial and 39-tone MIL-188-110A modems, Racal's SkyFax system, NATO STANAGs 4285 and 4529 plus the usual ALE and HFDL.

The standard version retails for EU4,500 direct from Hoka.

In a related development, US sigint specialists Monteria are also offering specialized versions of this decoder for professional applications, including a very interesting bitstream decoder addition which can reveal the underlying messaging embedded in high-speed modem traffic. The current offering recognizes file compression like PKZip and Unix tar, X.25 and TCP/IP data networking traffic and various picture, sound and document formats. Cool!

Prices for these special versions of the Hoka Code300-32 software are available on request from Monteria.

RadioRaft

Although it has received only minor attention since our last look, this package from French radio amateur Francois Guillet remains a good balance between price, performance and modes supported. Although many of the modes are now seldom heard, the program does differentiate itself by offering both DGPS (Differential GPS) decoding (which will satisfy the lowfer digital listener) and GMDSS (for those interested in monitoring maritime emergency traffic).
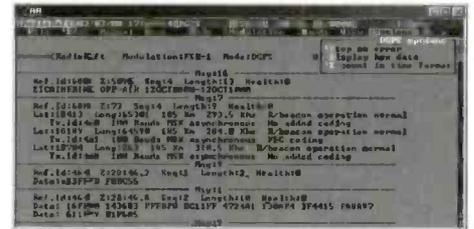
Figure 4: RadioRaft decoding DGPS signal

In total, RadioRaft now supports 30 modes that are still in daily usage on the HF bands, including ARQ-E and E3, ARQ-M2 and M4, Baudot RTTY, CW, DGPS, FEC-A, GMDSS, AX.25 Packet, PacTOR-1, and SITOR-A and B.

RadioRaft is available direct from Guillet or via a number of resellers who usually also offer the required PC-port interface.

AX.25 Packet Radio

This system's name is really the combination of a method of digital communications (packet over radio) and a simple computer net-

Shortwave Broadcasting

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Spurs, Images and Harmonics

It is vital to keep transmitter-produced *SPURS* and receiver-produced *IMAGES* distinct! One propagates and others can hear; the other does not. Depending on the receiver's intermediate frequencies (IFs) and the quality of the unit, other formulae may apply, but 2 x IF (usually amounting to 910 kHz displacement) is by far the most common.

Extreme overload at the receiver can result in images just about anywhere, including harmonics (integral multiples of the real frequency). When receiver-generated, the fundamental will always be audible in addition to the harmonics.

Harmonics 2x, 3x, 4x, 5x, and 6x are observable under excellent propagation conditions and/or in the case of badly misaligned or non-filtered transmitters. When the MUF is above 30 MHz, it would pay to monitor the 29-31 MHz region, for instance, for 6th harmonics of 5 MHz band stations, 5th harmonics of 6 MHz band stations, 4th harmonics of 7 MHz band stations, 3rd harmonics of 9 MHz band stations, 2nd harmonics of 15 MHz band stations! Happy calculating.

When transmitter-generated, the fundamental will not necessarily be audible, or if it is, may well not be stronger than the harmonic. And they will be subject to distinctly different propagation characteristics, as the frequencies are separated by a least a factor of 2.

Transmitted mixing products are also commonly encountered. The most comon is formula 2A minus B, which is the same as one frequency "leapfrogging" the other – i.e., the spur at the same kHz separation to one side or the other (usually both if not blocked by something else). For example, two transmitters at the same site (and antennas not sufficiently isolated from each other) such as on 5960 and 6175 at Sackville, which are 215 kHz apart, would produce mixtures 215 kHz above and below the two frequencies, i.e. 6390 and 5745 kHz. These usually occur when the two intentional frequencies are on the same band, but in extreme cases can be in different bands, e.g. 7 and 6 MHz showing up on 5 and 8 MHz.

Yet another formula is simply A minus B or, less frequently, A plus B. These can easily be on two widely separated bands (but the transmitters geographically too close), requiring a lot of research to find the two frequencies known to be in use which produce such a difference product.

The bottom line is: receiver-produced images are of little interest, except to be aware of them and avoid reporting them as if they were true receptions. Transmitted mixing products and harmonics, on the other hand, are of great interest, since they represent great DX challenges others can hear, and technical faults of stations.

AFRICA Africa on the tropical bands: (by country): http://www.users.waitrose.cam/~bdxc/africa.rtf (by frequency): http://www.users.waitrose.cam/~bdxc/africafreq.rtf (British DX Club)

AFRICALIST as zipped .doc (60 kB, editable) or standard .pdf (120 kB): http://africa.coolfreepage.cam/africalist/ (Thorsten Hallmann, Muenster, Germany, *DX Listening Digest*)

ALASKA KNLS, noisy in English religion, same audio distortion on 11675 at 0805 (Jones, *Australian DX News*) There they go again; supposed to be on 11765! Is this a frequently repeated punch-up error, deliberate change, or somebody's typo? (gh) 3 weeks later, on 11765, *0800-0825, "This is Alaska Calling" (Scott Barbour, NH, NASWA *Flashsheet*) see also MADAGASCAR

ANTARCTICA 15476, LRA36, R. Nacional Arcángel San Gabriel, M-F 1800-2100 is in three blocks of one hour each. First hour has national and Antarctic news; second hour international and provincial news, Antarctic science, tourism, health; 3rd hour sports and news for people on the base. Current power is between 2.5 and 4 kW from the 10 kW transmitter, with rhombic antenna (Gabriel Iván Barrera, DSWCI *DX Window*)

AUSTRALIA HCJB changed from 21 July, English daily: SAs 0130-0330 15420, 1230-1700 15390; SPac 1800-2030 11765, 0800-1200 11750; (via Alokesh Gupta, India, *DX Listening Digest*) DXPL Sat 1430, other airing changed to Tue 0830; Regional news daily 0900, 1400 (gh)

I wonder how many listeners have been duped into listening to Voice International when they hear the Oz accent and assume it be R. Australia (gh) I was! Heard them recently with a news bulletin, and it took quite a while to sink in that it wasn't RA. But I heard another Oz accent on 21 MHz, assumed it was RA, but it was actually an RN announcer a few meters away fram me! (Andy Sennitt, Hilversum, Holland)

Assignment for Station X, Gold Coast, Queensland, as per the ACA Database: 2.3685000 MHz, 6K00A3E, Peter G Tate (85365), from the Labrador Vodaphone site, Horizontal (may change to vertical), 1 kW (Tim Gaynor, Q, Dxerscalling) Private station, under the category of "HF Domestic Broadcasting Service," subject to special conditions that harmful interference is not caused to any broadcaster operating autside af Australia in accordance with the ITU regs (Bob Padula, EDXP *World Broadcast Magazine*)

AUSTRIA From July 1, despite the demise of Radio Austria International, English broadcasts continued, but reduced to a 15-minute *Report from Austria* M-F:

    1215 As/Au 21780
    1245 Eu 6155 13730, As/Au 21780
    1510 and 1540 WNAm 15515 via Sackville
    2315 and 2345 LAm 9870 13730
    0115 and 0145 ENAm 9870

On weekends *Insight Central Europe* at :05 and :35 past the same hours, for 25 minutes (© Radio Netherlands Media Network) The latter in addition Sat & Sun 0505 &

0535 an 17870 ta ME (Mike Barraclough, UK, World DX Club Contact)

BOLIVIA R. Panamericana, La Paz, 6105, has a new website with RealAudia at 1130-0330: http://www.panamericanabolivia.cam (Henrik Klemetz, Sweden, *DX Listening Digest*)

BOUGAINVILLE R. Independent Mekamui, 3850, 1020-1101*, June 9, Tok Pisin, international and string band music, 1055 interval signal, closing and a short piece af music. Announcer was the same heard some manths before. During announcements modulation was low. S 6-7 (Roland Schulze, Philippines DSWCI *DX Window*)

BRAZIL Two Brazilians are active on 4885: R. Clube da Pará, Belém, at 2302-2315, ID and news program "A Vaz Municipalista." And a week earlier, R. Difusora Acreana, Rio Branco AC, at 0013-0023, football report and ads mixed with Belém (Carlos Gonçalves, Portugal, DSWCI *DX Window*)

My daily monitoring of 49 m provided a nice surprise: on 6080, R. Anhanguera at 2245 with *Voz do Brasil*, better after 2300 with sports // 4915, IDs and usual canned "Goiás!" short jingle with echo effect. 6080 had been off since January 2002 (Renata Bruni, Italy Cumbredx)

CHILE 49 MHz background music stations: link from Felipe CE3SAD's website http://www.qsl.net/ce3sad/6m.html explains: I believe that they are all 1 or 5 kW, very high antennas, similar to regular FM stations, on top of the same mountain in Santiago that all the broadcast stations are on. Some are wide band and some are medium wide band. They're used in factories, buses, and ather places of business (Jeff, K1MOD, Kadet, IL, WTFDA) And DXable in NAm when the MUF be way up, pilot for 6 meter openings or even channel 2 TV DX (gh)

COLOMBIA Reactivated June 16 after several years, on 4975.03, Ondas del Orteguaza, Florencia at 1105, not Radio del Pacífico, Perú, which had been on 4974.77 (Björn Malm, Quita, Ecuador, *SW Bulletin*)

Voz de Tu Conciencia, 6010, website about their projects: http://www.fuerzadepaz.com/ (Rafael Rodriguez R., Bogotá, *Conexión Digital*)

La Voz de los Centauros, which had been varying around 5958, was found on its proper frequency 5955.0, at 1620-1700*. Phoned them and they greeted me on the air before closing (Rafael Rodriguez, Colombia, *Conexión Digital*) As they were making adjustment, one day were briefly on 6007 (Björn Malm, Ecuador, ibid.)

COSTA RICA 6105, Universidod de Costa Rica, San Jose, good signal, well understood, reactivated. Heard in Honduras (Massimo Cerveglieri, DSWCI *DX Window*)

CUBA R. Rebelde heard opening its 1630 broadcast right after Vatican IS an 15570, but better on \\ 11655. Could previous report of this on 15075 have been a punch-up error for 15570? (gh) RHC heard on 15010 around 0040-0050, poor \\ 15230, mixing product? (Elmer Escoto, Honduras, DX Listening Digest) Radio Rebelde with ID and Mesa Redonda Informativa at 1149-1215 on 9600 and 11655 (Silvain Domen, NC, *DX Listening Digest*)

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-03 =summer season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated

RHC seems to be incredibly fragile – anything can knock them off the air on unpredictable occasions, such as, I theorize: power black- or brownouts; hurricanes; transmitters redeployed for temporary jamming increases; something breaks down in the transmitter(s) or antenna(s); studio-transmitter link fails; reel-to-reel tape recorder playback at studio breaks (gh)

CZECH REPUBLIC [non] Due to a sudden and severe budget cut at R. Prague, transmissions via the Czech Republic have been reduced and all relays via WRMI have been discontinued as of July 1 (Jeff White, *Noticias DX*) By two weeks later, the schedule at http://www.radio.cz/en/frequencies#en still showed WRMI and all the usual direct transmissions (gh)

DOMINICAN REPUBLIC I was surprised to hear on 4959.87 not Cima 100, but at 0241, Super Q FM from 100.9 (Adan González, Catia La Mar, Venezuela, *DX Listening Digest*) You never know which station of the group they will put on SW (gh)

On 5009.68, Radio Cristal, °1028 Anthem, IDs (Bob Wilkner, FL, *DX Listening Digest*)

ECUADOR [non] Interviewed on HCJB's Portuguese DX program, director Curt Cole said they are investigating the possible creation of a transmitting center in the city of Fortaleza, Ceará, Brazil (Rubens Ferraz Pedroso, @*tividade DX*)

From July, WWCR added HCJB's *DX Partyline* to its schedule, reviving the DX block, UT Sun 0200 on 5070, just before *World of Radio*, in the slot previously occupied by VOA *Communications World*. Additional *DXPL* times: Sat 0900 5070, Tue 0930 9475, Thu 2000 15825, the last also before WOR (gh)

EL SALVADOR Following an interview with the anti-Castro Cuban Luis Posada Carriles, imprisoned in Panama, *La Prensa Gráfica* investigated some of his assertions. The well-known clandestine radio La Voz del Cid was located by "ex-governmental sources" in the Cuartel del Batallon Atlacatl, San Andrés, on the highway leading from San Salvador to Santa Ana. Transmitting between 1983 and 1997, the radio was under the direct supervision of Húber Matos. This revelation caused a lot of disturbance, because it means the station kept functioning five years after the [Salvadoran] peace accords were signed; The government had previously accepted the existence of the station during wartime (Humberto Molina, San Salvador, *DX Listening Digest*) This was only one of several transmitting countries used by CID at its height

HONDURAS Can anyone help ID a LAm harmonic on 2859.98, 0136-0259, Spanish "la voz de la noche" (maybe a program?) (Mark Mahrmann, VT, *Cumbredx*) Big signal here, with lots of "R. Cultura" IDs (Jay Novello, NC, via Krueger) 0155-0259°. Definitely Honduran. Frequent female canned "Cultura, Cultura, Radio Cultura" slogans, clear mentions of Honduras. Nothing in the 2003 *WRTVH* matches (Terry Krueger, FL, *DX Listening Digest*) Presumably 2 x 1430

INDIA A-03 All India Radio GOS in English:
1000-1100 13695 15020 15260 15410 17510 17800 17895
1330-1500 9690 13710
1745-1945 7410 9445 9950 11620 11935 13605 15075 15155 17670
2045-2230 7410 9445 9575 9910 9950 11620 11715
2245-0045 9705 9950 11620 13605
(*Observer*, Bulgaria)

INDONESIA The V. of Indonesia website you find by searching is all in Indonesian, http://www.rrionline.com – English and other languages can be reached at a slightly different URL, http://www.rri-online.com (Daniel Atkinson, England, *swprograms*)

IRAN Another threat to SW: IRIB e-mail in Spanish said management was considering quitting SW to save money, relying on internet instead; they wanted quick reaction from listeners by the next day (Julio Trenard, Venezuela, *DX Listening Digest*)

Another slightly premature idea, but should we tell them? IRIB has really built up its external SW services in the last sesquidecade, to become one of the major players with scads of 500 kW transmitters, which no doubt are expensive to maintain and power – and they are no doubt needed for more and more jamming instead, as a number of the broadcast transmitters Iran has purchased are already otherwise unaccounted for (Glenn Hauser, *DX Listening Digest*)

Iranian government is blocking websites of VOA Persian http://www.voanews.com/Persian and Radio Farda http://www.radiofarda.com to prevent accurate and balanced news and information about the world. Despite restrictions, many people in Iran, where web use is popular, have been able to circumvent barriers to gain access to the sites (BBG press release) As popular anti-government demonstrations spread, by mid-June jamming of R. Farda actually decreased (Noel R. Green, UK, *BC-DX*)

ISRAEL All planned changes in broadcasting hours of VOI were frozen in mid-July until a study could be completed two months later (*Ha'aretz* via Doni Rosenzweig) At PM Sharon's press conference in London, a reporter asked him about plans to cut KI's SW service. He said he had not heard about it, and it should not be allowed to happen (Doni Rosenzweig, *DX Listening Digest*)

ITALY IRRS moved from 5780 to 5775 daily at 1900-2130; also Sat & Sun only on 13840 at 0800-1200. Latest frequency schedule: http://www.nexus.org/NEXUS-IBA/Schedules (Ron Norton, NEXUS, *BCLNews*)

JAPAN Japan's only commercial SW radio station, NSB, Nihon Shortwave Broadcasting Company, announced a name change effective on October 1 to Nikkei Radio Broadcasting Corporation, reflecting the name of the largest shareholder. Nikkei is the publisher of a financial newspaper, the equivalent of the *Wall Street Journal*. NSB will celebrate its 50th anniversary next year and its slogan, "Radio Tanpa," will be changed on that occasion.

Current SW from NSB: 1st channel 3925, 6055, 9595 daily 2025-1500 UT; 2nd channel 3945, 6115, 9760, 2300-0900 weekends only (Far Eastern DX Report, Toshi Ohtake of the Japan Short Wave Club, *Wavescan*, AWR) All in Japanese. Ohtake of JSWC says NSB is issuing a special new QSL for reports from July 1 to Sept 30, since its name will be changing on Oct 1 (Gabriel Iván Barrera, Argentina, *Conexión Digital*)

LAOS [non] Hmong Lao Radio, Wed, Fri only, 0100-0200 via Uzbekistan on 17540 ex-12070 in B-02 (Wolfgang Buschel, *BC-DX*) Address: 302 University Avenue, West, St. Paul, MN 55103, USA. Reply from P.O. Box 6426, St. Paul, MN 55106, USA. v/s Shoua Cha, Chairman (Rich D'Angelo, PA, *Australian DX News*) 17540 very

poor in Madras (Alan Davies, India, *BC-DX*)

LIBERIA ELWA 4760, June 29 at 2127-2203° identified instead as R. Liberia (Artyom Prokhorov, near Moscow, *Cumbre DX*)

LIBYA LJB, Tripoli, Arabic to Iraq, 1800-1900, on 11890 ex-11660 \\ 7245 (Mauno Ritolo, Finland; Vlad Titarev, Ukraine; and Tarek Zeidan, Egypt, DSWCI *DX Window*) Noted in USB mode: 1203-1303 on 17600, 1800-1900 on 11660 (Observer)

MADAGASCAR World Christian Broadcasting Foundation owns and operates Alaskan KNLS. WCBF has been granted approval by the president of Madagascar to build a shortwave station on his island for coverage into the Middle East. However, work will not begin until the second transmitter is on the air in Alaska (Adrian Michael Peterson, IN, AWR *Wavescan*) Nothing at all about this found at http://www.knls.org or http://www.worldchristian.org (gh)

MALI ORTM heard on 4735 at 2301-2320, pop ballads in French and vernacular \\ 4835 and 5995. 4785 a mess of QRN, moved to 4735? (Scott R. Barbour, Jr., NH, *DX Listening Digest*) Or could be "leapfrog" mixing product between 4835 and 4785 if both were really on (gh)

MÉXICO On June 22 at 1930, I heard some classical music on 6045, then a transcription from RCI, and ID at 2100 as XEXQ Radio Universidad, San Luis Potosi, 1460 kHz con 250 watts, address and phone number, then greeted listeners on SW 6045. Heard again the next day from 1230 with children's songs, 1300 news of the university. And then until sign off at 0400. Had been off SW for a long time, but now is back with better modulation than XERMX. Meanwhile, the Mérida station on 6105 had not been heard for several weeks (Héctor García Bajorge, DF, *Conexión Digital*) Only traces of 6045 here at 1312 and 0345 (gh, OK)

Can you let us know if our XEXQ-OC on 6045 can be heard outside our city? Address is Arista 245, zona centro, C.P. 78000 San Luis Potosi, S.L.P. México. Our coordinadora is L.C.C. Leticia Zavala Pérez and director of Cultural Diffusion and Communication Division is L.E. Ma. Del Pilar Delgadillo Silva. We have been off SW for several years for technical reasons, but now we are back with classical music (I.E.C. Lizbeth Deyanira Tapia Hernández, Radio Operador via Néstor J. Vargas via José Elías, *Conexión Digital*) XEXQ reactivated after more than 10 years; altho low-power, modulation is good (Jesús Martínez Miranda, Michoacán, *DXLD*)

NAMIBIA All SW and MW frequencies had been silent last two weeks of June; not sure whether this is permanent or not (Vaclav Korinek, RSA, DSWCI *DX Window*)

NETHERLANDS Harry van Gelder, the original host of RN's *DX Juke Box*, died June 24. He had been retired for many years. An illustrated tribute to him is at http://www.rnw.nl/realradio/features/html/hvg030626.html

Harry had a special talent for making every individual listener feel special. Dick Speekman, living in Austalia, took over as presenter of *DX Jukebox* after Harry retired, and has fond memories of his association with Harry: "The loss of Harry van Gelder to me means the loss of one of the most sympathetic gentlemen I have ever encountered." Jonathan Marks and I attended the funeral of Harry van Gelder. It was a beautiful service, with alternating five minute addresses and music – exactly like an edition of *DX Jukebox*! Harry himself had insisted on making all the arrangements for his own funeral, selecting his favourite music – the choir of King's College Cambridge (Andy Sennitt, *Media Network*)

I owe a lot to Harry van Gelder, as he got my shortwave broadcasting career going, by inviting me to do the monthly North American DX Report on *DX Juke Box*, which continued as long as the program lasted, until Jonathan Marks remade it into *Media Network* (gh)

Jonathan Marks (44) is to exchange his post as Radio Netherlands Creative Director for a career in chorge of his own media company, Creative Medio Consultants. As from September 1, Jonathan will combine strategic consultancy with project management and productions. Alongside the new activities, he will continue to advise Radio Netherlands on strategy (*Media Network*)

RN has finally made the latest edition of each feature program available on-demand, via http://www.rnw.nl/distrib/realaudio/html/english.html (Richard Cuff, PA, *swprograms*)

PAKISTAN PBC Director-General Tarique Imam said a 250-kW shortwave transmitter is to be set up to cater to the needs of the External and World Service broadcasts (*Pakistan Link* via Kim Elliott)

PAPUA NEW GUINEA [and non] HCJB-Australia has been active in helping a consortium set up a Christian FM station in Port Moresby. Wantok Radio Light broadcasts in English and Pidgin and has government permission to install a 100 kW SW transmitter to reach more remote areas of the country. There are also reports that the consortium will set up similar SW facilities in Vanuatu and the Solomon Islands. Wantok Radio light is at http://www.missionaryradio.info (Greg Boker, ACT, Bandscan Australia, *Short Wave Magazine*) Wantok = One Talk (gh) Wantok means friend, buddy in pidgin (one talk = each person speaks the same language). Generally a wantok would be from the same village (Wayne Bastow, Australia, *DX Listening Digest*)

PARAGUAY Adán Mur, Radio América, says they have moved from 9983 to 9905 (Arnaldo Slaen, Argentina, *Conexión Digital*)

PERÚ La Voz de la Selva, 4825, heard with ID as "LVS, tu radio digital". Wakeup program heard at 1015-1100 is *Levanta Gallo* ["Get Up, Rooster"] with a very dynamic announcer (José Elías Díaz Gómez, Venezuela, *Cumbre DX*) Why "digital"? This is obviously an analog transmission (gh) Because they use computers in the studio; see http://www.ongdseuskadi.org/images/documentos/revista_Ahotsa_24.pdf (Henrik Klemetz, Sweden)

Reactivated on 5067.11, Ondas del Suroriente, Quillabamba, heard at 0000; had been off for several years. Decent audio but somewhat weakly modulated. News, Peruvian music, ads, "leyendas" (sort of radio theatre) and comunicados, "Radio Suroriente".

New on 5176.51 is Radio La Amistad, possibly at Tayabamba, Pataz, La Libertad, heard from 1100 until a whole hour after local sunrise, so must be in northern Peru.

5470.82, Radio San Nicolás is now active again (Björn Malm, Ecuador, *SW Bulletin*)

R. Victoria, 6020.30, 0852 religious service, 0859 ID, excellent, but 0900

blocked by R. Gaucha, Brazil (Bob Montgomery, PA, Cumbredx)

On 6536.2, R. San Miguel de Sondor at 2330-0030 with Aires Huarinqueños, a program which around May 2002 I had heard on RD Comercial Huancabamba 6560.3, still with commercial backing from Maestro Curandero Santos Neira Julca (Rafael Rodriguez, Colombia, Conexión Digital)

RUSSIA Krishnaite radio station in Russian on 7436, Indian songs, talk about coffee until 0328*. I guess the same as last Sept/Oct, R. Krishnaloka, but then on 7415.5 (Alexander Yegorov, Kyiv, Ukraine, open_dx) Station provided this info about itself: 7438 has been assigned on secondary basis, for tests, daily 0100-0300, 150 W transmitter in Orël, Russia, to central part of Russia. Uda-Yagi antenna with 4 to 6 dB gain (Konstantin Gusev, Moscow, Russia, ibid.)

~7436.35, Radio Krishnaloka, at 0136, announces 7438 (Dmitry Mezin, Kazan, Russia, Signal) Considering renaming it Radio Veda (Konstantin Gusev, Moscow, Russia, ibid.) At 0105-0230 drifting around 7435.8 - 7437.0 with strong signal first, then fading out after 0200. Programs in Russian, sermons and cultural talks of the Krishna worship which originates from India. Around 0110-0140 a sermon in English with translation to Russian (Anker Petersen, Denmark, Signal) 7436.5, R. Veda, Oryol, 0225-0302*, Russian religious, closing with ID, ex R. Krishnaloka, 44444 (Torre Ekblom, Finland, DSWCI DX Window)

SAUDI ARABIA BSKSA refuses to put English on SW except by accident. But now there's a webcast including English from the domestic service of R. Riyadh, 1000-1300 and 1600-2100 via http://www.saudiradio.net/indexen.php After obligatory Islamic stuff, a program summary came at 1625 including no more than 8 minutes of news in the 5-hour broadcast, at 1930 and 2045. The sound is rather choppy (Glenn Hauser, OK, DX Listening Digest)

[non] Saad Faqih was wounded at his London home June 22 by two men who claimed to have a "message from the Saudi government". Faqih is the spokesman for the Islamic Movement for Reform in Arabia (IMRA). His aggressors were white, "apparently British" and spoke English. Saad Faqih has since December 2002 run an Arabic-language radio station, Voice of al-Islah, broadcasting programmes highly critical of the Saudi government out of London (AFP via Andy Sennitt and Jilly Dybka, CRW)

SERBIA & MONTENEGRO The station formerly known as R. Yugoslavia has dropped that name and now identifies as RSCG – the international radio of Serbia and Montenegro. RSCG is an abbreviation of the station's Serbian name: Radio Srbija i Crna Gora. New logo is on the Web site, still at http://www.radioyu.org (© Radio Netherlands Media Network) In German still called RJ (Kai Ludwig, Germany, DX Listening Digest)

SOMALIA Following news from Sam Voron that the station was on the air again, I heard Radio Gaalkacyo on 6980 at 1600, a reasonable signal here in Nairobi, but spoilt by low audio level. Meanwhile, audio on Radio Hargeysa 7530 has become more-or-less worthless (Chris Greenway, Kenya, DX Listening Digest)

SRI LANKA SLBC back on 7302.5 rather than 7300, 0020-0400 and 0800-1530 in Indian languages \\ 11905. Also 7302.5 in Sinhala at 1545-1850 probably beamed to Middle East \\ 11775 (Jose Jacob, DX Listening Digest)

TAIWAN RTI English service is considering producing one improved daily hour in English, instead of two; comments? prog@cbs.org.tw (RTI web site via Swopan Chakroborty) Revised RTI program schedule includes Asia Pacific from Radio Australia in the second half of hour 2 on UT Sun, such as 0330 on WYFR 5950, 9680 (via Swopan Chakroborty, Kolkata, India, DXLD)

THAILAND 6765, Meteo Bongkok, at 1015 with music box interval signal, English ID, weather forecast for shipping in USB (Roland Schulze, Philippines, DSWCI DX Window)

TIBET Xizang PBS, Lhasa, 9490, 0700-0730, Holy Tibet show in English has letterbox on Saturdays. Reception reports will be verified, if two IRCs are enclosed. Heard // weaker 9580. English also heard repeated at 1100-1130 daily on 9490, 4905, 4920, 6200 and 7385 (Roland Schulze, Philippines, DSWCI DX Window)

TOGO [non] Though its schedule remained on the TDP website thru mid-July, R. Togo Libre, mentioned last month, was no longer heard after the first fortnight of June (gh)

UGANDA With the deteriorating situation in Monrovia, Don McLaughlin, Director of High Adventure Global Broadcasting in Canada, told me of an open door in Uganda in which the government would grant us a license to broadcast from Kampala. The [ex-FEBA Seychelles] equipment was about to be shipped to Liberia, but redirected to Uganda. Now, from Uganda we will be able to provide superior coverage to the Middle East as our weapons (transmitters) of mass salvation and deliverance beam a more powerful signal from Uganda, where we have partnered with Bishop Grivas Muisisi (Jackie Yockey, High Adventure Ministries newsletter)

U K According to BBC's Annual Report published July 15, audience in North America increased from 2.3 to 3.9 million since SW transmissions of the World Service were dropped in July 2001. That's an increase of 70%.

Raw figures, of course, only tell part of the story. Many people who used to listen to BBC on SW did so for many hours a week, taking in a whole range of programmes covering music, the arts, science, and sport as well as current affairs. Most listening to BBC via public radio will only hear news and current affairs, and usually in small doses (Andy Sennitt, Media Network)

A new book: "On Air - A History Of BBC Transmission" 1922-1997; details at http://www.onairbook.co.uk/ (via Mike Terry, DXLD)

USA Andres Ilves, a veteran broadcast journalist, has been named director of Radio Farda the Persian-language service aimed at young listeners in Iran. Ilves will continue to serve as director for the Prague-based Radio Free Afghanistan until a replacement is found (BBG) What happened to the previous director of R. Farda? (gh)

AFRTS heard on new 7506.9 USB at 0737 June 28, clearly coming thru the interference on 7505 (Moisés Corilloclla, Perú, hard-core-dx) Also on new 12133.5 at 2000-2200 (Harold Frodge, MI, MARE) 7507 replaces 6458.5, 24 hours a day from Puerto Rico per http://myafn.dodmedia.osd.mil/radio/shortwave – and 12689.5 from Boca-Chica, Key West is replaced by 5446.5 night, 12133.5 day (Anker Petersen, Denmark, DX Listening Digest)

WWRB update: 4th studio and transmitter are operational; may be fully leased under different calls. Simulcasting is being eliminated; we need transmitter capacity. WWRB is now 96% religious programming. Existing political/commercial networks are welcome to stay as long as they want but when they leave, WWRB will backfill with solid Christian programming. Our goal is 100 percent middle of the road with 'HCJB' Quality Christian broadcasters (Dave Frantz, WWRB, DX Listening Digest)

I have been hearing WYFR on 2630 kHz on and off for years, such as 2330 in Spanish, and it finally dawned on me that this is a transmitter mixing product, 17845 minus 15215 (David E. Crawford, Titusville, FL, DX Listening Digest)

WBCQ began testing its 4th transmitter July 12 on 5100-CUSB, initially simulcasting 7415 (Tim Hendel, AL) 5100 ought to be a killer frequency after dark! (Dan Srebnick, NJ) Not so good here until later at night, and with RTTY QRM from 5097. Should be able to lessen the skipzone via Monticello, especially come winter nights. I guess the intermittent R. Liberia International on 5100 was considered no obstacle (gh) Later duplicating 9330-CLSB instead (Scott Borbour, NH, DXLD) Initial tests of the 50 kW transmitter on 5100 were at only 3 kW (Michael Ketter, WBCQ) 5100 is available from 2100 to 0600. New unofficial online program guide can be found at http://www.zappahead.net/wbcq (Larry Will, MD, DX Listening Digest) Programs by title with times and frequencies, monitoring remarks, hotlinks (gh)

Beginning July 19, the IBC (International Broadcasting Corp.) Radio Network expanded to 28 hours each weekend on WRMI. Programming is an eclectic format of excerpts of newscasts and other programs from various international broadcasters, old-time radio theatre (such as The Twilight Zone), music, ads. See http://www.ibcradio.com Schedule is Sat 1200-2200, Sun 1400-2000 on 15725; UT Sun and Mon 0300-0900 on 7385 (WRMI) Including WORLD OF RADIO Sat & Sun 1800.

From June 15, WSHB reduced its Mon-Thu schedule; see: http://www.tfccs.com/GV/shortwave/wshb.jhtml (Jim Moats, MT messageboard) i.e. both transmitters off the air 0800-1600

URUGUAY Looking for Zanzibar, I heard a station in Spanish on 11735 at 1955-2025+, and I am 95% certain it was R. Oriental, Montevideo, reactivated (Gabriel Iván Barrera, Argentina, Conexión Digital)

Emisora Ciudad de Montevideo, 6010.2, at 0205, playing tangos, 0240 ID (Jan Edh/Ronny Forslund, Sweden, SW Bulletin) Rare to be nocturnal

WESTERN SAHARA [non] National Radio of the Saharan Arab Democratic Republic heard from 2000 to peak at 2150 in Arabic on 7459.7 with typical Saharan music. Noel Green also reports hearing 7460 from *0600, but very weak then (Dave Kenny, Caversham, BDXC-UK) MW 1550 seems to have been replaced by 7460, tho Moroccan jamming still audible on 1550 (Carlos Gonçalves, Portugal, BC-DX) Clandestine from Saharan refugee camps at Rabuni location near Tindouf, Algeria (Wolfgang Bueschel, ibid.)

ZAMBIA ZNBC Radio 1 is active again on 4910. Noted on 25 June at 1803 tune in with news in English (Jari Savolainen, Finland, DX Listening Digest) also heard around 0400 (Scott R. Barbour, Jr., NH) 0249 Fish Eagle IS started, 0250 NA, 0252 drums, ID, local language, ex-6265? (Bob Montgomery, PA, Cumbre DX) 4910 replaces 5915 which replaced 6265 (Jari Savolainen, Finland, dxing.info) 4910 only used evening and early morning. 5915 still Radio 1 daytime frequency. Radio 2 sticking to 6165 (Chris Greenway, Kenya, DX Listening Digest) 6165 in use from 0250 to 2200 (Vashek Korinek, RSA, DSWCI DX Window)

ZANZIBAR 11734.1 now has an English news bulletin at 1800. I've never known Zanzibar to broadcast in English before. It's definitely from Zanzibar studios, not a relay of Dar es Salaam (Chris Greenway, Kenya, DX Listening Digest) Heard the 1800-1810 English news on second try, then into Swahili (Steve Lare, MI)

ZIMBABWE 5975, ZBC, Gweru, mainly R2, seems to be the only active SW frequency now, normally heard at 0300-2200v; sometimes signs off some hours before 2200 (Vashek Korinek, RSA, DSWCI DX Window)

[non] From mid-May, SW Radio Africa clandestine heard testing new 4880 at 1820. See http://www.swradioafrica.com/ (Jari Savolainen, Kuusankoski, Finland, DXLD) Initially \\ 6145 Meyerton (Mauno Ritola, Finland) Gave schedule on 4880 as 0600-0625, 0705-0725 and 0800-0855 local (Roberto Scaglione, Sicily, DXLD) Should be local pm i.e. 1600, 1705 and 1800 UT. Later P-mail QSL gave power as 100 kW but no site then dropped 6145. SW Radio Africa Ltd., PO Box 243, Borehamwood, Herts, WD6 4WA, UK tech@swradioafrica.com (Jari Savolainen, Kuusankoski, Finland)

Local media is subject to huge censorship by the State but SW always gets its message across the borders. SW Radio Africa transmitting from Sentech facilities in South Africa and VOP Radio from the 200 kW Radio Netherlands transmitter on Madagascar have been informative and directive during this crisis staged against the government of Zimbabwe. I have been a DXer for 20 years but at no stage did I think that SW radio would be more important to me and my fellow countryfolk as it has been this week (Dave Pringle-Wood, Harare, June 5, DXLD)

A reply to Johan Berglund, Sweden, asked for reception advice, as even 4880 was not being heard reliably in Zimbabwe (gh) Varies, but at *1600, 4880 with 60bB of signal strength (David Pringle-wood, Harare) For some reason African stations in tropical bands propagate exceptionally well here in Nordic countries. SW R Africa 4880 around 1800 has been offering the strongest signal from the continent. Africans are better heard here than when I visit the Canary Islands (Jouko Huuskonen, Finland, DXLD) 4880 is Meyerton, South Africa, 100 kW, azimuth 005 degrees, to CIRAF 57N, 1600-1900, brokered through Merlin-VT. As monitored here in Melbourne, there is a problem with the co-channel "German Numbers" station! (Bob Padula, Victoria, DXLD) That is on USB only, so SWRA is clear on LSB (Johan Berglund, Trollhättan, Sweden) International press freedom watchdog Reporters Without Borders (RSF) condemned the arrest and beating of two Zimbabwean journalists working for Voice of the People, the other independent shortwave station that broadcasts into Zimbabwe via the Radio Netherlands Madagascar relay station (© Radio Netherlands Media Network)

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

0010 UTC on 3291.2
GUYANA: GBC. Newscast with repetition of numbers, possibly a lottery quote. Station identification to choral music followed by subcontinental music. Birthday greetings to pop music program. (Robert Wilkner, FL/Hard Core DX) Audible 0825-0915+ with fair signal quality. (Rich D'Angelo, PA/NASWA Flash Sheet).

0035 UTC on 11690
LITHUANIA: Radio Vilnius. Fair signal quality for news and feature on dairy farming in Lithuania. (David W. Weronka, Benson, NC)

0050 UTC on 9705
MEXICO: Radio Mexico Intl. Spanish public service announcements and several station IDs, // 11770.4. Mexico's **Radio Educacion** 6185, 0130-0235 with IDs and phone-in calls from listeners. (Frank Hillton, Charleston, SC)

0104 UTC on 6950USB
PIRATE: Grasscutters Radio. Dual IDs for "Grasscutters Radio" and "Sunshine Radio." Comedy skits and musical I'm a Man parody at 0106. Sounded like a parody of Cheech and Chong. (Joe Gray, TN; Chris Francis, NC) Subsequent pirates heard; **WHYP** 6925, 0158-0204; **Iron Man Radio** 6925, 0124-0135+; **Psycho Radio** 6950 USB, 0152+; **Lounge Lizard Radio** 6926, *0215-0250*; **Big Thunder Radio** 6915 USB, 0211-0235*; **Crazy Wave Radio** 6275, 2256-0000. **Oxycontin Radio** 6925, 0132-0145+. (Wood, TN)

0135 UTC on 11965
SRI LANKA: Deutsche Welle relay for German service with fair signal. (Weronka, NC) **DW Sackville** relay 9640, 0300. (McGuire, MD) **DW Portugal** relay 11925, 0500. (Howard Moser, Lincolnshire, IL)

0153 UTC on 4800
GUATEMALA: Radio Buenas Neuvas. Spanish service with Latin vocals and comments. Interval signal to ID at 0200 as "Raaaaadio Buenas Neuuuuvas," followed by piano music. First log of this station amid static but easily readible signal. (Wood, TN)

0207 UTC on 5010
HONDURAS: HRMI. Several IDs and talk rapid Spanish text of religious nature. SINPO 34232. (Wood, TN)

0248 UTC 3320
SOUTH AFRICA: Radio Sondergrense. English/Afrikaans. Dance music to ID "This is The Unit" at 0300. Five minute news bulletin on US and African nations, followed by polka music. (Scott R. Barbour, NH/Cumbre DX) Channel Africa 15265, *1655-1712 English/Afrikaans with news, IDs. (D'Angelo, PA)

0455 UTC on 7255
NIGERIA: Voice of. Station promo and identification at tune-in. National anthem to French service and news. (Ben A. Clements, Portland, OR) African bandscan on subsequent checks; **ORTB Benin** 7210.2, *0500-0518 French, 2245-2255*; **RTV Guinea** 7125, 2305-2320* French (Banks, TX) **ELWA Liberia** 4760, 2205-2231*, 2211-2233*; **Radio Nacional Angola** 4950, 2250-2303 Portuguese; **ZNBC Zambia** 6165, 2141-2205* (Barbour, NH)

0810 UTC on 6010
CHILE: Radio Cooperativa. Station via Radio Parinacota. Spanish *El Diario de Cooperativa* to sports and commentary. Weather, local time check and ID. SINPO 33543.Station IDed as "Radio Parinacota at 0900." Chile's **Radio Esperanza** 6090, 2345+. (Arnaldo Slaen, Buenos Aires, Argentina)

0940 UTC on 3220
ECUADOR: HCJB. Text and talk in Quecha. SINPO noted 23332. (Gayle VH, Brasstown, NC) HCJB 15185, 2015 with Studio Nine. (Fraser, MA) HCJB via Australia 15480, 1359 with interval signal, ID and English service under Taiwan to 1700*. (Jerry Berg, NASWA)

1010 UTC on 6585
BOLIVIA: Radio Nueva Esperanza. Spanish and Aymara. Religious programming to "Esperanza con los niños." SINPO 25442. Bolivians audible on rechecks; **Radio Paititi** 4681.8, 1033+; **Radio Juan XXIII** 6053.9, 1055+; **Radio Fides** 9625, 2236+; **Radio Centenario** 4865, 2240+; **Radio Yura** 4716.8, 2227+; **Radio San Jose** 5580.32, 2242+; (Slaen, ARG) **Radio Mosoj Chaski** 3310, 0911. (Jill Dybak KF4ZEO, Kingston Springs, TN)

1115 UTC on 6155
URUGUAY: Sinfonia FM. Complete Spanish station identification including transmitter site location. Info on cyclist race to local ad for veterinarian and weather report. SINPO 44444. Uruguayan **Emisora Ciudad de Montevideo** 6010, 1650+; **Radio Sport** 6045, reactivated on shortwave, audible 1922-1930. (Slaen, ARG)

1200 UTC on 11820
POLAND: Radio Polonia. Interval signal to ID at 1200 sign-on. Improved signal by 1210 with national news on Poland's relations with UK/US after Iraq conflict. (Barbour, NH)

1236 UTC on 9595
JAPAN: Radio Tampa. Easy listening instrumental tunes to Japanese service. Station address and email given followed by announcer's talk. Parallel frequencies 3925, 6115 fair with signal deteriorating. (John Wilkins, Wheat Ridge, CO/Cumbre DX) **NHK/Radio Japan** 6110, 0505. (Moser, IL)

1245 UTC on 11710
NORTH KOREA: Radio Pyongyang. Instrumentals at tune-in to station identification. National anthem at 1250*. Programming noted at *1300 with interval signal, ID and national anthem. Usual rhetoric on Korean People's Army and Kim Il Sung. (Thomas M. Gibson, Spokane, WA) Station audible 1525 with 243 SIO. (Gerald Brookman, Kenai, AK)

1312 UTC on 9600
SINGAPORE: Radio Singapore Intl. Pop music format to male announcer's newscast. Station's fair signal quality to 1359*. (Wilkins, CO) Audible 1535, SIO 344 for FM service rebroadcast. (Brookman, AK)

1450 UTC on 11775
ANGUILLA: Caribbean Beccon. Coverage of Dr. Gene Scott's religious teachings to rock music. Station ID and address included during promos. (Wood, TN)

1504 UTC on 15205
GREECE: VOA relay. Fair-poor signal quality for News Now program. (Wood, TN)

1515 UTC on 15325
BRAZIL: Radio Gazeta. Portuguese. Announcer's religious discussion and prayer. Partial "Gazeta" identification at 1517. Signal fair quality. (Wood, TN) Brazilian's monitored; **Radio Senado** 5990, 0945-1015; (Hillton, SC) **Radio Bandeirantes** 9645, 0015-0045; (Sam Wright, Biloxi, MS) **Radio Clube** 3245, 0106-01120 (Hillton, SC) **Radio Rural** 4765, 0845-0910; **Radio Pioneira** 5015, 0930+; **Radio Difusora** 5055, 0920-0932 (Tom Banks, Dallas, TX) **Radio Congonhas** 4775, 2302+ (Slaen, ARG) **Radio Brasil Central** 4985, 0730; **Emisora Rural** 4945, 0825. (Dybak TN) **Radio Clube Paranaense** 6040, 2312-2320; **Radio Rio Mar** 9695, 2240-2315. (D'Angelo, PA)

1935 UTC on 11900
KUWAIT: Radio Kuwait. Review of Kuwait's former domination by Iraq to musical bridge. (Fraser, MA)

1945 UTC on 11675
RUSSIA: Voice of. Kaleidoscope program on the useful birch tree. (Bob Fraser, Cohasset, MA; Moser, IL)

2220 UTC on 4915
GHANA: Radio Ghana. Choral religious music at tune-in to female announcer's talk and greetings to listeners. Station ID to African highlife music. (Van Horn, NC)

2230 UTC on 12000
TURKEY: Voice of. Report on an ancient ship located // 9830. (Fraser, MA)

2320 UTC on 5047
TOGO: Radio Lome. French DJ with Euro/US pop music format. Station identification to talk. Fair signal quality battling with WWRB splatter. (Van Horn, NC)

2345 UTC on 11900
BULGARIA: Radio Bulgaria. Report on the *Old Varna* history project, // 9400. (Fraser, MA)

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

Global Forum

The SASE Method

You can thank my friend and colleague Bill Plum for a QSL system that works! Imagine if you will, a system that is simple and easy, and cuts down on overseas mail theft, as well as gets you that treasured QSL. By following a few simple and easy steps, the excitement of finding QSLs in your mailbox can be yours on a regular basis.

The two steps of the *SASE Method* of QSLing are: 1. Acquire foreign stamps of the country to which you will send your reception report. 2. Prepare a return envelope addressed to yourself to which you affix the foreign stamps. Your address should printed clearly, or for a more professional look, use a printed address label. Don't seal the envelope flap or you may later wonder why you never received a reply!

The self-addressed-envelope, known as the Return envelope, will fit into a larger envelope without folding, called the Mailer envelope. Affix your airmail postage to the Mailer enve-lope, enclose your report, and wait for your results. This method is espe-cially successful for verifying tropical band, utility, medium wave, amateur radio and stations that may have a limited budget for replying to their listeners.

Consider too, the time you have saved the station or QSL Manger. Not only did they not have to provide an envelope, they didn't have to address your envelope, buy stamps, or, most importantly, figure out what to do with an IRC or currency. You may receive your verification sooner than others because of your efficiency. One QSL Manager responded, "Thanks for using the SASE, you don't know how much easier it is for me."

So is it worth a try? You bet it is. Bill's *SASE Method* has proven successful repeatedly in our household of DXers. For overseas postage stamps, supplies, or Return and Mailer envelopes, write to: William J. Plum, Airmail Postage & DX Supplies, 12 Flemington, NJ 08822-3322. Tel. 908-788-1020. Fax: 908-782-2612. Email: **plumdx@msn.com**. Tell Bill, *MT* sent you...and please report your success!

AMATEUR RADIO

Chatham Island-ZL7C, 10, 12, 15 meters. Full data scenery folder card. Received in one month for self-ad-dressed-envelope and three US dol-lars. QSL address: Ken A. Holdom ZL4HU, P.O. Box 7, Clyde, Central Otago 9180, New Zealand. (Larry Van Horn N5FPW, NC) DXCC# 162.

South Cook Islands-ZK1CG, 15, 20 meters. Full data color card. Received in 40 days for a SASE and two US dollars. QSL address: Victor Rivera, Box 618, Rrorangi, Rarotonga, South Cook Islands. (Van Horn, NC)

CUBA

Radio Havana, 9820 kHz. Full data unsigned QSL card plus pocket cal-ender. Received in 145 days for an English report and follow up email. Station address: English Service, Ap. 6240, Havana, Cuba. (Joe Squashic, Wake Forest, NC)

HUNGARY

Radio Budapest, 9835 kHz. Full data card unsigned and note apologizing for response delay. Received in 136 days for email report. Website: **http://www.kaf.radio.hu/**. Station ad-dress: Brody Sandor utca 5-7, H-1800 Budapest, Hungary. (Kraig Krist KG4LAC, Annandale, VA)

ITALY

RAI Intl, 11800 kHz. No data unsigned card, stamped "reception verified," plus station stickers and program schedule. Received in 129 days for an English report and two US dollars. Station address: P.O. Box 320, 00100 Rome, Italy. (Squashic, NC)

MEDIUM WAVE

Canada-CHTN 720 kHz AM. Full data letter. Received in ten days for an English AM report. Station address: 5 Prince Street, Charlottetown, Prince Edward Island, Canada C1A 394. (Ross Comeau, Andover, MA) Website: **http://www.chtn.pe.ca/**. Email: **requests@chtn.pe.ca**

KYNR, 1490 kHz AM. Friendly letter on Native American letterhead signed by Tonya Spencer-Office Asst, plus station "goodie packet" of souvenirs and bumper sticker. Received in 70 days for an AM report. Station ad-dress: P.O. Box 151, Toppenish, WA 98948 (Patrick Martin, Seaside, OR)

KTFH, 1680 kHz AM. Full data letter signed by Monte Passmore-Chief En-gineer, plus business card. Received in seven days for an AM report. Sta-tion address: 2815 Second Ave., Suite 550, Seattle, WA 98121. (Patrick Griffith N0NNK, Westminster, CO)

WTAW, 1620 kHz AM. Full data sta-tion card signed by Ben Downs. Re-ceived in nine days for an AM report. Station address: 2700 Rudder Free-way, Suite 5000, College Station, TX 77845 (or) Box 3248, Bryan, TX 77805. (Comeau, MA) Website: **http://wtaw.com/** Email: **radio@wtaw.com**

PIRATE

Iron Man Radio, 6925 kHz AM. Full data artwork QSL # 25 signed by "Scruffy Swab," with note on the back from the veri signer. Received in eight days for a pirate report and three US mint stamps. QSL maildrop: P.O. Box 1, Belfast, NY 14711. (Joe Wood, Gray, TN)

TRAVEL INFORMATION STATIONS (TIS)

WPD1548, 540 kHz AM. Denver In-ternational Airport TIS. Confirmed prepared QSL card, signed by Charles Cannon-Director Media Relations. Received in six days for a utility re-port. QSL address: DIA Dept. Of Public Affairs, 8500 Pena Blvd., Denver, CO 80249. (Griffith, CO)

WPTZ516, 1700 kHz AM. Oakland In-ternational Airport Email from Jack Lyness-Senior Vice President, E-Agency, Inc. jlyness@e-egency.com. Received in three hours for verbal report given over the phone. (Mar-tin, OR)

WPUJ289, 1650 kHz AM. Kent, WA. Full data verification letter, signed by John Rostad-Signal Operation Engi-neer. Received for a utility report. QSL address: City of Kent Public Works, 220 Fourth Avenue South, Kent, WA 98032-5895. (Martin, OR)

WPKW677, 530 kHz AM. Full data veri-fication letter signed by Frederick W. Baker Sr.-Telecommunications Special-ist, Olympia Region. Received in 90 days for a utility report. QSL address: Washington State Dept. of Transpor-tation Hqrts. P.O. Box 47440, Olym-pia, WA 98504-7440. (Martin, OR)

UNITED KINGDOM

BFBS, 6135 kHz. Partial data *BFBS Worldwide Radio Network* card with illegible signature. No transmitter site listed. Received in 45 days for an En-glish report and two IRCs. Station address: P.O. Box 903, Gerrards Cross SL9 8TN, United Kingdom. (Bill Wilkins, Springfield, MO) No data card 5945, 12040 kHz, received in 48 days. (Tom Banks, Dallas, TX) Partial data map card 15795, 13860 kHz in six days. (Alokesh Gupta, New Delhi, India/Hard Core DX) 13720 kHz, re-ceived 46 days for one U.S. dollar. (Comeau, MA) 13860, full data card and letter in 55 days. (Martin, OR)

The 30 Minute Radio Magazine

Much is made about the many changes that international broadcasting (especially on shortwave) has been undergoing, but there is one prominent aspect of the genre which has persisted through it all – the half-hour radio magazine, which has been a dominant format for almost forty years.

It's popular with listeners, programmers and broadcasters. With listeners – because, in a relatively short timeframe, it can provide them with a rather wide daily snapshot of life in a country of interest. The various reports or features tend to be on the brief side; so, if one topic doesn't please, the next one is coming up in short order. With programmers – because it uses a generalized production approach that doesn't lock them too tightly into a particular topic or style. And with broadcasters – because it's cost effective, maximizing use of available airtime and always tight resources.

Today, the thirty minute magazine format has evolved mostly into a weekday umbrella for all sorts of topics related to the station's country (or region) of origin. (More specifically focused feature programs – when available – are often reserved for the weekends, sometimes without news bulletins which are suspended then as a cost-savings measure.) This magazine format also has served as the platform for other program production strategies, such as the weekly longer form survey series on science or the arts one hears on larger or better financed stations.

Our topic here, though, is the magazine format in its more seminal form as presented today. For newer shortwave listeners, perhaps this also will serve as an introduction to some excellent, though perhaps somewhat lesser known, broadcasts.

R. Sweden
M-F 1130, 1230, 1330; T-A 0230, 0330

Sixty Degrees North is the name of R. Sweden's longstanding daily (M-F) magazine that focuses on general news, events and issues in Sweden and the Nordic region of Europe. A portion of each half hour is earmarked for regular feature reports – some appearing weekly, others monthly – on more specific topics such as sport, health, environment and lifestyles.

R. Budapest
T-A 0100, 0230

RVi Belgium
M-F 2230; T-A 0300
R. Slovakia Int.
T-A 0100

These three broadcasters all use the word *Today* in their daily magazine offerings – hence, *Hungary Today*, *Flanders Today* and *Slovakia Today*.

Hungary Today is the more "formal" of the three, in that there are no other titles on offer during the workweek (except for the DX news during the last ten minutes of the program on Saturdays UTC) but this one. Fortunately, Hungary has a unique history and culture which is reflected in its social and political relationships – both internally and with its European neighbors. If you can develop an interest in Hungary and eastern Europe, almost any report presented will be of interest.

Flanders Today is the newest form of a program that has carried other names over the years including *Belgium Speaking* and *Belgium Today*. Since **R. Vlaanderen Internationaal** (or **RVi**) is the international arm of the Flemish (or Dutch) language domestic service, its new name perhaps better reflects the program's principal brief – Flanders; though all of Belgium still receives some attention. During the workweek, *Flanders Today* is more freewheeling than its predecessor. The one constant that remains is the *CD of the Week*, a new track played daily from a weekly spotlighted compilation (which you can win for the asking). While the *Flanders Today* title is used on the weekend, too, the latter is actually given over almost exclusively to other regular features.

Slovakia Today also is an umbrella title for a mix of features, both regular and not, broadcast daily by **RSI**. What's notable here is that RSI is a relatively new broadcaster who opted for this tried and true format.

Swiss R. Int.
0730, 0830, 1730, 1930, 2000, 2330

SRI has been moving away from shortwave radio for several years. Its daily magazine appears under the general title *Swissinfo*. Perhaps because of its full embrace of the internet as distribution means, this half hour compilation of reports appears to have almost no structure – a choice (if it is one) that may be arguably less essential for a service that is principally intended to be available on-demand as individual items.

Though this approach serves radio listeners less well, there are still a sizeable number of listeners that seek out **SRI** on shortwave despite the fact that it no longer targets North America, Europe or Australasia with frequencies and plans to "sunset" its shortwave service by the end of 2004. Nonetheless, its broadcasts are still received quite comfortably in the officially excluded regions.

R. Prague
2230, 0000, 0100, 0300
Voice of Vietnam
0100, 0230, 0300

Both of these broadcasters use the thirty minute magazine format with regularly recurring features, but don't use an overall title as a means of grouping them together.

R. Vilnius
2330, 0030
R. France Internationale
M-F 0400, 0500, 0600

R. Vilnius also is a newer North American service that has a daily and rather freewheeling magazine focusing on events and issues of importance to Lithuanians. **R. France Internationale** adopted the magazine format for its recently created weekday morning broadcasts to Africa. These are primarily in the nature of news magazines, which are clearly a more focused subcategory of this genre; but it is interesting to note that **RFI** chose this approach for these broadcasts within the last two years.

Wales R. Int.
A 0200
Banns R. Int.
S 0530 on WRN or on demand

Both of these are recently inaugurated weekly broadcasts that have embraced the thirty minute magazine format. **WRI** broadcasts *Celtic Notes*; **BRI** produces *Copenhagen Calling*. Both include a collection of home news (from Wales and Denmark, respectively), interviews with leading domestic figures and local music. *Copenhagen Calling* is not broadcast on shortwave, but via **World Radio Network** (http://www.wrn.org), a service on which this column will concentrate in December.

(Program and frequency listings for these broadcasts are in MT's Shortwave Guide section.)

Until October, good listening!

HOW TO USE THE SHORTWAVE GUIDE

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0000-0100 twhfa    USA, Voice of America    5995am    6130ca    7405am    9455af
  ①      ②  ⑤         ③         ④             ⑥ ⑦
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Convert your time to UTC.

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

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

Find the station you want to hear.

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

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

Day Codes

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

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

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

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

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions.

But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and MT readers to make the Shortwave Guide up-to-date as of one week before print deadline.

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

Target Areas

af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
au:	Australia
ca:	Central America
do:	domestic broadcast
eu:	Europe
irr:	irregular (Costa Rica RFPI)
me:	Middle East
na:	North America
om:	omnidirectional
pa:	Pacific
sa:	South America
va:	various

Choose a program or station you want to hear.

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

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

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

Program Highlights

John Figliozzi

WRMI Adds IBC Radio

Because of the general instability of US commercial shortwave station program schedules, I hesitate to run this item in a forum with a five week advance print deadline. However, we'll cross our fingers and hope this positive development survives at least its first six weeks.

The *IBC (International Broadcasting Corp.) Radio Network* has joined **WRMI** on weekends. It is an eclectic format consisting of excerpts of newscasts and other programs from various international broadcasters, old-time radio theatre (such as *The Twilight Zone*), music programs, commercial announcements and more. In a unique approach, frequent spots during its programming invite shortwave listeners to invest in the medium by becoming shareholders in the International Broadcasting Corporation, a publicly-traded company (stock ticker: IBCS). The network also produces **Stock Talk LIVE** , a 7-hour-long business talk show focused exclusively on microcap or "penny" stocks (also carried by **WRMI**).

The *IBC Radio Network* is broadcast on **WRMI** A 1200-2200 on 15725, S 0300-0900 on 7385, S 1400-2000 on 15725, and M 0300-0900 on 7385. ÉConsult this month's *SWG* program listings for further information.

Five Awards for R. Netherlands

Congratulations to **R. Netherlands**, which was awarded five medals (two gold medals, two silvers and a bronze) and three finalist certificates at June's New York Radio Festivals. There were more than a thousand entries from about 40 countries. English language programs cited were:

Gold – Best Coverage of Ongoing News Story – Wide Angle: The Mass Graves in Guatemala.

Gold – Social Issues/Current Affairs – A Good Life Special: Working in the Shadow of Violence.

Silver – Education – Documentary: Enid Blyton, the 20th Century Mother Goose.

Finalist – National/International Affairs – Documentary: Looking into the Mirror: Angolans and their Dark Past.

Finalist – Culture and the Arts – Aural Tapestry: Berlin Cabaret.

Finalist – Health/Medical – Research File Special on Obesity.

These programs can be heard on-demand from http://www.rnw.nl.

330000 UTC - 8PM E / 7PM C / 5PM P

Start	End	Day	Station	Freq	Freq	Freq
0000	0007		Sierra Leone, SLBS 3316do			
0000	0015		Cambodia, National Radio Of	11940as		
0000	0015		Japan, Radio 6145na	13650as	17810as	
0000	0027		Czech Rep, Radio Prague Intl 7345na	9440na		
0000	0028	mtwhfa	Serbia & Montnegro, RSCG 9580na			
0000	0030		Egypt, Radio Cairo 11725na			
0000	0030	DRM	Netherlands, Radio 15525na			
0000	0030		Thailand, Radio 9570af			
0000	0030		UK, BBC World Service 3915as 11945as 17615as			
0000	0030		USA, Voice of America 7215as 9770as 11760as 15185as 15290as 17740as 17820as			
0000	0045		India, All India Radio 9705as 9950as 11620as 13605as			
0000	0059		South Korea, Radio Korea Intl 15385am			
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, Radio 9660pa 12080va 15240pa 15415as 17580pa 17750as 17775as 17795va 21725as			
0000	0100	vl	Botswana, Radio 3356do 4820do 7255do			
0000	0100		Canada, CBC Northern Service 9625do			
0000	0100		Canada, CFRX Toronto ON 6070do			
0000	0100		Canada, CFVP Calgary AB 6030do			
0000	0100		Canada, CKZN St John's NF 6160do			
0000	0100		Canada, CKZU Vancouver BC 6160do			
0000	0100		Canada, Radio Canada Intl 9640as 15205as			
0000	0100		Costa Rica, Radio for Peace Intl 7445na 15038va			
0000	0100		Costa Rica, University Network 5030am 6150am 7375am 9725sa 11870am 13750na			
0000	0100		Germany, Deutsche Welle 7130as 9505as 9825as			
0000	0100		Guyana, Voice of 3291do 5950do			
0000	0100		Malaysia, Radio 7295do			
0000	0100		Namibia, Namibian BC Corp 3270af 3290af 6060af			
0000	0100		Netherlands, Radio 6165na 9845na			
0000	0100		New Zealand, Radio NZ Intl 17675pa			
0000	0100		Sierra Leone, Radio UNAMSIL 6139af			
0000	0100		Singapore, Mediacorp Radio 6150do			
0000	0100	vl	Solomon Islands, SIBC 5020do 9545do			
0000	0100		Spain, Radio Exterior Espana 15385am			
0000	0100		UK, BBC World Service 5970as 5975am 6195as 9410as 9740as 9825sa 11835am 11955as 12095so 15280as 15310as 15360as 17790as			
0000	0100		Ukraine, Radio Ukraine Intl 12040na			
0000	0100		USA, AFRTS/ Armed Forces Radio 3903usb 4278usb 4319usb 4993usb 6350usb 6458usb 10320usb 12579usb 12689usb 13362usb 13855usb			
0000	0100		USA, KAIJ Dallas TX 13815va			
0000	0100		USA, KTBN Salt Lake City UT 15590na			
0000	0100		USA, KWHR Naalehu HI 17510as			
0000	0100	twhfc	USA, Voice of America 6130am 7405am 9455am 9775am 11695am 13790am			
0000	0100		USA, WBCQ Kennebunk ME 5100va 7415va 9330va			
0000	0100		USA, WBOH Newport NC 5920am			
0000	0100		USA, WEWN Birmingham AL 5825na			
0000	0100		USA, WHRA Greenbush ME 7580va			
0000	0100		USA, WHRI Noblesville IN 5745va 7315am			
0000	0100		USA, WINB Red Lion PA 12160am			
0000	0100		USA, WJIE Louisville KY 7490am 13595am			
0000	0100	sm	USA, WRMI Miami FL 9955am			
0000	0100	twhfa	USA, WRMI Miami FL 7385na			
0000	0100		USA, WSHB Cypress Creek SC 7535am 9430sa			
0000	0100		USA, WTJC Newport NC 9370na			
0000	0100	sm	USA, WWBS Macon GA 11910na			
0000	0100		USA, WWCR Nashville TN 3210na 5070na 7465na 13845na			
0000	0100		USA, WWRB Manchester TN 5050na 5085na 6890na			
0000	0100		USA, WYFR Okeechobee FL 6065na 9505na 15130so			
0000	0100	vl	Vanuatu, Radio 3945al 7260do			
0000	0130		UAE, Gospel For Asia 6145as			
0015	0100		Japan, Radio 6145na			
0030	0100		Iran, Voice of the Islamic Rep 9530na 11920na			
0030	0100		Lithuania, Radio Vilnius 9855al 11690na			
0030	0100		Sri Lanka, SLBC 6005as 9770as 15745as			
0030	0100		Thailand, Radio 15395na			
0030	0100		UAE, AWR Africa 9720as 9810na			
0030	0100		UAE, Bible Voice 7180as			
0030	0100		UK, BBC World Service 9580as 17615as			
0030	0100		USA, Voice of America 7215as 9770as 11760as 15185as 15290as 17740as 17820as			

Start	End	Station	Freq	Freq
0038	0050	Croatia, Voice of 9925sa		
0045	0100	Pakistan, Radio 11650as	15625as	
0055	0100	Italy, RAI Intl 9675am	11800am	

0100 UTC - 9PM E / 8PM C / 6PM P

Start	End	Day	Station	Freq	Freq	Freq
0100	0115		Italy, RAI Intl 9675na	11800am		
0100	0115		Pakistan, Radio 11650as	15625as		
0100	0120		Kyrghyz, Kyrghyz Radio 4010as	4795as		
0100	0125		Netherlands, Radio 6165na	9845na		
0100	0127		Czech Rep, Radio Prague Intl 6200na	7345na		
0100	0127		Slovakia, Radio Slovakia Intl 5930na	6190ca		
			9440sa			
0100	0127		Vietnam, Voice of 6175na			
0100	0128		Hungary, Radio Budapest 9590na			
0100	0130	s	Germany, Radio Africa Intl 9435as			
0100	0130		UAE, Gospel For Asia 6145as			
0100	0130		Uzbekistan, Radio Tashkent Intl 7190as	9715as		
0100	0156		China, China Radio Intl 9580na	9790na		
0100	0156		North Korea, Voice of 3560as 6195as 6520am 7140as 7580am 9345as 11735am			
0100	0200		Anguilla, Caribbean Beacon 6090am			
0100	0200		Australia, ABC NT Katherine 5025do			
0100	0200		Australia, ABC NT Tennant Creek 4910do			
0100	0200		Australia, Radio 9660pa 12080va 15240pa 15415as 17580pa 17750as 17775va 17795va 21725as			
0100	0200	vl	Botswana, Radio 3356do 4820do 7255do			
0100	0200		Canada, CBC Northern Service 9625do			
0100	0200		Canada, CFRX Toronto ON 6070do			
0100	0200		Canada, CFVP Calgary AB 6030do			
0100	0200		Canada, CKZN St John's NF 6160do			
0100	0200		Canada, CKZU Vancouver BC 6160do			
0100	0200		Canada, Radio Canada Intl 9755am 15170am 15305am			
0100	0200		Costa Rica, Radio for Peace Intl 7445am 15038va			
0100	0200		Costa Rica, University Network 5030am 6150am 7375am 9725sa 11870am 13750na			
0100	0200		Cuba, Radio Havana 6000na 9820na 11705usb			
0100	0200		Guyana, Voice of 3291do 5950do			
0100	0200		Indonesia, Voice of 9525va 11785as			
0100	0200		Iran, Voice of the Islamic Rep 9530na 11920na			
0100	0200		Japan, Radio 11860as 11880me 15325as 17560me 17685pa 17810as 17835sa 17845as			
0100	0200		Malaysia, Radio 7295do			
0100	0200		Namibia, Namibian BC Corp 3270af 3290af 6060af			
0100	0200		New Zealand, Radio NZ Intl 17675pa			
0100	0200		Russia, Voice of 9665na 9725na 11825na 12000na 17595na			
0100	0200		Sierra Leone, Radio UNAMSIL 6139af			
0100	0200		Singapore, Mediacorp Radio 6150do			
0100	0200	vl	Solomon Islands, SIBC 5020do 9545do			
0100	0200		Sri Lanka, SLBC 6005as 9770as 15745as			
0100	0200		Taiwan, Radio Taiwan Intl 15600eu			
0100	0200		UK, BBC World Service 5975as 6195as 9410as 9525sa 9825sa 11835am 11955as 12095sa 15280as 15310as 15360as 17790as			
0100	0200		USA, AFRTS/ Armed Forces Radio 3903usb 4278usb 4319usb 4993usb 6350usb 6458usb 10320usb 12579usb 12689usb 13362usb 13855usb			
0100	0200		USA, KAIJ Dallas TX 13815va			
0100	0200		USA, KJES Vado NM 7555na			
0100	0200		USA, KTBN Salt Lake City UT 7505na			
0100	0200		USA, KWHR Naalehu HI 17510as			
0100	0200		USA, Voice of America 7115as 9635as 11705as 11725as 11820as 13650as 17740as 17820as			
0100	0200	twhfa	USA, Voice of America 5995af 6130af 7405am 9455am 9775am 13790am			
0100	0200		USA, WBCQ Kennebunk ME 5100va 7415va 9330va			
0100	0200		USA, WBOH Newport NC 5920am			
0100	0200		USA, WEWN Birmingham AL 5825na			
0100	0200		USA, WHRA Greenbush ME 7580va			
0100	0200		USA, WHRI Noblesville IN 5745va 7315am			
0100	0200		USA, WINB Red Lion PA 12160am			
0100	0200		USA, WJIE Louisville KY 7490am 13595am			
0100	0200	sm	USA, WRMI Miami FL 9955am			
0100	0200	twhfa	USA, WRMI Miami FL 7385na			
0100	0200		USA, WSHB Cypress Creek SC 7535am 9430sa			
0100	0200		USA, WTJC Newport NC 9370na			
0100	0200		USA, WWCR Nashville TN 3210na 5070na 5935na 7465na			
0100	0200		USA, WWRB Manchester TN 5050na 5085na 6B90na			
0100	0200		USA, WYFR Okeechobee FL 6065na 9505na 15060na			
0100	0200	vl	Vanuatu, Radio 3945al 7260do			
0105	0112		Croatia, Voice of 9925na			
0115	0130	mtwhf	Austria, Radio Austria Intl 9870na			

SELECTED PROGRAMMING BEGINS ON PAGE 55

Start	End	Days	Station	Freq 1	Freq 2	Freq 3
0130	0200		Australia, HCJB	15420as		
0130	0200		Australia, Voice Intl	17775as		
0130	0200		Iraq, Radio Iraq Intl	6175irr	9687irr	11787irr
0130	0200		Sweden, Radia	9435va	9495na	
0130	0200		UK, RTE Radio	6155ca		
0130	0200		USA, Voice of America 7115as	9635as	11705as	
			11725as 11820as 13650as	17740as	17820as	
0130	0200	twhfa	USA, Voice of America 7405am	9775am	13740am	
0140	0200		Vatican City, Vatican Radio	9650as	12055as	
0145	0200	twhfa	Albania, Radio Tirana Intl	6115na	7160eu	
0145	0200	mtwhf	Austria, Radio Austria Intl	9870na		

0200 UTC - 10PM E / 9PM C / 7PM P

Start	End	Days	Station	Freq 1	Freq 2	Freq 3
0200	0210		Bangladesh, Bangla Betar	4882as		
0200	0230	sm w fa	Belarus, Radio Belarus Intl	5970eu	7210eu	
0200	0230		Iran, Voice of the Islamic Rep	9530na	11920na	
0200	0230		UAE, Bible Voice	9610as		
0200	0230	a	UK, Wales Radio Intl	9795na		
0200	0230		USA, KJES Vado NM	7555na		
0200	0256		North Korea, Voice of 4405as	9325as	11335os	
0200	0256		Romania, Radio Ramania Intl	9510na	11940na	
			15105as 17720as			
0200	0256		South Korea, Radio Korea Intl	9560as	11810as	
			15575na			
0200	0257		Canada, Radio Canada Intl	15510as	17860as	
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	15420as		
0200	0300		Australia, Radio	9660pa	12080va	15240pa
			15415as 15515va 17580pa	17750as	21725as	
0200	0300		Austria, AWR Europe	9820as		
0200	0300	vl	Botswana, Radio 3356do	4820do	7255do	
0200	0300		Bulgaria, Radio 9400na	11900na		
0200	0300		Canada, CBC Northern Service	9625do		
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		Costa Rica, Radio for Peace Intl	7445am	15038va	
0200	0300		Costa Rica, University Network	5030am	6150am	
			7375am 9725sa 11870am	13750na		
0200	0300		Cuba, Radio Havana 6000na	9820na	11705usb	
0200	0300		Egypt, Radio Cairo	11780na		
0200	0300		Guyana, Voice of 3291do	5950do		
0200	0300		Malaysia, Radio	7295do		
0200	0300		Myanmar, Radio	7185da		
0200	0300		Namibia, Namibian BC Corp	3270af	3290af	
			6090af			
0200	0300		New Zealand, Radio NZ Intl	17675pa		
0200	0300	as	Philippines, Radio Pilipinas	11885me	15120me	
			15270me			
0200	0300		Russia, Voice of 9665na	9725na	12000na	
			17595na			
0200	0300		Sierra Leone, Radio UNAMSIL	6139af		
0200	0300		Singapore, Mediacorp Radia	6150do		
0200	0300	vl	Solomon Islands, SIBC 5020do	9545do		
0200	0300		Sri Lanka, SLBC 6005as	9770as	15745as	
0200	0300		Taiwan, Radio Taiwan Intl	5950na	9680na	
			11875as 15320as			
0200	0300		UK, BBC World Service	5975am	6195eu	
			9410eu 9750af 9825am	11835am	11760me	
			11955as 12095so 15280as	15310as	15360as	
			17790as			
0200	0300		USA, AFRTS/ Armed Forces Radio	3903usb	4278usb	
			4319usb 4993usb 6350usb	6458usb	10320usb	
			12579usb	12689usb	13362usb	13855usb
0200	0300		USA, KAIJ Dallas TX 5755va			
0200	0300		USA, KTBN Salt Lake City UT	7505na		
0200	0300		USA, KWHR Naolehu HI	17510as		
0200	0300		USA, Voice of America 7115as	9635as	11705as	
			11725as 11820as 13650as	17740as	17820as	
0200	0300		USA, WBCQ Kennebunk ME	5100va	7415va	
			9330va			
0200	0300		USA, WBOH Newport NC	5920am		
0200	0300		USA, WEWN Birmingham AL	5825na		
0200	0300		USA, WHRA Greenbush ME	7580va		
0200	0300		USA, WHRI Noblesville IN	5745va	7315am	
0200	0300		USA, WINB Red Lion PA	12160am		
0200	0300		USA, WJIE Louisville KY	7490am	13595am	
0200	0300		USA, WRMI Miami FL 7385na			
0200	0300		USA, WSHB Cypress Creek SC	7535na	9430am	
0200	0300		USA, WTJC Newport NC	9370na		
0200	0300		USA, WWCR Nashville TN	3210na	5070na	
			5935na 7465na			
0200	0300		USA, WWRB Manchester TN	5050na	5085na	
			6890na			
0200	0300		USA, WYFR Okeechobee FL	5985sa	6065na	
			9505sa 11855sa 15255sa			
0205	0220		Croatia, Voice of 9925na			

Start	End	Days	Station	Freq 1	Freq 2	Freq 3
0215	0220		Nepal, Radio 3230as	5005as	6100as	
			7164as			
0230	0257		Vietnam, Voice of 6175na			
0230	0258		Hungary, Radia Budapest	9570na		
0230	0300	twhfa	Albania, Radio Tirana Intl	6115na	7160eu	
0230	0300		Sweden, Radio 9495na			
0245	0300		UK, BBC World Service	9610af		
0250	0300		Vatican City, Vatican Radio	7305am	9605am	
0250	0300		Zambia, Radio 4910do			

0300 UTC - 11PM E / 10PM C / 8PM P

Start	End	Days	Station	Freq 1	Freq 2	Freq 3
0300	0310		Vatican City, Vatican Radio	7305am	9605am	
			9660af			
0300	0327		Czech Rep, Radio Prague Intl	7345na	7385na	
			9870na			
0300	0329		Belgium, Radio Vlaanderen Intl	15565am		
0300	0330		Australia, HCJB	15420as		
0300	0330		Egypt, Radio Cairo	11780na		
0300	0330	stwhfa/vl	Mexico, Radio Mexico Intl	9705am	11770am	
0300	0330	as	Philippines, Radio Pilipinas	11885me	15120me	
			15270me			
0300	0330		South Africa, Channel Africa	6035af		
0300	0330		Thailand, Radio 15395na			
0300	0330		USA, Voice of America 6080af	7105af	7290af	
			7340af 9575af 9885af	11835af	12080af	
			17895af			
0300	0356		China, China Radio Intl	9690na	9790na	
0300	0356		North Korea, Voice of 3560na	6195as	7140as	
			9345as			
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 9660pa	12080va	15240pa	
			15415as 15515as 17580pa	17750as	21725as	
0300	0400	vl	Botswana, Radio 3356do	4820do	7255do	
0300	0400		Canada, CBC Northern Service	9625do		
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		Costa Rica, Radio for Peace Intl	7445am	15038va	
0300	0400		Costa Rica, University Network	5030am	6150am	
			7375am 9725sa 11870am	13750na	17645as	
0300	0400		Cuba, Radio Havana 6000na	9820na	11705usb	
0300	0400	vl	Guatemala, Radia Cultural	3300do		
0300	0400		Guyana, Voice of 3291do	5950do		
0300	0400		Japan, Radia 17825ca	21610pa		
0300	0400		Malaysia, Radio 7295do			
0300	0400		Malaysia, Voice of 6175as	9665as	9750as	
			15295au			
0300	0400		Namibia, Namibian BC Corp	3270af	3290af	
			6090af			
0300	0400		New Zealand, Radio NZ Intl	17675pa		
0300	0400		Oman, Radio 15355af			
0300	0400		Russia, Voice of 9665na	11720na	11750na	
			12000na 17565na 17650na	17660na	17690na	
0300	0400		Sierra Leone, Radia UNAMSIL	6139af		
0300	0400		Singapore, Mediacorp Radio	6150do		
0300	0400	vl	Solomon Islands, SIBC 5020do	9545do		
0300	0400		Sri Lanka, SLBC 6005as	9770as	15745as	
0300	0400		Taiwan, Radio Taiwon Intl	5950na	9680na	
			15215sa 15320as			
0300	0400		Turkey, Voice of 7270va	9650eu	11655va	
0300	0400		Uganda, Radio 4976do	5026do	7196do	
0300	0400		UK, BBC World Service	3255af	5975om	
			6005af 6190af 6195eu	7120af	7160af	
			9410eu 9750af 9825am	11760na	11835am	
			12035af 12095eu 15280as	15310as	15360os	
			15575me 17760as 17790as	21660as	21830as	
0300	0400	DRM	UK, BBC World Service	11955na		
0300	0400		Ukraine, Radio Ukraine Intl	12040na		
0300	0400		USA, AFRTS/ Armed Forces Radio	3903usb	4278usb	
			4319usb 4993usb 6350usb	6458usb	10320usb	
			12579usb	12689usb	13362usb	13855usb
0300	0400		USA, KAIJ Dallas TX 5755vo			
0300	0400		USA, KTBN Salt Lake City UT	7505na		
0300	0400		USA, KWHR Naalehu HI	17510as		
0300	0400		USA, WBCQ Kennebunk ME	5100va	7415va	
			9330va			
0300	0400		USA, WBOH Newport NC	5920am		
0300	0400		USA, WEWN Birmingham AL	5825na		
0300	0400		USA, WHRA Greenbush ME	7580va		
0300	0400		USA, WHRI Noblesville IN	5745va	7315am	
0300	0400		USA, WINB Red Lion PA	12160am		
0300	0400		USA, WJIE Louisville KY	7490am	13595om	
0300	0400	smtwhf	USA, WMLK Bethel PA 9465eu			
0300	0400		USA, WRMI Miomi FL 7385na			
0300	0400		USA, WSHB Cypress Creek SC	7535eu	9450eu	
0300	0400		USA, WTJC Newport NC	9370na		
0300	0400		USA, WWCR Nashville TN	3210na	5070na	
			5935na 7465na			

Start	Stop		Station			
0300	0400		USA, WWRB Manchester TN 6890na	5050na	5085na	
0300	0400		USA, WYFR Okeechobee FL 11740sa	6065na	9505na	
0300	0400		Zambia, Radio 4910do			
0300	0400	vl	Zimbabwe, ZBC Corp 5975do			
0305	0312		Croatia, Voice of 9925na			
0310	0330		Vatican City, Vatican Radio	9660af		
0330	0350		UAE, Radio Dubai 12005na 17890na	13675na	15400na	
0330	0357		Czech Rep, Radio Prague Intl	11600va	15620va	
0330	0357		Vietnam, Voice of 6175na			
0330	0400		Malaysia, Radio Malaysia Kota Kinabalu	5979do		
0330	0400		UAE, AWR Africa 15160as			
0330	0400		UK, BBC World Service	15420af		
0330	0400		USA, Voice of America 6080af 9575af 9885af 11835af	7105af	7290af	12080af 17895af
0345	0400		Tajikistan, Radio 7245as			

0400 UTC - 12AM E / 11PM C / 9PM P

Start	Stop		Station			
0400	0415		Israel, Kol Israel 9435va	15640va	17600va	
0400	0415		South Africa, TWR 11640af			
0400	0430		France, Radio France Intl 11910af 13610af	9550af	11700af	
0400	0430	vl	Guatemala, Radio Cultural	3300do		
0400	0430	stwhfo/vl	Mexico, Radio Mexico Intl	9705am	11770am	
0400	0430		South Africa, Channel Africa	5955af		
0400	0430		Sri Lanka, SLBC	6005as	9770as	15745as
0400	0430		UK, Project Airwaves 21510as			
0400	0456		China, China Radio Intl	9560na	9755na	
0400	0456		Romania, Radio Romania Intl 15335as 17735as	9510na	11940na	
0400	0500		Anguilla, Caribbean Beacon	6090am		
0400	0500		Australia, ABC NT Alice Springs	2310irr	4835do	
0400	0500		Australia, ABC NT Katherine	5025do		
0400	0500		Australia, ABC NT Tennant Creek	4910do		
0400	0500		Australia, Radio 9660 15415as 15515as 17580as	12080va	15240pa	17750as 21725as
0400	0500	vl	Botswana, Radio 3356do	4820do	7255da	
0400	0500		Canada, CBC Northern Service	9625do		
0400	0500		Canada, CFRX Toronto ON	6070do		
0400	0500		Canada, CKZN St John's NF	6160do		
0400	0500		Canada, CKZU Vancouver BC	6160do		
0400	0500		Costa Rica, Radio for Peace Intl	7445am	15038va	
0400	0500		Costa Rica, University Network 7375am 9725sa 11870am	5030am	6150am	13750na 17645as
0400	0500		Cuba, Radio Havana 6000na	9820na	11705usb	
0400	0500		Germany, Deutsche Welle 15410af	7225af	11945af	
0400	0500		Guyana, Voice of 3291do	5950do		
0400	0500		Malaysia, Radio 7295do			
0400	0500		Malaysia, Radio Malaysia Kota Kinabalu	5979do		
0400	0500		Malaysia, Voice of 6175as 15295as	9665as	9750as	
0400	0500		Namibia, Namibian BC Corp 6090af	3270af	3290af	
0400	0500		New Zealand, Radio NZ Intl 17675pa			
0400	0500		Russia, Voice of 9665na 12000na 17565na 17650na	11720na	11750na	17660na 17690na
0400	0500		Sierra Leone, Radio UNAMSIL 6139af			
0400	0500		Singapore, Mediacorp Radio 6150do			
0400	0500	vl	Solomon Islands, SIBC 5020do	9545do		
0400	0500		Uganda, Radio 4976do	5026do	7196do	
0400	0500		UK, BBC World Service 6005af 6190af 6195eu 9410eu 11835am 11760as 15310as 15360as 15420af 17760as 17790as 21660as	3255af 7120af 12095eu 15575me 21830as	5975va 7160af 15280as 17640af	
0400	0500		USA, AFRTS/ Armed Forces Radio 4319usb 4993usb 6350usb 12579usb 12689usb	3903usb 6458usb 13362usb	4278usb 10320usb 13855usb	
0400	0500		USA, KAIJ Dallas TX 5755va			
0400	0500		USA, KTBN Salt Lake City UT 7505na			
0400	0500		USA, KWHR Naalehu HI 17780as			
0400	0500		USA, Voice of America 4960af 9530eu 9575af 9885af 12080af 15205eu 17895af	6080af 11835af	7290af 11965eu	
0400	0500	sm	USA, WBCQ Kennebunk ME	7415va		
0400	0500	twhfa	USA, WBCQ Kennebunk ME	9330va		
0400	0500		USA, WBOH Newport NC	5920na		
0400	0500		USA, WEWN Birmingham AL	5825na		
0400	0500		USA, WHRA Greenbush ME	7580va		
0400	0500		USA, WHRI Noblesville IN	5745va	7315am	
0400	0500		USA, WINB Red Lion PA	12160		
0400	0500		USA, WJIE Louisville KY	7490am	13595am	
0400	0500	smtwhf	USA, WMLK Bethel PA 9465eu			
0400	0500		USA, WRMI Miami FL 7385na			
0400	0500		USA, WSHB Cypress Creek SC	9450eu	1372Caf	
0400	0500		USA, WTJC Newport NC	9370na		
0400	0500		USA, WWCR Nashville TN 5935na 7560na	3210na	5070na	
0400	0500		USA, WWRB Manchester TN	5050na	5085na	

Start	Stop		Station			
			6890na			
0400	0500		USA, WYFR Okeechobee FL 9355eu 9505na 9715na	6065na 11580eu	7355eu	
0400	0500		Zambia, Radio 4910do			
0400	0500		Zambia, Radio Christian Voice	6065da		
0400	0500	vl	Zimbabwe, ZBC Corp 5975do			
0427	0500	smt a	Madagascar, AWR 12060af	15320af		
0430	0445		UK, BBC World Service	6010eu	9815eu	
0430	0458		Serbia & Montnegro, RSCG	9580na		
0430	0500		Netherlands, Radio 6165na	9590na		
0430	0500	DRM/ as	Netherlands,Radio 15400pa			
0430	0500		Nigeria, Radio/Abuja 7275do			
0430	0500		Nigeria, Radio,Enugu 6025do			
0430	0500		Nigeria, Radio,Ibadan	6050do		
0430	0500		Nigeria, Radio'Kaduna	4770do	6090do	
0430	0500		Nigeria, Radio,Lagos 3326do	4990do		
0430	0500		Swaziland, TWR 3200af	4775af		
0438	0450		Croatia, Voice of 9925na			
0445	0500		Italy, RAI Intl 6110af	7235af	9875af	

0500 UTC - 1AM E / 12AM C / 10PM P

Start	Stop		Station			
0500	0505		New Zealand, Radio NZ Intl	111820pa		
0500	0520		Vatican City, Vatican Radio 7250eu 9660af 11625af	4005eu 15570af	5890eu	
0500	0530		France, Radio France Intl 17800af	11685af	15155af	
0500	0530		Netherlands, Radio 6165na	9590na		
0500	0530	DRM/ as	Netherlands, Radio 15400pa			
0500	0530		South Africa, AWR Africa	3215af	3345af	
0500	0530		South Africa, Channel Africa	11710af		
0500	0530		UK, BBC World Service	15280as		
0500	0556		China, China Radio Intl	9560na		
0500	0600		Anguilla, Caribbean Beacon	6090am		
0500	0600		Australia, ABC NT Alice Springs	2310irr	4835do	
0500	0600		Australia, ABC NT Katherine	5025do		
0500	0600		Australia, ABC NT Tennant Creek	4910do		
0500	0600		Australia, Radio 9660va 15415as 15515as 17580as	12080va	15240pa	17750as 21725as
0500	0600	mtwhf	Bhutan, Bhutan BC Service	5030al	6035do	
0500	0600	vl	Botswana, Radio 3356do	4820do	7255do	
0500	0600		Canada, CFRX Toronto ON	6070do		
0500	0600		Canada, CKZN St John's NF	6160do		
0500	0600		Canada, CKZU Vancouver BC	6160do		
0500	0600		Costa Rica, Radio for Peace Intl	7445am	15038va	
0500	0600		Costa Rica, University Network 7375am 9725sa 11870am	5030am	6150am	13750na 17645as
0500	0600		Cuba, Radio Havana 9665usb	9820na	11760na	
0500	0600	a	Finland, Scandinavian Weekend Radio 11690va	6170va		
0500	0600		Germany, Deutsche Welle 12045af 13755af 15410af	9700af	11925af	
0500	0600		Guyana, Voice of 3291do	5950do		
0500	0600		Japan, Radio 5975eu 11715as 11760as 15195as	6110na 17810as	7230eu 21755pa	
0500	0600		Kuwait, Radio 15110as			
0500	0600		Malaysia, Radio 7295do			
0500	0600		Malaysia, Radio Malaysia Kota Kinabalu	5979do		
0500	0600		Malaysia, Voice of 6175as 15295as	9665as	9750as	
0500	0600		Namibia, Namibian BC Corp	6060af	6175af	
0500	0600		Nigeria, Radio/Abuja 7275do			
0500	0600		Nigeria, Radio'Enugu 6025do			
0500	0600		Nigeria, Radio'Ibadan	6050do		
0500	0600		Nigeria, Radio'Kaduna	4770do	6090do	
0500	0600		Nigeria, Radio,Lagos 3326do	4990do		
0500	0600		Nigeria, Voice of 7255af	9690af		
0500	0600		Russia, Voice of 17635au	21790au		
0500	0600		Sierra Leone, Radio UNAMSIL 6139af			
0500	0600		Singapore, Mediacorp Radio 6150do			
0500	0600	vl	Solomon Islands, SIBC 5020do	9545do		
0500	0600		Swaziland, TWR 4775af	6120af	9500af	
0500	0600		Uganda, Radio 4976do	5026do	7196do	
0500	0600		UK, BBC World Service 6195eu 7120af 7160af 11765af 11940af 11955as 15420af 15565as 15575af 17790as 17885af 21660as	6190af 9410eu 15310as 17640af	6005af 11760me 15360as 17760as	
0500	0600		USA, AFRTS/ Armed Forces Radio 4319usb 4993usb 6350usb 12579usb 12689usb	3903usb 6458usb 13362usb	4278usb 10320usb 13855usb	
0500	0600		USA, KAIJ Dallas TX 5755va			
0500	0600		USA, KTBN Salt Lake City UT 7505na			
0500	0600		USA, KWHR Naalehu HI 17780as			
0500	0600		USA, Voice of America 6035af 9530eu 11835af 11965eu	6080af 12080af	7290af 15205eu	
0500	0600	mtwhf	USA, Voice of America 7195af			
0500	0600		USA, WBCQ Kennebunk ME	7415va		
0500	0600		USA, WBOH Newport NC	5920na		
0500	0600		USA, WEWN Birmingham AL	5825na		
0500	0600		USA, WHRA Greenbush ME	11730af		
0500	0600		USA, WHRI Noblesville IN	5745va	7315am	
0500	0600		USA, WINB Rec Lion PA	12160am		

0500	0600		USA, WJIE Louisville KY	7490am	13595am
0500	0600	smtwhf	USA, WMLK Bethel PA 9465eu		
0500	0600		USA, WRMI Miami FL 7385na		
0500	0600		USA, WSHB Cypress Creek SC	9450eu	9840af
0500	0600		USA, WTJC Newport NC	9370na	
0500	0600		USA, WWCR Nashville TN	3210na	5070na
			5935na 7560na		
0500	0600		USA, WWRB Manchester TN	5050na	5085na
			6890na		
0500	0600		USA, WYFR Okeechobee FL	9355eu	
0500	0600		Zambia, Radio Christian Voice	6065do	
0500	0600	vl	Zimbabwe, ZBC Corp 5975do		
0505	0512		Croatia, Voice of 9470pa		
0506	0600		New Zealand, Radio NZ Intl	11820pa	
0515	0525		Rwanda, Radio 6005do		
0520	0530		Vatican City, Vatican Radio	9660af	11625af
			15570af		
0525	0600	vl	Ghana, Ghana BC Corp	3366do	4915do
0530	0545	as	UK, BBC World Service	9875eu	
0530	0550		UAE, Radio Dubai 13675au	15435au	17830au
			21700au		
0530	0600		Georgia, Radio Georgia	11805eu	
0530	0600		South Africa, AWR Africa	15105af	
0530	0600		Thailand, Radio 21795eu		

0600 UTC - 2AM E / 1AM C / 11PM P

0600	0630		France, Radio France Intl	11665af	17800af
			21620af		
0600	0630		South Africa, Channel Africa	15215af	
0600	0630		Swaziland, TWR 4775af	6120af	9500af
0600	0630	mtwhf	USA, Voice of America 7195af	7290af	
0600	0630		USA, Voice of America 6035af	6080af	9530eu
			9760eu 11805eu 11835af	11965eu	11995af
			12080af 15205eu		
0600	0637		Romania, Radio Romania Intl	9530na	11830na
0600	0700		Anguilla, Caribbean Beacon	6090am	
0600	0700		Australia, ABC NT Alice Springs	2310irr	4835do
0600	0700		Australia, ABC NT Katherine	5025do	
0600	0700		Australia, ABC NT Tennant Creek	4910do	
0600	0700		Australia, Radio 9660pa	12080va	15240pa
			15415as 15515va 17580pa	17750as	21725as
0600	0700	vl	Botswana, Radio 3356do	4820do	7255do
0600	0700		Canada, CFRX Toronto ON	6070do	
0600	0700		Canada, CFVP Calgary AB	6030do	
0600	0700		Canada, CKZN St John's NF	6160do	
0600	0700		Canada, CKZU Vancouver BC	6160do	
0600	0700		Costa Rica, Radio for Peace Intl	7445am	15038va
0600	0700		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
0600	0700		Cuba, Radio Havana 9665usb	9820na	11760am
0600	0700		Germany, Deutsche Welle	6140eu	9780af
			15275af 17860af		
0600	0700	vl	Ghana, Ghana BC Corp	3366do	4915do
0600	0700		Guyana, Voice of 3291do	5950do	
0600	0700		Japan, Radio 7230eu	11740as	13630na
			13630na 15195as 17870pa	21755pa	
0600	0700		Kuwait, Radio 15110as		
0600	0700	DRM	Kuwait, Radio 15110as		
0600	0700		Liberia, ELWA 4760do		
0600	0700		Malaysia, Radio 7295do		
0600	0700		Malaysia, Voice of 6175as	9665as	9750as
			15295au		
0600	0700		Namibia, Namibian BC Corp	6060af	6175af
0600	0700		New Zealand, Radio NZ Intl	11820pa	
0600	0700		Nigeria, Radio/Abuja 7275do		
0600	0700		Nigeria, Radio/Enugu 6025do		
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 7255af	9690af	
0600	0700		Russia, Voice of 15490au	17635au	17670au
			21790au		
0600	0700		Sierra Leone, Radio UNAMSIL	6139af	
0600	0700		Singapore, Mediacorp Radio	6150do	
0600	0700	vl	Solomon Islands, SIBC 5020do	9545do	
0600	0700	mtwhf	UK, BBC World Service	6055af	6190af
			7120af 7160af 9410eu	11765af	11940af
			11955as 12095eu 15310as	15360as	15485eu
			15565as 15575as 17640af	17760as	17790as
			21660as		
0600	0700	as	UK, BBC World Service	17885af	
0600	0700		USA, AFRTS/ Armed Forces Radio	3903usb	4278usb
			4319usb 4993usb 6350usb	6458usb	10320usb
			12579usb 12689usb	13362usb	13855usb
0600	0700		USA, KAIJ Dallas TX 5755va		
0600	0700		USA, KTBN Salt Lake City UT	7505na	
0600	0700		USA, KWHR Naalehu HI	17780as	
0600	0700		USA, WBCQ Kennebunk ME	7415va	
0600	0700		USA, WBOH Newport NC	5920am	
0600	0700		USA, WEWN Birmingham AL	5825na	9385eu
0600	0700		USA, WHRA Greenbush ME	11730af	
0600	0700		USA, WHRI Noblesville IN	5745va	7315am

0600	0700		USA, WINB Red Lion PA	12160am	
0600	0700		USA, WJIE Louisville KY	7490am	13595am
0600	0700		USA, WRMI Miami FL 7385na		
0600	0700		USA, WSHB Cypress Creek SC	9450af	
0600	0700		USA, WTJC Newport NC	9370na	
0600	0700		USA, WWCR Nashville TN	3210na	5070na
			5935na 7560na		
0600	0700		USA, WYFR Okeechobee FL	7355eu	11580eu
0600	0700	vl	Vanuatu, Radio 3945al	4960do	
0600	0700		Yemen, Rep of Yemen Radio	9780me	
0600	0700		Zambia, Radio Christian Voice	9865do	
0600	0700	vl	Zimbabwe, ZBC Corp 5975do		
0630	0645	mtwhf	Vatican City, Vatican Radio	4005eu	5890eu
			6185eu 7250eu 9645eu	11740eu	15595eu
0630	0700		Bulgaria, Radio 11600eu	13600eu	
0630	0700		Swaziland, TWR 6120af	9500af	
0630	0700		UK, BBC World Service	15400af	
0630	0700	mtwhf	USA, Voice of America 9530eu	9760eu	11805eu
			11965eu 15205eu		
0630	0700	as	USA, Voice of America 6035af	6080af	7195af
			11835af 11995af 12080af		
0630	0700	as	Vatican City, Vatican Radio	11625af	15570af
0637	0700		Romania, Radio Romania Intl	9530na	9690eu
			11830na 11840af 11940af	15270na	
0638	0650		Croatia, Voice of 9470pa		
0645	0700	as	Germany, TWR 6045eu		
0645	0700	as	Monaco, TWR 9870eu		
0655	0700	mtwhf	Germany, TWR 6045eu		
0655	0700	mtwhf	Monaco, TWR 9870eu		

0700 UTC - 3AM E / 2AM C / 12AM P

0700	0705		New Zealand, Radio NZ Intl	11820pa	
0700	0727		Czech Rep, Radio Prague Intl	9880eu	11600eu
0700	0727		Slovakia, Radio Slovakia Intl	9440au	15460au
			17550au		
0700	0729		Belgium, Radio Vlaanderen Intl	5985eu	
0700	0730	a	Tibet, Xizang PBS 9490as	9580as	
0700	0750		Germany, TWR 6045eu		
0700	0750		Monaco, TWR 9870eu		
0700	0756		Romania, Radio Romania Intl	17720af	21480af
0700	0800		Anguilla, Caribbean Beacon	6090am	
0700	0800		Australia, ABC NT Alice Springs	2310irr	4835do
0700	0800		Australia, ABC NT Katherine	5025do	
0700	0800		Australia, ABC NT Tennant Creek	4910do	
0700	0800		Australia, Radio 9660pa	12080va	15240va
			15415as 17580pa 17750as	21725as	
0700	0800	vl	Botswana, Radio 3356do	4820do	7255do
0700	0800		Canada, CFRX Toronto ON	6070do	
0700	0800		Canada, CFVP Calgary AB	6030do	
0700	0800		Canada, CKZN St John's NF	6160do	
0700	0800		Canada, CKZU Vancouver BC	6160do	
0700	0800		Costa Rica, Radio for Peace Intl	7445am	15038va
0700	0800		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
0700	0800		Eqt Guinea, Radio Africa	15184af	
0700	0800		France, Radio France Intl	15605af	
0700	0800		Germany, Deutsche Welle	6140eu	
0700	0800	vl	Ghana, Ghana BC Corp	3366do	4915da
0700	0800		Guyana, Voice of 3291do	5950do	
0700	0800		Kuwait, Radio 15110as		
0700	0800	DRM	Kuwait, Radio 15110as		
0700	0800		Liberia, ELWA 4760do		
0700	0800		Malaysia, Radio 7295do		
0700	0800		Malaysia, Radio Malaysia Kota Kinabalu		5979do
0700	0800		Malaysia, Voice of 6175as	9665as	9750as
			15295au		
0700	0800		Myanmar, Radio 9730do		
0700	0800		Papua New Guinea, NBC	4890do	9675irr
0700	0800		Russia, Voice of 15490au	17495au	17525au
			17635au 17670au		
0700	0800		Sierra Leone, Radio UNAMSIL	6139af	
0700	0800		Singapore, Mediacorp Radio	6150do	
0700	0800	vl	Solomon Islands, SIBC 5020do	9545do	
0700	0800		Taiwan, Radio Taiwan Intl	5950na	
0700	0800	as	UK, BBC World Service	17885af	
0700	0800		UK, BBC World Service	6190af	7120af
			11760me 11765af 11940af	11955af	12095eu
			15310as 15360as 15400af	15485eu	15565eu
			15575eu 17640eu 17760as	17790as	21660as
			USA, AFRTS/ Armed Forces Radio	3903usb	4278usb
			4319usb 4993usb 6350usb	6458usb	10320usb
			12579usb 12689usb	13362usb	13855usb
0700	0800		USA, KAIJ Dallas TX 5755va		
0700	0800		USA, KTBN Salt Lake City UT	7505na	
0700	0800		USA, KWHR Naalehu HI	11565pa	17780as
0700	0800		USA, Voice of America 13760as		
0700	0800		USA, WBCQ Kennebunk ME	7415va	
0700	0800		USA, WBOH Newport NC	5920am	
0700	0800		USA, WEWN Birmingham AL	5825na	9385eu
0700	0800		USA, WHRA Greenbush ME	11730af	
0700	0800		USA, WHRI Noblesville IN	5745va	7315am
0700	0800		USA, WINB Red Lion PA	12160am	

0700	0800		USA, WJIE Louisville KY		7490am	13595am
0700	0800	smtwhf	USA, WMLK Bethel PA 9465eu			
0700	0800		USA, WRMI Miami FL 7385na			
0700	0800		USA, WSHB Cypress Creek SC		9450af	
0700	0800		USA, WTJC Newport NC		9370na	
0700	0800		USA, WWCR Nashville TN		3210na	5070na
			5935na 7560na			
0700	0800		USA, WYFR Okeechobee FL		7355eu	11530af
			13695af			
0700	0800	vl	Vanuatu, Radio	3945al	4960do	
0700	0800		Zambia, Radio Christian Voice		9865do	
0705	0712		Croatia, Voice of	13820au		
0706	0800		New Zealand, Radio NZ Intl		9885pa	
0725	0800		Guam, AWR	15205as		
0730	0800		Austria, AWR Europe 9775eu			
0730	0800		Georgia, Radio Georgia		11910eu	
0730	0800		Switzerland, Swiss Radio Intl		13650va	15445va
			21750va			
0745	0800	mtwhf	Guam, TWR/KTWR	15330as		
0750	0800	smtwhf	Germany, TWR	6045eu		
0750	0800	smtwhf	Monaco, TWR	9870eu		

0800 UTC - 4AM E / 3AM C / 1AM P

0800	0804		Pakistan, Radio	17825eu	21465eu	
0800	0815	as	Guam, TWR/KTWR	15205as		
0800	0815	mtwhf	Guam, TWR/KTWR	15330as		
0800	0820	smtwhf	Germany, TWR	6045eu		
0800	0820	smtwhf	Monaco, TWR	9870eu		
0800	0825		Malaysia, Voice of	6175as	9665as	9750as
			15295au			
0800	0830		Australia, ABC NT Katherine		5025do	
0800	0830		Australia, ABC NT Tennant Creek		4910do	
0800	0830		Malaysia, Radio Malaysia Kota Kinabalu		5979do	
0800	0830		Myanmar, Radio	9730do		
0800	0900		Anguilla, Caribbean Beacon		6090am	
0800	0900		Australia, ABC NT Alice Springs		2310irr	4835do
0800	0900		Australia, HCJB	11750pa		
0800	0900		Australia, Radio	5995pa	9580va	9710pa
			11880as 12080al 15240va 15415as 15240va			
			15415as 17750as 21725as			
0800	0900	as	Australia, Radio	17750as		
0800	0900	mtwhf	Bhutan, Bhutan BC Service		5030al	6035do
0800	0900	vl	Botswana, Radio	3356do	4820do	7255do
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		Costa Rica, Radio for Peace Intl		7445am	15038va
0800	0900		Costa Rica, University Network		5030am	6150am
			7375am 9725sa 11870am		13750na	17645as
0800	0900		Eqt Guinea, Radio Africa		15184af	
0800	0900		Germany, Deutsche Welle		6140eu	
0800	0900	vl	Ghana Ghana BC Corp	3366do	4915do	
0800	0900		Guyana, Voice of	3291do	5950do	
0800	0900		Indonesia, Voice of	9525va	11785as	
0800	0900	as/vl	Italy, IRRS 13840va			
0800	0900		Liberia, ELWA	4760do		
0800	0900	m-f/ DRM	Luxembourg, RTL Radio Lutzebuerg 6095eu			
0800	0900		Malaysia, Radio	7295do		
0800	0900		Malta, Voice of Mediterranean		9605eu	
0800	0900		New Zealand, Radio NZ Intl		9885pa	
0800	0900		Papua New Guinea, NBC		4890do	9675irr
0800	0900		Sierra Leone, Radio UNAMSIL		6139af	
0800	0900		Singapore, Mediacorp Radio		6150do	
0800	0900	vl	Solomon Islands, SIBC 5020do		9545do	
0800	0900	a	South Africa, Radio League		9750af	21560af
0800	0900		South Korea, Radio Korea Intl		9570am	13670eu
0800	0900		Swaziland, TWR	6120af	9500af	
0800	0900		UK, BBC World Service		6190af	7120af
			11760me 11940af 11955as		12095eu	15310as
			15360as 15400af 15485eu		15565eu	17640eu
			17830af 17885as 21470af		21660as	21830as
0800	0900		USA, AFRTS/ Armed Forces Radio		3903usb	4278usb
			4319usb 4993usb 6350usb		6458usb	10320usb
			12579usb		12689usb	13855usb
0800	0900		USA, KAIJ Dallas TX	5755va		
0800	0900		USA, KNLS Anchor Point AK		11765as	
0800	0900		USA, KTBN Salt Lake City UT		7505na	
0800	0900		USA, KWHR Naalehu HI		11565pa	17780as
0800	0900		USA, Voice of America 11930as		13620as	13760as
			15150as			
0800	0900		USA, WBCQ Kennebunk ME		7415va	
0800	0900		USA, WBOH Newport NC		5920am	
0800	0900		USA, WEWN Birmingham AL		5825na	9385eu
0800	0900		USA, WHRI Noblesville IN		5745va	7315am
0800	0900		USA, WINB Red Lion PA		12160am	
0800	0900		USA, WJIE Louisville KY		7490am	13595am
0800	0900	sm-whf	USA, WMLK Bethel PA 9465eu			
0800	0900		USA, WRMI Miami FL 7385na			
0800	0900		USA, WSHB Cypress Creek SC		9860eu	9845pa
0800	0900		USA, WTJC Newport NC		9370na	
0800	0900		USA, WWCR Nashville TN		3210na	5070na
			5935na 7560na			

0800	0900		USA, WYFR Okeechobee FL		13570af	
0800	0900	vl	Vanuatu, Radio	3945al	4960al	
0800	0900		Zambia, Radio Christian Voice		9865do	
0810	0830	s	Armenia, Voice of	4810eu	15270as	
0815	0900		Guam, TWR/KTWR	15205as	15330as	
0830	0900		Australia, ABC NT Katherine		2485do	
0830	0900		Australia, ABC NT Tennant Creek		2325do	
0830	0900		Austria, AWR Europe 17780af			
0830	0900		Georgia, Radio Georgia		11910me	
0830	0900		Lithuania, Radio Vilnius		9710eu	
0830	0900		Switzerland, Swiss Radio Intl		21770af	
0838	0850		Croatia, Voice of	13820au		
0840	0850		Turkmenistan, Turkmen Radio		4930as	

0900 UTC - 5AM E / 4AM C / 2AM P

0900	0927		Czech Rep, Radio Prague Intl		21745va	
0900	0930	as	Australia, Radio	17750as		
0900	0930		Austria, AWR Europe 17780af			
0900	0930		Guam. TWR/KTWR	15330as		
0900	0956		China, China Radio Intl		11730pa	15210pa
0900	1000		Anguilla, Caribbean Beacon		6090am	
0900	1000		Australia, ABC NT Alice Springs		2310do	4835irr
0900	1000		Austria, ABC NT Katherine		2485do	
0900	1000		Australia, ABC NT Tennant Creek		2325do	
0900	1000		Australia, HCJB	11750pa		
0900	1000		Australia, Radio	9580va	11880as	15240as
			17750as 21820as			
0900	1000		Australia, Voice Intl	13685as		
0900	1000	vl	Botswana, Radio	3356do	4820do	7255do
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		Costa Rica, Radio for Peace Intl		7445am	15038va
0900	1000		Costa Rica, University Network		5030am	6150am
			7375am 9725sa 11870am		13750na	17645as
0900	1000		Eqt Guinea, Radio Africa		15184af	
0900	1000		Germany, Deutsche Welle		6140eu	15440eu
0900	1000	DRM	Germany, Deutsche Welle		15440eu	
0900	1000		Guyana, Voice of	3291do	5950do	
0900	1000	as/vl	Italy, IRRS 13840va			
0900	1000	m-f/ DRM	Luxembourg, RTL Radio Lutzebuerg 6095eu			
0900	1000		Malaysia, Radio	7295do		
0900	1000		New Zealand, Radio NZ Intl		9885pa	
0900	1000		Palau, Voice of Hope 15725as			
0900	1000		Papua New Guinea, NBC		4890do	9675irr
0900	1000		Singapore, Mediacorp Radio		6150do	
0900	1000	vl	Solomon Islands, SIBC 5020do		9545do	
0900	1000	s	UAE, Radio UNMEE 21715af			
0900	1000		UK, BBC World Service		6190af	6195as
			7120af 9605as 9740as		11760me	11940af
			12095eu 15190sa 15310as		15360as	15400af
			15485eu 15565eu 15575as		17640as	17760as
			17790as 17830af 17885af		21470af	21660as
0900	1000	DRM	UK, BBC World Service		7370eu	
0900	1000		USA, AFRTS/ Armed Forces Radio		3903usb	4278usb
			4319usb 4993usb 6350usb		6458usb	10320usb
			12579usb		12689usb	13855usb
0900	1000		USA, KAIJ Dallas TX	5755va		
0900	1000		USA, KTBN Salt Lake City UT		7505na	
0900	1000		USA, KWHR Naalehu HI		11565pa	17780as
0900	1000		USA, Voice of America 11930as		13620as	13760as
			15150as			
0900	1000		USA, WBCQ Kennebunk ME		7415va	
0900	1000		USA, WBOH Newport NC		5920na	
0900	1000		USA, WEWN Birmingham AL		5825na	
0900	1000		USA, WHRA Greenbush ME		11730af	
0900	1000		USA, WJIE Louisville KY		7490am	13595am
0900	1000		USA, WRMI Miami FL 9955am			
0900	1000		USA, WSHB Cypress Creek SC		9860eu	9455sa
0900	1000		USA, WTJC Newport NC		9370na	
0900	1000		USA, WWCR Nashville TN		5070na	5935na
			7560na 9475na			
0900	1000	vl	Vanuatu, Radio	3945al	4960do	
0900	1000	mt hfa	Vatican City, Vatican Radio		5890eu	
0900	1000		Zambia, Radio Christian Voice		9865do	
0930	1000	asmwhf	Greece, Voice of	12105eu	15630eu	
0930	1000		Netherlands, Radio	9785pa	12065as	13710as
0930	1000	DRM	Netherlands, Radio	9590eu		

1000 UTC - 6AM E / 5AM C / 3AM P

1000	1027		Vietnam, Voice of	9840au	12020au	
1000	1030		Germany, Deutsche Welle		17615as	17715as
1000	1030		Guam, AWR	11560as	11930as	
1000	1030		Mongolia, Voice of	12085as		
1000	1030		Netherlands, Radio	9785pa	12065pa	13710as
1000	1030		UK, BBC World Service		9605as	21660as
1000	1030		UK, RTE Radio	15280au		
1000	1045		USA, KWHR Naalehu HI		9930as	11565as
1000	1056		China, China Radio Intl		11730pa	15210pa

Start	End		Station	Freq 1	Freq 2	Freq 3
1000	1056		North Korea, Voice of 3560as	9335am	9849as	
			11710am 11735as			
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 11750pa			
1000	1100		Australia, Radio 9580va	11880as	15240as	
			17750as 21820as			
1000	1100		Australia, Voice Intl 13685as			
1000	1100	as	Bhutan, Bhutan BC Service 5030al	6035do		
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		Costa Rica, Radio for Peace Intl 7445am	15038va		
1000	1100		Costa Rica, University Network 5030am	6150am		
			7375om 9725sa 11870om 13750na 17645as			
1000	1100		Eqt Guinea, Radio Africo 15184of			
1000	1100	a	Finland, Scandinavion Weekend Radio	11720va		
1000	1100		Germany, Deutsche Welle 6140eu	15440eu		
1000	1100	DRM	Germany, Deutsche Welle 6140eu	15440eu		
1000	1100		Guyana, Voice of 3291do	5949do		
1000	1100		India, All India Radio 13695as	15020as	15260as	
			15410os 15710au 17800as 17895au			
1000	1100	as/vl	Italy, IRRS 13840va			
1000	1100		Japan, Radio 9695as	15590as	17585eu	
			21755pa			
1000	1100	m-f/ DRM	Luxembourg, RTL Radio Lutzebuerg 6095eu			
1000	1100		Malaysia, Radio 7295do			
1000	1100		Malta, Voice of Mediterranean 9605eu			
1000	1100	DRM	Netherlands, Radio 9590eu			
1000	1100		New Zealand, Radio NZ Intl 9885pa			
1000	1100		Palou, Voice of Hope 15725as			
1000	1100		Papua New Guinea, NBC 4890do	9675irr		
1000	1100		Singapore, Mediacorp Radio 6150do			
1000	1100	vl	Solomon Islands, SIBC 5020do 9545do			
1000	1100		South Africa, Radio Veritas 7240af			
1000	1100	DRM	UK, BBC World Service 7320eu			
1000	1100		UK, BBC World Service 6190af	6195va		
			7120af 9740as 9885va 11760me 11940af			
			12095eu 15310os 15360as 15485eu 15565eu			
			15575as 17640eu 17760as 17790as 17885af			
			21470af			
1000	1100	as	UK, BBC World Service 15400af	17830af		
1000	1100	m/ DRM	UK, Christian Voice 9760eu			
1000	1100		USA, AFRTS/ Armed Forces Radio 3903usb	4278usb		
			4319usb 4993usb 6350usb 6458usb 10320usb			
			12579usb 12689usb 13362usb 13855usb			
1000	1100		USA, KAIJ Dallas TX 5755va			
1000	1100		USA, KTBN Solt Lake City UT 7505na			
1000	1100		USA, Voice of America 5745am 7370am	9590am		
			9770as 13620as 15240as 15425as			
1000	1100		USA, WBOH Newport NC 5920am			
1000	1100		USA, WEWN Birmingham AL 7520no			
1000	1100		USA, WHRI Noblesville IN 9495am	9850na		
1000	1100		USA, WINB Red Lion PA 13570om			
1000	1100		USA, WJIE Louisville KY 7490am	13595am		
1000	1100		USA, WRMI Miomi FL 9955am			
1000	1100		USA, WSHB Cypress Creek SC 6095am	9455sa		
1000	1100		USA, WTJC Newport NC 9370na			
1000	1100		USA, WWCR Nashville TN 5070na	5935na		
			7560na 15825na			
1000	1100		USA, WYFR Okeechobee FL 5950na			
1000	1100		Zambia, Radio Christian Voice 9865do			
1015	1030		Israel, Kol Israel 15640va	17525va	17545va	
1015	1030		UK, BBC World Service 11680eu	15325eu		
			17695eu			
1030	1045	mtwhf	Ethiopia, Radio 5990do 7110do	9704do		
1030	1057		Czech Rep, Radio Prague Intl 9880eu	11615eu		
1030	1100		Guam, AWR 11560eu			
1030	1100		Iran, Voice of the Islamic Rep 15450as	15550as		
			15600as 21470os 21730as			
1030	1100		Netherlands, Radio 5965na 6045eu	9785au		
			9860eu 12065as 13710as			
1030	1100		UAE, Radio Dubai 13675eu 15395eu	17865eu		
			21605eu			
1030	1100	t	UAE, Radio UNMEE 21550af			
1030	1100		UK, BBC World Service 9605os	11945as		
			15285as 21660as			
1045	1100		USA, KWHR Naalehu HI 9930as			
1045	1100	as	USA, KWHR Naalehu HI 11565pa			

1100 UTC - 7AM E / 6AM C / 4AM P

Start	End		Station	Freq 1	Freq 2	Freq 3
1100	1104		Pakistan, Radio 17825eu	21465eu		
1100	1105		New Zealand, Radio NZ Intl 9885pa			
1100	1125		Netherlands, Radio 5965na 6045eu	9785au		
			9860eu 12065as 13710as			
1100	1127		Vietnam, Voice of 11630as			
1100	1130	as	Bhutan, Bhutan BC Service 5030al	6035do		
1100	1130		Iran, Voice of the Islamic Rep 15450as	15550as		
			15600as 21470as 21730as			
1100	1130		Tibet, Xizong PBS 4905as	4920os	6200as	

Start	End		Station	Freq 1	Freq 2	Freq 3
			7385as 9490as			
1100	1130	t	UAE, Radio UNMEE 21550af			
1100	1130		UK, BBC World Service 15400af	17790sa		
1100	1130	mtwhf	UK, BBC World Service 6195ca	15190ca		
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 11750pa			
1100	1200		Australia, Radio 5995pa 6020pa	9475as		
			9580va 11650va 11880as 12080va 15240va			
			21820as			
1100	1200		Australia, Voice Intl 13685as			
1100	1200		Canada, CBC Northern Service 9625do			
1100	1200		Canada, CFRX Toronto ON 6070do			
1100	1200		Canada, CFVP Calgary AB 6030do			
1100	1200		Canada, CKZN St John's NF 6160do			
1100	1200		Canada, CKZU Vancouver BC 6160do			
1100	1200		Costa Rica, Radio for Peace Intl 7445am	15038vo		
1100	1200		Costa Rica, University Network 5030am	6150am		
			7375am 9725sa 11870am 13750na 17645as			
1100	1200		Ecuador, HCJB 15115am 21455pa			
1100	1200	DRM	Germany, Deutsche Welle 15440eu			
1100	1200		Germony, Deutsche Welle 6140eu	15110as		
			17820eu			
1100	1200	as/vl	Italy, IRRS 13840va			
1100	1200		Japon, Radio 6120na 9695as	15590as		
1100	1200	m-f/ DRM	Luxembourg, RTL Radio Lutzebuerg 6095eu			
1100	1200		Malaysia, Radio 7295do			
1100	1200	DRM	Netherlands, Radio 9590eu			
1100	1200		Papua New Guinea, NBC 4890do	9675irr		
1100	1200		Singapore, Radio Singapore Intl 6150as	9600as		
1100	1200		UK, BBC World Service 6190of	6195va		
			7120af 9740as 11760me 11940af 12095eu			
			15190va 15310os 15485eu 15565eu 15575eu			
			17640eu 17760as 17790os 17830of 17885af			
			21470af			
1100	1200	DRM	UK, BBC World Service 7320eu	9410eu		
1100	1200		Ukraine, Radio Ukroine Intl 15415eu			
1100	1200		USA, AFRTS/ Armed Forces Rodio 3903usb	4278usb		
			4319usb 4993usb 6350usb 6458usb 10320usb			
			12579usb 12689usb 13362usb 13855usb			
1100	1200		USA, KAIJ Dallas TX 5755va			
1100	1200		USA, KTBN Salt Lake City UT 7505na			
1100	1200	as	USA, KWHR Naalehu HI 11565pa			
1100	1200		USA, Voice of America 6160as 9645as	9760as		
			9770os 13610os 15240as 15425as			
1100	1200		USA, WBOH Newport NC 5920am			
1100	1200		USA, WEWN Birmingham AL 7520na			
1100	1200		USA, WHRI Noblesville IN 9495am	9850na		
1100	1200		USA, WINB Red Lion PA 13570am			
1100	1200		USA, WJIE Louisville KY 7490am	13595am		
1100	1200		USA, WRMI Miomi FL 9955am			
1100	1200		USA, WSHB Cypress Creek SC 6095am	9455am		
1100	1200		USA, WTJC Newport NC 9370na			
1100	1200		USA, WWCR Nashville TN 5070na	5935na		
			7560na 15825na			
1100	1200		USA, WYFR Okeechobee FL 5850na	5950no		
			7335sa 11855sa			
1100	1200		Zambia, Radio Christian Voice 9865do			
1106	1200		New Zealand, Radio NZ Intl 9885po			
1115	1145		Nepal, Radio 3230as 5005as	6100as		
			7164as			
1125	1200		Netherlands, Radio 5965na 6045eu	9860eu		
1130	1145		UK, BBC World Service 7135as	11920as		
1130	1159		Belgium, Radio Vlaanderen Intl 9865as			
1130	1200		Bulgaria, Radio 11700eu 15700eu			
1130	1200		South Korea, Radio Korea Intl 9650na			
1130	1200		Sweden, Radio 17505va	17840na		
1130	1200	f	Vatican City, Vatican Radio 15595va	17515va		

1200 UTC - 8AM E / 7AM C / 5AM P

Start	End		Station	Freq 1	Freq 2	Freq 3
1200	1225		Netherlands, Radio 5965na	6045eu	9860eu	
1200	1230		France, Radio France Intl	17815of	21620af	
			25820af			
1200	1230	DRM	Netherlands, Radio 9590eu			
1200	1230		South Korea, Radio Korea Intl 9650na			
1200	1230		Uzbekistan, Radio Tashkent Intl 7285as	9715as		
			15295as 17775os			
1200	1256		Chino, China Radio Intl 9730as	9760pa		
			11760os 11980os 15415pa			
1200	1259		Poland, Radio Polonia 9525eu	11820eu		
1200	1300		Anguilla, Caribbean Beacon 11775am			
1200	1300		Australia, ABC NT Alice Springs 2310do	4835irr		
1200	1300		Australia, ABC NT Katherine 2485do			
1200	1300		Australio, ABC NT Tennant Creek 2325do			
1200	1300		Australia, Radio 5995pa 6020pa	9475as		
			9580va 11650va 11880as 12080va 21820as			
1200	1300		Australia, Voice Intl 13685as			
1200	1300		Canada, CBC Northern Service 9625do			
1200	1300		Canada, CFRX Toronto ON 6070do			
1200	1300		Canada, CFVP Calgary AB 6030do			
1200	1300		Canada, CKZN St John's NF 6160do			
1200	1300		Canada, CKZU Vancouver BC 6160do			

Start	End	Days	Station	Frequencies
1200	1300		Canada, Radio Canada Intl	9660as 15190as
1200	1300	mtwhf	Canada, Radio Canada Intl	9515na 13655na 17800na
1200	1300		China, Voice of Hope 13590as	
1200	1300		Costa Rica, Radio for Peace Intl	7445am 15038va
1200	1300		Costa Rica, University Network	5030am 6150am 7375am 9725sa 11870am 13750na 17645as
1200	1300		Ecuador, HCJB	15115am 21455pa
1200	1300	DRM	Germany, Deutsche Welle	9655eu
1200	1300		Germany, Deutsche Welle	6140eu 15440eu
1200	1300		Jordan, Radio	11690eu
1200	1300	m-f/ DRM	Luxembourg, RTL Radio Lutzebuerg 6095eu	
1200	1300		Malaysia, Radio	7295do
1200	1300		New Zealand, Radio NZ Intl	9885pa
1200	1300		Papua New Guinea, NBC	4890do 9675irr
1200	1300		Singapore, Radio Singapore Intl	6150as 9600as
1200	1300		Taiwan, Radio Taiwan Intl	7130as 9610au
1200	1300		UK, BBC World Service	6190af 6195va 7120af 9740as 11760me 11940af 12095eu 15190as 15310as 15485eu 15565as 15575me 17640eu 17760as 17790as 17830af 17885af 21470af
1200	1300	DRM	UK, BBC World Service	7320eu 9410eu
1200	1300		USA, AFRTS/ Armed Forces Radio	3903usb 4278usb 4319usb 4993usb 6350usb 6458usb 10320usb 12579usb 12689usb 13362usb 13855usb
1200	1300		USA, KAIJ Dallas TX	5755va
1200	1300		USA, KTBN Salt Lake City UT	7505na
1200	1300		USA, KWHR Naalehu HI	9930as
1200	1300as		USA, KWHR Naalehu HI	11565pa
1200	1300		USA, Voice of America 6160as	9645as 9760as 13610as 15160as 15240as 15425as
1200	1300	mtwhf	USA, WBCQ Kennebunk ME	17495va
1200	1300		USA, WBOH Newport NC	5920am
1200	1300		USA, WEWN Birmingham AL	7520na
1200	1300		USA, WHRI Noblesville IN	9495am 9850na
1200	1300		USA, WINB Red Lion PA	13570am
1200	1300		USA, WJIE Louisville KY	7490am 13595am
1200	1300		USA, WRMI Miami FL 15725na	
1200	1300		USA, WSHB Cypress Creek SC	9430na 11670am
1200	1300		USA, WTJC Newport NC	9370na
1200	1300		USA, WWCR Nashville TN	7560na 12160na 13845na 155825na
1200	1300		USA, WYFR Okeechobee FL	5850na 5950na 13695na 17750na
1200	1300		Zambia, Radio Christian Voice	9865do
1215	1230	mtwhf	Austria, Radio Austria Intl	21780pa
1215	1300		Egypt, Radio Cairo	17775as
1230	1245		UK, BBC World Service	15105af 17780af 21640af
1230	1257		Vietnam, Voice of	9840as 12019as
1230	1300		Australia, HCJB	15390as
1230	1300		Bangladesh, Bangla Betar	7185as 9550as
1230	1300		Sri Lanka, SLBC	6005as 9770as 15745as
1230	1300		Sweden, Radio	15750as 17505as 17840na
1230	1300		Thailand, Radio	9860as
1230	1300		Turkey, Voice of	17595va 17830eu
1230	1300		UAE, Gospel For Asia 15590as	
1230	1300	a	UK, Wales Radio Intl	17845au
1240	1255	f	Greece, Voice of	11730na 12110eu 15630eu 15650au
1245	1300	mtwbf	Austria, Radio Austria Intl	6155eu 13730pa 21780pa

1300 UTC - 9AM E / 8AM C / 6AM P

Start	End	Days	Station	Frequencies
1300	1305		New Zealand, Radio NZ Intl	9885pa
1300	1310	mtwhfa	Turkmenistan, Turkmen Radio	5015as
1300	1327		Czech Rep, Radio Prague Intl	13580eu 21745as
1300	1330		Ecuador, HCJB	15115am 21455pa
1300	1330		Egypt, Radio Cairo	17775as
1300	1330		Turkey, Voice of	17595as 17830eu
1300	1330		UAE, AWR Africa	17740as
1300	1330		UAE, Gospel For Asia 15590as	
1300	1356		China, China Radio Intl	7405na 9570na 11760pa 11900pa 11980as 15180as 17720na
1300	1356		North Korea, Voice of 4405as	7505eu 9335na 11335eu 11710am
1300	1400		Anguilla, Caribbean Beacon	11775am
1300	1400		Australia, HCJB	15390as
1300	1400		Australia, Radio	5995pa 6020pa 9580va 11650va 11660as 21820as
1300	1400		Australia, Voice Intl	13685as
1300	1400		Canada, CBC Northern Service	9625do
1300	1400		Canada, CFRX Toronto ON	6070do
1300	1400		Canada, CFVP Calgary AB	6030do
1300	1400		Canada, CKZN St John's NF	6160do
1300	1400		Canada, CKZU Vancouver BC	6160do
1300	1400		Canada, Radio Canada Intl	9515na 13655na 17800na
1300	1400		China, Voice of Hope 13590as	
1300	1400		Costa Rica, Radio for Peace Intl	7445am 15038va
1300	1400		Costa Rica, University Network	5030am 6150am 7375am 9725sa 11870am 13750na 17645as

Start	End	Days	Station	Frequencies
1300	1400		Germany, Deutsche Welle	6140eu
1300	1400	DRM	Germany, Deutsche Welle	9655eu
1300	1400		Germany, Overcomer Ministries	6110eu
1300	1400		Jordan, Radio	11690eu
1300	1400	m-f/ DRM	Luxembourg, RTL Radio Lutzebuerg 6095eu	
1300	1400		Malaysia, Radio	7295da
1300	1400		Papua New Guinea, NBC	4890da 9675irr
1300	1400	DRM	Russia, Voice of	15780eu
1300	1400		Singapore, Radio Singapore Intl	6150as 9600as
1300	1400	as	South Africa, Channel Africa	11780af 21620of 21760af
1300	1400		South Korea, Radio Korea Intl	9570om 13670am
1300	1400		Sri Lanka, SLBC	6005as 9770as 15745as
1300	1400		UK, BBC World Service	6190va 6195va 7120af 9740as 11760me 11940af 12095eu 15190va 15310as 15420af 15485eu 15575me 17640eu 17760as 17790as 17830af 17885as 21470af
1300	1400	DRM	UK, BBC World Service	7320eu
1300	1400		USA, AFRTS/ Armed Forces Radio	3903usb 4278usb 4319usb 4993usb 6350usb 6458usb 10320usb 12579usb 12689usb 13362usb 13855usb
1300	1400		USA, KAIJ Dallas TX	5755va
1300	1400		USA, KJES Vado NM	11715na
1300	1400		USA, KNLS Anchor Point AK	11870as
1300	1400		USA, KTBN Salt Lake City UT	7505na
1300	1400		USA, KWHR Naalehu HI	9930as
1300	1400		USA, Voice of America 6160as	9645as 9760as 15160as 15425as
1300	1400		USA, WBCQ Kennebunk ME	17495va
1300	1400		USA, WBOH Newport NC	5920am
1300	1400		USA, WEWN Birmingham AL	7520na
1300	1400		USA, WHRA Greenbush ME	17560af
1300	1400		USA, WHRI Noblesville IN	9850na 15105am
1300	1400		USA, WINB Red Lion PA	13570am
1300	1400		USA, WJIE Louisville KY	7490am 13595am
1300	1400		USA, WRMI Miami FL 15725na	
1300	1400		USA, WSHB Cypress Creek SC	9430na 11670am
1300	1400		USA, WTJC Newport NC	9370na
1300	1400		USA, WWCR Nashville TN	9475na 12160na 13845na 15825na
1300	1400		USA, WYFR Okeechobee FL	11560as 11830na 11970na 17750na
1300	1400		Zambia, Radio Christian Voice	9865do
1306	1400	occasional	New Zealand, Radio NZ Intl	6095pa
1330	1350		UAE, Radio Dubai	13630eu 13675eu 15395eu 17865eu 21605eu
1330	1357		Vietnam, Voice of	11630eu 13740eu
1330	1400		Guam, AWR	11980as 15275as
1330	1400		India, All India Radio 9690as	13710as
1330	1400		Laos, Lao National Radio	7145do
1330	1400		Sweden, Radio	17505va 17840na
1330	1400		UAE, AWR Africa	15320as
1330	1400		UK, BBC World Service	15105af 21640af
1330	1400		Uzbekistan, Radio Tashkent Intl	7285as 9715as 15295as 17775as

1400 UTC - 10AM E / 9AM C / 7AM P

Start	End	Days	Station	Frequencies
1400	1415	mtw	UK, BBC World Service	11860af 15420af 21490af
1400	1430		Ecuador, HCJB	15115am 21455pa
1400	1430		Egypt, Radio Cairo	17775as
1400	1430	vl	Mexico, Radio Mexico Intl	9705am 11770am
1400	1430		Thailand, Radio	9830as
1400	1455	as	South Africa, Channel Africa	11780af 21620af 21760af
1400	1456		China, China Radio Intl	7405na 9700as 11675as 11765as 13685af 15125af 17720na
1400	1456		Romania, Radio Romania Intl	15270eu 15365eu 17790eu 17805as
1400	1500		Anguilla, Caribbean Beacon	11775am
1400	1500		Australia, HCJB	15390as
1400	1500		Australia, Radio	5995va 6080pa 9580va 11650va 11660as
1400	1500		Australia, Voice Intl	13685as
1400	1500		Canada, CBC Northern Service	9625do
1400	1500		Canada, CFRX Toronto ON	6070do
1400	1500		Canada, CFVP Calgary AB	6030do
1400	1500		Canada, CKZN St John's NF	6160do
1400	1500		Canada, CKZU Vancouver BC	6160do
1400	1500		Canada, Radio Canada Intl	9515na 13655na 17800na
1400	1500		China, Voice of Hope 13590as	
1400	1500		Costa Rica, Radio for Peace Intl	7445am 15038va
1400	1500		Costa Rica, University Network	5030am 6150am 7375am 9725sa 11870am 13750na 17645as
1400	1500	a	Finland, Scandinavian Weekend Radio	5980va
1400	1500		France, Radio France Intl	11610as 17515as
1400	1500		Germany, Deutsche Welle	6140eu
1400	1500	a	Germany, Overcomer Ministries	6110me
1400	1500		India, All India Radio 9690as	13710as
1400	1500		Japan, Radio	7200as 9505na 11730as 11840pa 11755me

1400	1500		Jordan, Radio	11690eu		
1400	1500	m-f/ DRM	Luxembourg, RTL Radio Lutzeburg	6095eu		
1400	1500	occasional	New Zealand, Radio NZ Intl	6095pa		
1400	1500		Oman, Radio	15140eu		
1400	1500		Russia, Voice of	7340as	9745as	12055as
			17645as			
1400	1500	DRM	Russia, Voice of	15780eu		
1400	1500		Singapore, Mediacorp Radio	6150do		
1400	1500		Sri Lanka, SLBC	6005as	9770as	15745as
1400	1500		Taiwan, Radio Taiwan Intl	15265as		
1400	1500	DRM	UK, BBC World Service	7320eu		
1400	1500		UK, BBC World Service	6135as	6190af	
			6195as 7120af 9740as	11940af	12095eu	
			15190va 15310as 15485eu	15565me	15575me	
			17640eu 17790as 17830af	21470af	21660af	
1400	1500		USA, AFRTS/ Armed Forces Radio	3903usb	4278usb	
			4319usb 4993usb 6350usb	6458usb	10320usb	
			12579usb 12689usb	13362usb	13855usb	
1400	1500		USA, KAIJ Dallas TX	13815va		
1400	1500		USA, KJES Vado NM	11715na		
1400	1500		USA, KTBN Salt Lake City UT	7505na		
1400	1500		USA, Voice of America 6160as	7125as	9760as	
			15160as 15255eu 15425as			
1400	1500		USA, WBCQ Kennebunk ME	17495va		
1400	1500		USA, WBOH Newport NC	5920am		
1400	1500		USA, WEWN Birmingham AL	9955na		
1400	1500		USA, WHRA Greenbush ME	17560af		
1400	1500		USA, WHRI Noblesville IN	9850am	15105am	
1400	1500		USA, WINB Red Lion PA	13570am		
1400	1500		USA, WJIE Louisville KY	7490am	13595am	
1400	1500		USA, WRMI Miami FL 15725na			
1400	1500		USA, WTJC Newport NC	9370na		
1400	1500		USA, WWCR Nashville TN	9475na	12160na	
			13845na 15825na			
1400	1500		USA, WYFR Okeechobee FL	11560as	11830na	
			11970na 17750na			
1400	1500		Zambia, Radio Christian Voice	9865do		
1415	1420		Nepal, Radio 3230as	5005as	6100as	
			7164as			
1430	1500		Myanmar, Radio 5040do	5985do		
1430	1500		Netherlands, Radio 9860as	11835as	12075as	
			15220na			
1445	1500		Guam, TWR/KTWR 15330as			
1445	1500		UK, BBC World Service	6140as	7205as	

1500 UTC - 11AM E / 10AM C / 8AM P

1500	1500	as	Canada, Radio Canada Intl	9515na	13655na
			17800na		
1500	1515	s	Germany, Pan American BC	15650me	
1500	1528	s	Hungary, Radio Budapest	6025eu	9715eu
1500	1530	vl	Mexico, Radio Mexico Intl	9705am	11770am
1500	1530		Mongolia, Voice of 12015eu		
1500	1530		South Africa, Channel Africa	17770af	
1500	1530		Sri Lanka, SLBC 6005as	9770as	15745as
1500	1545		Guam, TWR/KTWR 15330as		
1500	1556		China, China Radio Intl	7160as	9785as
			13685af 15125af 17720af		
1500	1556		North Korea, Voice of 4405as	7505eu	9335am
			11335eu 11710am		
1500	1600		Anguilla, Caribbean Beacon	11775am	
1500	1600		Australia, HCJB 15390as		
1500	1600		Australia, Radio 5995va	6080pa	9475as
			9580va 11650va 11660as		
1500	1600		Australia, Voice Intl 13665as		
1500	1600		Canada, CBC Northern Service	9625do	
1500	1600		Canada, CFRX Toronto ON	6070do	
1500	1600		Canada, CFVP Calgary AB	6030do	
1500	1600		Canada, CKZN St John's NF	6160do	
1500	1600		Canada, CKZU Vancouver BC	6160do	
1500	1600		Canada, Radio Canada Intl	15455as	17720as
1500	1600		Costa Rica, Radio for Peace Intl	7445am	15038va
1500	1600		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
1500	1600		Germany, Deutsche Welle	6140eu	
1500	1600	smtwhf	Germany, Overcomer Ministries	6110me	
1500	1600	s	Ireland, Reflections Europe	3910eu	6295eu
			12255eu		
1500	1600		Japan, Radio 7200as	9750as	11705na
			11730as		
1500	1600		Jordan, Radio 11690na		
1500	1600	s	Latvia, Laser Radio 5935eu		
1500	1600	m-f/ DRM	Luxembourg, RTL Radio Lutzeburg 6095eu		
1500	1600		Myanmar, Radio 5040do	5985do	
1500	1600		Netherlands, Radio 9890as	11835as	12075as
			15220na		
1500	1600	occasional	New Zealand, Radio NZ Intl	6095pa	
1500	1600		Russia, Voice of 4940me	4965me	4975me
			7315as 7325me 7340as	11500as	11985me
1500	1600	DRM	Russia, Voice of 15780eu		
1500	1600		Singapore, Mediacorp Radio	6150do	
1500	1600		UK, BBC World Service	5975as	6135as
			6190af 6195as 7120af	9740as	11940af
			12095eu 15190va 15310as	15400af	15485eu

1500	1600		15565eu 17790as 17830af	21470af	21660af
1500	1600		USA, AFRTS/ Armed Forces Radio	3903usb	4278usb
			4319usb 4993usb 6350usb	6458usb	10320usb
			12579usb 12689usb	13362usb	13855usb
1500	1600		USA, KAIJ Dallas TX	13815va	
1500	1600		USA, KTBN Salt Lake City UT	15590na	
1500	1600		USA, KWHR Naalehu HI	9930as	
1500	1600		USA, Voice of America 6160as	7125as	9590as
			9700eu 9760as 9845as	12040as	15205as
			15255as 15550as		
1500	1600		USA, WBCQ Kennebunk ME	17495va	
1500	1600		USA, WBOH Newport NC	5920am	
1500	1600		USA, WEWN Birmingham AL	9955na	
1500	1600		USA, WHRA Greenbush ME	17650af	
1500	1600		USA, WHRI Noblesville IN	13760va	15105am
1500	1600		USA, WINB Red Lion PA	13570am	
1500	1600		USA, WJIE Louisville KY	7490am	13595am
1500	1600	smtwhf	USA, WMLK Bethel PA 9465eu		
1500	1600		USA, WRMI Miami FL 15725na		
1500	1600		USA, WTJC Newport NC	9370na	
1500	1600		USA, WWCR Nashville TN	9475na	12160na
			13845na 15825na		
1500	1600		USA, WYFR Okeechobee FL	6280na	11830na
			15520as 17750na		
1500	1600		Zambia, Radio Christian Voice	4965do	
1510	1525	mtwhf	Austria, Radio Austria Intl	15515na	
1515	1600	as	Germany, Bible Voice BC Network 15680me		
1515	1600	a	Vatican City, Vatican Radio	13765as	15235as
1530	1545		Bangladesh, Bangla Betar	4882as	
1530	1545		UK, BBC World Service	11685as	15540as
1530	1600		Georgia, Radio Georgia	6180me	
1530	1600	mtwhf	Germany, Bible Voice BC Network 15680me		
1530	1600	s	Germany, Pan American BC	15650me	
1530	1600		Iran, Voice of the Islamic Rep	7245eu	9635as
			11775as		
1540	1550		Turkmenistan, Turkmen Radio	4930do	
1545	1600	s h	Bangladesh, Bangla Betar	4882as	

1600 UTC - 12PM E / 11AM C / 9AM P

1600	1615		Pakistan, Radio 11570va	15065va	15725va
			17720va		
1600	1625		Netherlands, Radio 9890as	11835as	12075as
			15220na		
1600	1627		Czech Rep, Radio Prague Intl	5930eu	21745af
1600	1627		Vietnam, Voice of 11630eu	13740eu	
1600	1630		Guam, AWR 11560as	15215as	15235as
1600	1630		Iran, Voice of the Islamic Rep	7245eu	9635as
			11775as		
1600	1630		Jordan, Radio 11690na		
1600	1630	w	Moldova, Radio Pridnestrovye	5960eu	
1600	1630		South Africa, Channel Africa	9525af	
1600	1630		UAE, Gospel For Asia 11695as		
1600	1635		UAE, Radio Dubai 13630eu	13675eu	15395eu
			17865eu 21605eu		
1600	1650	occasional	New Zealand, Radio NZ Intl	6095pa	
1600	1656		North Korea, Voice of 3560as	9975as	11735af
1600	1700		Algeria, Radio Algiers Intl	11715eu	15160eu
1600	1700		Anguilla, Caribbean Beacon	11775am	
1600	1700		Australia, HCJB 15390as		
1600	1700		Australia, Radio 5995va	6080pa	9475as
			9580va 11650va 11660as		
1600	1700		Australia, Voice Intl 13665as		
1600	1700		Canada, CBC Northern Service	9625do	
1600	1700		Canada, CFRX Toronto ON	6070do	
1600	1700		Canada, CFVP Calgary AB	6030do	
1600	1700		Canada, CKZN St John's NF	6160do	
1600	1700		Canada, CKZU Vancouver BC	6160do	
1600	1700		Costa Rica, Radio for Peace Intl	7445am	15038va
1600	1700		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
1600	1700		Ethiopia, Radio 5990af	7110af	7165af
			9560af 9704af 11800af		
1600	1700	a	Finland, Scandinavian Weekend Radio	6170va	
1600	1700		France, Radio France Intl	9730af	11615af
			11995af 12015af 15160af	15605af	17605af
			17850af		
1600	1700		Germany, Bible Voice BC Network 15680me		
1600	1700	DRM	Germany, Deutsche Welle	6140eu	7125eu
1600	1700		Germany, Deutsche Welle	6140eu	6170as
			7225as 17595as		
1600	1700	a	Germany, Overcomer Ministries	6110eu	
1600	1700	a	Greece, Voice of 9420eu	15630eu	17705na
1600	1700	s	Ireland, Reflections Europe	3910eu	6295eu
			12255eu		
1600	1700	s	Latvia, Laser Radio 5935eu		
1600	1700		Russia, Voice of 7315as	7350as	11720as
			11985me 12055as 15540me		
1600	1700	DRM	Russia, Voice of 15780eu		
1600	1700		South Africa, Radio Veritas	3230af	
1600	1700		South Korea, Radio Korea Intl	5975om	9515af
			9870af		
1600	1700		Taiwan, Radio Taiwan Intl	11550as	
1600	1700		UK, BBC World Service	3915as	5975as

Left column

			6190eu	6195as	7120af	7160as	9410eu
			9510as	11940af	12095eu	15190va	1531Cas
			15400af	15475eu	15565eu	17790as	17830af
			21470af				

Start	End	Days	Station	Freq1	Freq2
1600	1700		USA, AFRTS/ Armed Forces Radio	3903usb	4278usb
			4319usb 4993usb 6350usb	6458usb	10320usb
			12579usb	12689usb	13362usb	13855usb
1600	1700		USA, KAIJ Dallas TX	13815va	
1600	1700		USA, KTBN Salt Lake City UT	15590na	
1600	1700		USA, KWHR Naalehu HI	9930as	
1600	1700		USA, Voice of America 12080af	13600as	17895af
1600	1700		USA, WBCQ Kennebunk ME	17495va	
1600	1700		USA, WBOH Newport NC	5920am	
1600	1700		USA, WEWN Birmingham AL	13615na	
1600	1700		USA, WHRA Greenbush ME	17650af	
1600	1700		USA, WHRI Noblesville IN	13760na	15105am
1600	1700		USA, WINB Red Lian PA	13570am	
1600	1700		USA, WJIE Louisville KY	7490am	13595am
1600	1700	smtwhf	USA, WMLK Bethel PA 9465eu		
1600	1700		USA, WRMI Miami FL 15725na		
1600	1700		USA, WSHB Cypress Creek SC	18910af	
1600	1700		USA, WTJC Newport NC	9370na	
1600	1700		USA, WWCR Nashville TN	9475na	12160na
			13845na 15825na		
1600	1700		USA, WWRB Manchester TN	9320na	12172na
1600	1700		USA, WYFR Okeechobee FL	11830na	1552Cas
			17750na 18980eu 21455eu	21525af	
1600	1700		Zambia, Radio Christian Voice	4965da	
1615	1630		UK, BBC World Service	15420af	
1615	1630		Vatican City, Vatican Radio	4005eu	5890eu
			7250eu 9645eu 15595eu		
1615	1700	as	UK, BBC World Service	21490af	
1630	1645		Israel, Kol Israel 15640va	17545va	
1630	1657		Slovakia, Radio Slovakia Intl	5920eu	6055eu
			7345eu		
1630	1700		Egypt, Radio Cairo 15255af		
1630	1700		Guam, AWR 11560as	11975as	15215as
			15235as		
1630	1700		UAE, AWR Africa 17630me		
1630	1700		UK, BBC World Service	9530eu	11735eu
			13645eu 15420af		
1645	1700		Tajikistan, Radio 7245as		
1650	1700	mtwhf	New Zealand, Radio NZ Intl	6095pa	

1700 UTC - 1PM E / 12PM C / 10AM P

Start	End	Days	Station	Freq1	Freq2
1700	1715	vl	Samalia, Radio Galkaya	6985va	
1700	1727		Czech Rep, Radio Prague Intl	5930eu	17485af
1700	1727		Vietnam, Voice of 9725eu		
1700	1730		Azerbaijan, Voice of 6110eu	9155eu	
1700	1730		France, Radio France Intl	15605af	17605af
1700	1730	h	Germany, Bible Voice BC Network	15680me	
1700	1730		South Africa, Channel Africa	15265af	
1700	1746		UK, BBC World Service	6005af	9630af
1700	1750	mtwhf	New Zealand, Radio NZ Intl	6095pa	
1700	1756		China, China Radio Intl	9570af	9695af
			11910af 11920af		
1700	1756		Romania, Radio Romania Intl	9510eu	1182Ceu
			11940eu 15380eu		
1700	1759		Poland, Radio Polonia	5995eu	7285eu
1700	1800		Anguilla, Caribbean Beacon	11775am	
1700	1800		Australia, Radio 5995va	6080pa	9475as
			9580va 9815pa 11880va		
1700	1800		Australia, Voice Intl 11680as		
1700	1800		Canada, CBC Northern Service	9625da	
1700	1800		Canada, CFRX Toronto ON	6070do	
1700	1800		Canada, CFVP Calgary AB	6030da	
1700	1800		Canada, CKZN St John's NF	6160da	
1700	1800		Canada, CKZU Vancouver BC	6160da	
1700	1800		Costa Rica, Radio for Peace Intl	7445am	1503&va
1700	1800		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
1700	1800		Egypt, Radio Cairo 15255af		
1700	1800		Eqt Guinea, Radio Africa	7189af	15184al
1700	1800	wf as	Germany, Bible Voice BC Network	15680me	1575Cme
1700	1800	DRM	Germany, Deutsche Welle	7125eu	
1700	1800		Germany, Deutsche Welle	6140eu	
1700	1800		Germany, Radio Africa Intl	13820af	11735af
1700	1800		Japan, Radio 9505na	11970eu	15355af
1700	1800		Nigeria, Voice of 7255af	9690af	15120af
1700	1800		Russia, Voice of 7315as	9775eu	9890eu
			11510af 11985af		
1700	1800	as	Russia, Voice of 9480eu		
1700	1800		South Africa, Radio Veritas	3230af	
1700	1800		UK, BBC World Service	3255af	3915as
			5975as 6190af 6195as	7120af	7160cs
			9410eu 9510as 12095eu	15310as	15400af
			15420af 15485eu 15565eu	17830af	21470af
1700	1800		USA, AFRTS/ Armed Forces Radio	3903usb	4278usb
			4319usb 4993usb 6350usb	6458usb	10320usb
			12579usb	12689usb	13362usb	13855usb
1700	1800		USA, KAIJ Dallas TX	13815va	
1700	1800		USA, KTBN Salt Lake City UT	15590na	
1700	1800		USA, WBCQ Kennebunk ME	17495va	

Right column

Start	End	Days	Station	Freq1	Freq2
1700	1800		USA, WBOH Newport NC	5920am	
1700	1800		USA, WEWN Birmingham AL	13615na	17595eu
1700	1800		USA, WHRA Greenbush ME	17650af	
1700	1800		USA, WHRI Noblesville IN	9495am	13760va
1700	1800		USA, WINB Red Lian PA	13570am	
1700	1800		USA, WJIE Louisville KY	7490am	13595am
1700	1800	smtwhf	USA, WMLK Bethel PA 9465eu		
1700	1800		USA, WRMI Miami FL 15725na		
1700	1800		USA, WSHB Cypress Creek SC	18910af	
1700	1800		USA, WTJC Newport NC	9370na	
1700	1800		USA, WWCR Nashville TN	9475na	12160na
			13845na 15825na		
1700	1800		USA, WWRB Manchester TN	9320na	12172na
1700	1800		USA, WYFR Okeechobee FL	18980eu	21455eu
			21680af		
1700	1800		Zambia, Radio Christian Voice	4965da	
1715	1730		Swaziland, TWR 3200af		
1730	1745		UK, BBC World Service	3390va	7230va
			9525va		
1730	1745	mw	UK, BBC World Service	6050eu	11955eu
			15585eu		
1730	1745	mtwhf	UK, United Natrons Radio	7150af	15495me
			17810af		
1730	1759		Belgium, Radio Vlaanderen Intl	9925eu	13690eu
			13710me		
1730	1800		Bulgaria, Radio 9400eu	11900eu	
1730	1800		Georgia, Radio Georgia	11910eu	
1730	1800		Guam, AWR 9385me	12015me	
1730	1800		Liberia, ELWA 4760da		
1730	1800		Malta, Voice of Mediterranean	12060eu	
1730	1800		Netherlands, Radio 6020af	7120af	11655af
1730	1800		Philippines, Radio Pilipinas	11720me	15190me
			17720me		
1730	1800		Swaziland, TWR 3200af	9500af	
1730	1800	mtwhfa	Sweden, Radio 6065va		
1730	1800	s	Sweden, Radio 13580va		
1730	1800		Switzerland, Swiss Radio Intl	13750va	15515va
			17870va		
1730	1800		Vatican City, Vatican Radio	13765af	15570af
			17515af		
1735	1745	vl/th	Paraguay, Radio Nacional	9739sa	
1745	1800		Bangladesh, Bangla Betar	7185eu	9550eu
			15520eu		
1745	1800		India, All India Radio 7410eu	9445af	9950eu
			11620eu 11935af 13605af	15075af	15155af
			17670af		
1751	1800		New Zealand, Radio NZ Intl	11725pa	

1800 UTC - 2PM E / 1PM C / 11AM P

Start	End	Days	Station	Freq1	Freq2
1800	1810		Zanzibar, Voice of Tanzania	11734do	
1800	1827		Slovakia, Radio Slovakia Intl	5920eu	6055eu
			7345eu		
1800	1827		Vietnam, Voice of 11630eu	13740eu	
1800	1830		Egypt, Radio Cairo 15255af		
1800	1830	s	Germany, Radio Africa Intl	15750af	
1800	1830		Netherlands, Radio 6020af	7120af	11655af
1800	1830		South Africa, AWR Africa	3215af	3345af
			9520af		
1800	1830		South Africa, Channel Africa	15265af	
1800	1830		UK, BBC World Service	5975as	9510as
1800	1830		UK, RTE Radio 15585me		
1800	1850		New Zealand, Radio NZ Intl	11725pa	
1800	1900		Anguilla, Caribbean Beacon	11775am	
1800	1900	mtwhf	Argentina, RAE 9690eu	15345eu	
1800	1900		Australia, HCJB 11765pa		
1800	1900		Australia, Radio 6080pa	7240va	9475as
			9580va 9815pa 11880va		
1800	1900		Australia, Voice Intl 11680as		
1800	1900		Bangladesh, Bangla Betar	7185eu	9550eu
			15520eu		
1800	1900		Canada, CBC Northern Service	9625da	
1800	1900		Canada, CFRX Toronto ON	6070da	
1800	1900		Canada, CFVP Calgary AB	6030da	
1800	1900		Canada, CKZN St John's NF	6160da	
1800	1900		Canada, CKZU Vancouver BC	6160da	
1800	1900		Costa Rica, Radio for Peace Intl	7445am	15038va
1800	1900		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
1800	1900		Eqt Guinea, Radio Africa	7189af	15184al
1800	1900	DRM	Germany, Deutsche Welle	6140eu	
1800	1900		Germany, Deutsche Welle	6140eu	
1800	1900		Germany, Radio Africa Intl	13820va	11735va
1800	1900	s	Greece, Voice of 9420eu	15630eu	17705na
1800	1900		India, All India Radio 7410eu	9445af	9950eu
			11620eu 11935af 13605af	15075af	15155af
			17670af		
1800	1900	s	Ireland, Reflections Europe	3910eu	6295eu
			12255eu		
1800	1900		Kuwait, Radio 11990va		
1800	1900	s	Latvia, Laser Radio 5935eu		
1800	1900		Liberia, ELWA 4760do		
1800	1900		Nigeria, Voice of 7255af	9690af	15120af
1800	1900		Philippines, Radio Pilipinas	11720me	15190me

Start	End	Days	Station	Freq	Freq	Freq
			17720me			
1800	1900		Russia, Voice of	9480eu	9775eu	9890eu
			11510af 11630eu 11675eu	11870af		
1800	1900		Sierra Leone, Radio UNAMSIL	6139af		
1800	1900	s	South Africa, Radio League	3215af		
1800	1900	as	South Africa, Radio Lusofonia	3345af		
1800	1900		South Africa, Radio Veritas	3230af		
1800	1900		Swaziland, TWR	3200af	9500af	
1800	1900		UK, BBC World Service	3255af	6190af	
			6195eu 7120af	9410eu	12095eu	15310me
			15400af 15420af	17830af	21470af	
1800	1900		USA, AFRTS/ Armed Forces Radio	3903usb	4278usb	
			4319usb 4993usb	6350usb	6458usb	10320usb
			12579usb	12689usb	13362usb	13855usb
1800	1900		USA, KAIJ Dallas TX	13815va		
1800	1900		USA, KJES Vado NM	15385na		
1800	1900		USA, KTBN Salt Lake City UT	15590na		
1800	1900	mtwhfa	USA, WBCQ Kennebunk ME	17495va		
1800	1900	s	USA, WBCQ Kennebunk ME	17495va		
1800	1900		USA, WBOH Newport NC	5920am		
1800	1900		USA, WEWN Birmingham AL	13615na	17595eu	
1800	1900		USA, WHRA Greenbush ME	17650af		
1800	1900		USA, WHRI Noblesville IN	9495am	13760va	
1800	1900		USA, WINB Red Lion PA	13570am		
1800	1900		USA, WJIE Louisville KY	7490am	13595am	
1800	1900	smtwhf	USA, WMLK Bethel PA 9465eu			
1800	1900		USA, WRMI Miami FL 15725na			
1800	1900		USA, WSHB Cypress Creek SC	15665eu	18910af	
1800	1900		USA, WTJC Newport NC	9370na		
1800	1900		USA, WWCR Nashville TN	9475na	12160na	
			13845na 15825na			
1800	1900		USA, WWRB Manchester TN	9320na	12172na	
1800	1900		USA, WYFR Okeechobee FL	18980eu		
1800	1900		Yemen, Rep of Yemen Radio	9780me		
1800	1900		Zambia, Radio Christian Voice	4965do		
1830	1845		Germany, IBRA Radio 15695af			
1830	1855		Greece, Voice of	12110eu		
1830	1858		Serbia & Montenegro, RSCG	6100eu		
1830	1900		Georgia, Radio Georgia	11760eu		
1830	1900		Netherlands, Radio	6020af	7120af	9895af
			11655af 13700af	17605af	21590af	
1830	1900		South Africa, AWR Africa	9520af		
1830	1900		Turkey, Voice of	9785eu		
1830	1900		UK, BBC World Service	6005af	9630af	
1830	1900		UK, RTE Radio	13640na	21630af	
1845	1900	mtwhfa	Albania, Radio Tirana Intl	7210eu	9520eu	
1845	1900		Congo, RTV Congalaise	4765af	5985af	
1851	1900		New Zealand, Radio NZ Intl	15160pa		

1900 UTC - 3PM E / 2PM C / 12PM P

Start	End	Days	Station	Freq	Freq	Freq
1900	1925		Israel, Kol Israel	11605va	15615va	15640af
			17545va			
1900	1927		Vietnam, Voice of	9725eu	11630eu	13740eu
1900	1928		Hungary, Radio Budapest	3975eu	6025eu	
			11720eu			
1900	1930	s	Germany, Radio Africa Intl	15565me		
1900	1930	mtwhf	Nigeria, Radio Jakada Intl	15170af		
1900	1930		Philippines, Radio Pilipinas	11720me	15190me	
			17720me			
1900	1930		Turkey, Voice of	9785eu		
1900	1945		India, All India Radio 7410eu	9445af	9950eu	
			11620eu 11935af	13605af	15075af	15155af
			17670af			
1900	1945		Iraq, Radio Iraq Intl 6175irr	9687irr	11787irr	
1900	1956		China, China Radio Intl	9440af	13790af	
1900	1956		North Korea, Voice of 4405as	7505eu	11335eu	
1900	2000		Anguilla, Caribbean Beacon	11775am		
1900	2000		Australia, HCJB	11765pa		
1900	2000		Australia, Radio	6080pa	7240va	9500as
			9580va 9815pa	11880va		
1900	2000		Australia, Voice Intl	11680as		
1900	2000	vl	Botswana, Radio	3356do	4820do	7255da
1900	2000		Canada, CBC Northern Service	9625do		
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		Costa Rico, Radio for Peace Intl	7445am	15038va	
1900	2000		Costa Rico, University Network	5030am	6150am	
			7375am 9725sa	11870am	13750na	17645as
1900	2000		Eqt Guinea, Radio Africo	7189af	15184al	
1900	2000	a	Finland, Scandinavian Weekend Radio	5990va		
			11690va			
1900	2000		Germany, Deutsche Welle	6180af	7225af	
			11965af 13590af			
1900	2000	vl	Ghana, Ghana BC Corp	3366do	4915do	
1900	2000		Italy, IRRS 5775va			
1900	2000		Kuwait, Radio	11990va		
1900	2000	s	Latvia, Laser Radio	5935eu		
1900	2000		Liberia, ELWA	4760do		
1900	2000		Malaysia, Radio	7295do		
1900	2000	mtwhas	Malta, Voice of Mediterranean	12060eu		
1900	2000		Namibia, Namibian BC Corp	3270af	3290af	

Start	End	Days	Station	Freq	Freq	Freq
			6060af			
1900	2000		Netherlands, Radio	6020af	7120af	9895af
			11655af 13700af	17605af	21590af	
1900	2000		New Zealand, Radio NZ Intl	15160pa		
1900	2000		Nigeria, Radio/Abuja 7275do			
1900	2000		Nigeria, Radio/Enugu 6025do			
1900	2000		Nigeria, Radio/Ibadan	6050do		
1900	2000		Nigeria, Radio/Kaduna	4770do	6090do	
1900	2000		Nigeria, Radio/Lagos 3326do	4990do		
1900	2000		Nigeria, Voice of	7255af	9690af	15120af
1900	2000		Russia, Voice of	7440eu	9775eu	9890eu
			11675eu 12070eu	15735am		
1900	2000		Sierra Leone, Radio UNAMSIL	6139af		
1900	2000		Sierra Leone, SLBS	3316do		
1900	2000	vl	Solomon Islands, SIBC 5020do	9545do		
1900	2000		South Korea, Radio Korea Intl	5975om	7275eu	
1900	2000		Swaziland, TWR	3200af		
1900	2000		Thailand, Radio	7155eu		
1900	2000		Uganda, Radio	4976do	5026do	7196do
1900	2000		UK, BBC World Service	3255af	6005af	
			6190af 6195eu	7120af	9410eu	9630af
			12095af 15310me	15400af	17830af	
1900	2000		UK, Gospel For Asia	15590af		
1900	2000		USA, AFRTS/ Armed Forces Radio	3903usb	4278usb	
			4319usb 4993usb	6350usb	6458usb	10320usb
			12579usb	12689usb	13362usb	13855usb
1900	2000		USA, KAIJ Dallas TX	13815va		
1900	2000		USA, KTBN Salt Lake City UT	15590na		
1900	2000		USA, Voice of America 7260me	9680me	11925as	
			13635me			
1900	2000		USA, WBCQ Kennebunk ME	17495va		
1900	2000	s	USA, WBCQ Kennebunk ME	7415va		
1900	2000		USA, WBOH Newport NC	5920am		
1900	2000		USA, WEWN Birmingham AL	13615na	17595eu	
1900	2000		USA, WHRA Greenbush ME	17650af		
1900	2000		USA, WHRI Noblesville IN	9495am	13760va	
1900	2000		USA, WINB Red Lion PA	13570am		
1900	2000		USA, WJIE Louisville KY	7490am	13595am	
1900	2000	smtwhf	USA, WMLK Bethel PA 9465eu			
1900	2000		USA, WRMI Miami FL 15725na			
1900	2000		USA, WSHB Cypress Creek SC	15665eu	18910af	
1900	2000		USA, WTJC Newport NC	9370na		
1900	2000		USA, WWCR Nashville TN	9475na	12160na	
			13845na 15825na			
1900	2000		USA, WWRB Manchester TN	9320na	12172na	
1900	2000		USA, WYFR Okeechobee FL	3230af	17750eu	
			18980eu			
1900	2000	vl	Vanuatu, Radio	3945al	7260do	
1900	2000	vl	Zimbabwe, ZBC Corp 5975do			
1915	1925		Rwanda, Radio	6005do		
1915	1930		UK, BBC World Service	17885af		
1923	1930		Libya, Voice of Africa	11635af	15105af	15315af
1930	1959		Belgium, Radio Vlaanderen Intl	9925eu	13690eu	
1930	2000	t h	Belarus, Radio Belarus Intl	7105eu	7210eu	
1930	2000		Iran, Voice of the Islamic Rep	9800eu	11670eu	
			11750eu 11860eu			
1930	2000		Papua New Guinea, NBC	4890do	9675irr	
1930	2000		Slovakia, AWR Europe 7130eu			
1930	2000		Sweden, Radio	6065va		
1930	2000		Switzerland, Swiss Radio Intl	11815va	13645va	
			13795va 15220af			
1935	1955		Italy, RAI Intl	5970eu	9745eu	
1940	1945		Turkmenistan, Turkmen Radio	4930as		
1940	2000	mtwhfa	Armenia, Voice of	4810eu	9960eu	
1950	2000		Vatican City, Vatican Radio	4005eu	5890eu	
			7350eu			

2000 UTC - 4PM E / 3PM C / 1PM P

Start	End	Days	Station	Freq	Freq	Freq
2000	2010		Vatican City, Vatican Radio	4005eu	5890eu	
			7250eu 9660af	11625af	13765af	
2000	2025		Netherlands, Radio	6020af	7120af	9895af
			11655af 13700af	17605af	21590af	
2000	2027		Czech Rep, Radio Prague Intl	5930eu	11600as	
2000	2030		Australia, HCJB	11765pa		
2000	2030		Iran, Voice of the Islamic Rep	9800eu	11670eu	
			11750eu 11860eu			
2000	2030		Italy, IRRS 5775va			
2000	2030		Mongolia, Voice of	12015eu		
2000	2030		Swaziland, TWR	3200af		
2000	2030	DRM	Vatican City, Vatican Radio	9795eu		
2000	2056		China, China Radio Intl	9440af	11640af	
			13630af 15110eu	17790eu		
2000	2059	mtwhf	Spain, Radio Exterior Espana	9570af	15290eu	
2000	2100		Algeria, Radio Algiers Intl	11715eu	15160eu	
2000	2100		Anguilla, Caribbean Beacon	11775am		
2000	2100		Australia, Radio	9500as	9580va	9815pa
			11880va 12080do			
2000	2100	as	Australia, Radio	6080pa	7240va	
2000	2100		Australia, Voice Intl	11680as		
2000	2100	vl	Botswana, Radio	3356do	4820do	7255do
2000	2100		Canada, CBC Northern Service	9625do		
2000	2100		Canada, CFRX Toronto ON	6070do		
2000	2100		Canada, CFVP Calgary AB	6030do		

Start	Stop	Notes	Station	Freq 1	Freq 2
2000	2100		Canada, CKZN St John's NF	6160do	
2000	2100		Canada, CKZU Vancouver BC	6160do	
2000	2100		Canada, Radio Canada Intl	5850va	5995va
			11690va 11965va 12015va	15325va	15470va
			17870va		
2000	2100		Costa Rica, Radio for Peace Intl	7445am	15038va
2000	2100		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
2000	2100		Eqt Guinea, Radio Africa	7189af	15184al
2000	2100		Germany, Deutsche Welle	9780af	15205af
			17810af		
2000	2100	vl	Ghana, Ghana BC Corp	3366do	4915do
2000	2100		Guam, AWR 11750as	11980as	
2000	2100		Indanesia, Voice of 11785eu	15150eu	
2000	2100	s	Ireland, Reflections Europe	3910eu	6295eu
			12255eu		
2000	2100		Kuwait, Radio 11990va		
2000	2100	s	Latvia, Laser Radio 5935eu		
2000	2100		Liberia, ELWA 4760do		
2000	2100		Malaysia, Radio 7295do		
2000	2100		Namibia, Namibian BC Corp	3270af	3290af
			6060af		
2000	2100		New Zealand, Radio NZ Intl	15160pa	
2000	2100		Nigeria, Radio/Abuja 7275do		
2000	2100		Nigeria, Radio/Enugu 6025do		
2000	2100		Nigeria, Radio/Ibadan	6050do	
2000	2100		Nigeria, Radio/Kaduna	4770do	6090do
2000	2100		Nigeria, Radio/Lagos 3326do	4990do	
2000	2100		Nigeria, Voice of 7255af	9690af	15120af
2000	2100		Papua New Guinea, NBC	4890do	9675irr
2000	2100		Russia, Voice of 9775eu	11675eu	12070eu
			15455eu 15735am		
2000	2100		Sierra Leone, Radio UNAMSIL	6139af	
2000	2100		Sierra Leone, SLBS 3316do		
2000	2100	vl	Solomon Islands, SIBC 5020do	9545do	
2000	2100		Syria, Radio Damascus	12085eu	13610eu
2000	2100		Uganda, Radio 4976do	5026do	7196do
2000	2100		UK, AWR Europe 15385af		
2000	2100		UK, BBC World Service	3255af	6005af
			6190af 6195eu 7120af	9410eu	9630af
			12095af 15400af 17830af		
2000	2100		USA, AFRTS/ Armed Forces Radio	3903usb	4278usb
			4319usb 4993usb 6350usb	6458usb	10320usb
			12579usb 12689usb	13362usb	13855usb
2000	2100		USA, KAIJ Dallas TX 13815va		
2000	2100		USA, KTBN Salt Lake City UT	15590na	
2000	2100		USA, Voice of America 4950af	6095eu	9760eu
			9770eu 9850af 11855af	11975af	13670af
			15410af 15445af 15580af	17745af	17895af
2000	2100		USA, WBCQ Kennebunk ME	7415va	9330na
			17495va		
2000	2100		USA, WBOH Newport NC	5920am	
2000	2100		USA, WEWN Birmingham AL	13615na	17595eu
2000	2100		USA, WHRA Greenbush ME	17650as	
2000	2100		USA, WHRI Noblesville IN	5745va	9495am
2000	2100		USA, WINB Red Lion PA	13570am	
2000	2100		USA, WJIE Louisville KY	7490am	13595am
2000	2100		USA, WRMI Miami FL 15725na		
2000	2100		USA, WTJC Newport NC	9370na	
2000	2100		USA, WWCR Nashville TN	9475na	12160na
			13845na 15825na		
2000	2100		USA, WWRB Manchester TN	9320na	12172na
2000	2100		USA, WYFR Okeechobee FL	3230af	15195af
			17725sa 17845af 18930eu	18980eu	
2000	2100	vl	Vanuatu, Radio 3945al	7260do	
2000	2100	vl	Zimbabwe, ZBC Corp 5975ao		
2000	2100		USA, WSHB Cypress Creek SC	15665af	18910af
2010	2030		Vatican City, Vatican Radio	9660af	11625af
			13765af		
2025	2045		Italy, RAI Intl 6185va	9670va	11880af
2030	2045		Swaziland, TWR 3200af		
2030	2045		Thailand, Radio 9680eu		
2030	2057		Vietnam, Voice of 11630eu	13740eu	
2030	2100	t h	Belarus, Radio Belarus Intl	7105eu	7210eu
2030	2100		Cuba, Radio Havana 11760eu	13660usb	
2030	2100		Egypt, Radio Cairo 15375af		
2030	2100	DRM	Netherlands, Radio 9795eu		
2030	2100		Turkey, Voice of 9525as		
2030	2100	f	UK, Wales Radio Intl 7325eu		
2030	2100	as	USA, Voice of America 9040af		
2030	2100		Uzbekistan, Radio Tashkent Intl	5025eu	9545eu
			11905eu		
2045	2100		India, All India Radio 7410eu	9445eu	9575au
			9910au 9950eu 11620va	11715au	

Start	Stop	Notes	Station	Freq 1	Freq 2
2100	2128		Hungary, Radio Budapest	6025eu	11890af
2100	2128		Serbia & Montnegro, RSCG	6100eu	
2100	2130		Canada, Radio Canada Intl	5850va	7235va
			13690va 15325vo 17870va		
2100	2130		China, China Radio Intl	11640af	13630af
			15110eu 17790eu		
2100	2130		Cuba, Radio Havana 11760eu	13660usb	

Start	Stop	Notes	Station	Freq 1	Freq 2
2100	2130		South Korea, Radio Korea Intl	3955eu	
2100	2130		Turkey, Voice of 9525as		
2100	2156		North Korea, Voice of 4405as	7505eu	11335eu
2100	2156		Romania, Radio Romania Intl	7185eu	9510eu
			9725eu 11775eu		
2100	2159	os	Spain, Radio Exterior Espana	9570af	9840eu
2100	2200		Anguilla, Caribbean Beacon	11775am	
2100	2200		Australia, Radio 7240va	9500as	9580va
			9660pa 11880va 12080va	17715va	21740va
2100	2200		Austria, AWR Europe 15130af		
2100	2200	vl	Botswana, Radio 3356do	4820do	7255do
2100	2200		Bulgaria, Radio 5800eu	7500eu	
2100	2200		Canada, CBC Northern Service	9625do	
2100	2200		Canada, CFRX Toronto ON	6070do	
2100	2200		Canada, CFVP Calgary AB	6030do	
2100	2200		Canada, CKZN St John's NF	6160do	
2100	2200		Canada, CKZU Vancouver BC	6160do	
2100	2200	vl/ DRM	Canada, Radio Canada Intl	9795eu	
2100	2200		Costa Rica, Radio for Peace Intl	7445am	15038va
2100	2200		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
2100	2200		Egypt, Radio Cairo 15375af		
2100	2200		Eqt Guinea, Radio Africa	7189af	15184al
2100	2200	f	Finland, Scandinavian Weekend Radio		5990va
			11720va		
2100	2200		Germany, Deutsche Welle	9440af	11865af
			15205af		
2100	2200	vl	Ghana, Ghana BC Corp	3366do	4915do
2100	2200		Guyana, Voice of 5949do		
2100	2200		India, All India Radio 7410eu	9445eu	9575au
			9910au 9950eu 11620va	11715au	
2100	2200	s	Ireland, Reflections Europe	3910eu	6295eu
			12255eu		
2100	2200		Japan, Radio 6035pa	6055eu	6180eu
			11855af 17825na 21670pa		
2100	2200		Liberia, ELWA 4760do		
2100	2200		Malaysia, Radio 7295do		
2100	2200		Malta, Voice of Mediterranean	12060eu	
2100	2200	vl	Mexico, Radio Mexico Intl	9705am	11770am
2100	2200		Namibia, Namibian BC Corp	3270af	3290af
			6060af		
2100	2200		Nigeria, Radio/Abuja 7275do		
2100	2200		Nigeria, Radio/Enugu 6025do		
2100	2200		Nigeria, Radio/Ibadan	6050do	
2100	2200		Nigeria, Radio/Kaduna	4770do	6090do
2100	2200		Nigeria, Radio/Lagos 3326do	4990do	
2100	2200		Nigeria, Voice of 15120af		
2100	2200		Papua New Guinea, NBC	4890do	9675irr
2100	2200		Sierra Leone, Radio UNAMSIL	6139af	
2100	2200		Sierra Leone, SLBS 3316do		
2100	2200		Syria, Radio Damascus	12085eu	13610eu
2100	2200		UK, BBC World Service	3255af	3915as
			5965as 5975am 6005af	6190af	6195va
			7120af 9410eu 11945as	12095sa	15400af
			17830af		
2100	2200		Ukraine, Radio Ukraine Intl	5905eu	
2100	2200		USA, AFRTS/ Armed Forces Radio	3903usb	4278usb
			4319usb 4993usb 6350usb	6458usb	10320usb
			12579usb 12689usb	13362usb	13855usb
2100	2200		USA, KAIJ Dallas TX 13815va		
2100	2200		USA, KTBN Salt Lake City UT	15590na	
2100	2200		USA, Voice of America 6040eu	6095eu	9530eu
			9705as 9760eu 11870as	11875af	
			13670af 15185as 15410af	15445af	15580af
			17740as 17820as 17895af		
2100	2200		USA, WBCQ Kennebunk ME	5100va	7415na
			9330va 17495va		
2100	2200		USA, WBOH Newport NC	5920am	
2100	2200		USA, WEWN Birmingham AL	13615na	17595eu
2100	2200		USA, WHRA Greenbush ME	17650af	
2100	2200		USA, WHRI Noblesville IN	5745va	9495am
2100	2200		USA, WINB Red Lion PA	13570am	
2100	2200		USA, WJIE Louisville KY	7490am	13595am
2100	2200		USA, WRMI Miami FL 15725na		
2100	2200		USA, WSHB Cypress Creek SC	15665af	18910af
2100	2200		USA, WTJC Newport NC	9370na	
2100	2200		USA, WWCR Nashville TN	9475na	12160na
			13845na 15825na		
2100	2200		USA, WWRB Manchester TN	9320na	12172na
2100	2200		USA, WYFR Okeechobee FL	17725sa	17845af
			18930eu 18980eu		
2100	2200	vl	Vanuatu, Radio 3945al	7260do	
2100	2200	vl	Zimbabwe, ZBC Corp 5975do		
2115	2130	mtwhf	UK, BBC World Service	11675am	15390am
2115	2200		Egypt, Radio Cairo 9990eu	15375af	
2123	2130		Libya, Voice of Africa 11635af	15105af	15315af
2130	2145	tf	UK, BBC World Service	11720sa	
2130	2156		China, China Radio Intl	15110eu	17790eu
2130	2157		Czech Rep, Radio Prague Intl	11600na	13580na
2130	2200	twhfa	Albania, Radio Tirana Intl	7130eu	9540eu
2130	2200		Australia, ABC NT Alice Springs	2310do	4835irr
2130	2200		Australia, ABC NT Katherine	5025do	
2130	2200		Australia, ABC NT Tennant Creek	4910do	
2130	2200		Guam, AWR 11850os	11980os	
2130	2200		Iran, Voice of the Islamic Rep	9870ou	13665au
2130	2200		Sweden, Radio 6065va	11650as	

2130	2200		Uzbekistan, Radio Tashkent Intl 11905eu	5025eu	9545eu

2200 UTC - 6PM E / 5PM C / 3PM P

2200	2215		New Zealand, Radio NZ Intl	15160pa	
2200	2227		Iran, Voice of the Islamic Rep	9870au	13665au
2200	2228	smtwhf	Serbia & Montenegro, RSCG	7230au	
2200	2230		Canada, Radio Canada Intl 11920am 15170am 15455am	6140am 17880am	9590am
2200	2230		India, All India Radio 7410eu 9910au 9950eu 11620va	9445eu 11715au	9575au
2200	2230	s	Ireland, Reflections Europe 12255eu	3910eu	6295eu
2200	2230	mtwhf/vl	Mexico, Radio Mexico Intl	9705am	11770am
2200	2230		Papua New Guinea, NBC	4890do	9675irr
2200	2230	mtwhf	USA, Voice of America 9850af 15580af	11975af	13670af
2200	2245		Egypt, Radio Cairo 9990eu		
2200	2255		Turkey, Voice of 9830va	12000va	
2200	2256		China, China Radio Intl	9880eu	
2200	2300		Anguilla, Caribbean Beacon	6090am	
2200	2300		Australia, ABC NT Alice Springs	2310do	4835irr
2200	2300		Australia, ABC NT Katherine	5025do	
2200	2300		Australia, ABC NT Tennant Creek	4910do	
2200	2300		Australia, Radio 9660va 15230as 17715va 17795va 21740va	12080va	13620va
2200	2300	vl	Botswana, Radio 3356da	4820da	7255da
2200	2300		Canada, CBC Northern Service	9625da	
2200	2300		Canada, CFRX Toronto ON	6070do	
2200	2300		Canada, CFVP Calgary AB	6030do	
2200	2300		Canada, CKZN St John's NF	6160do	
2200	2300		Canada, CKZU Vancouver BC	6160do	
2200	2300		Costa Rica, Radio for Peace Intl	7445am	15038va
2200	2300		Costa Rica, University Network 7375am 9725sa 11870am	5030om 13750na	6150am 17645as
2200	2300		Eqt Guinea, Radio Africa	7189af	15184al
2200	2300		Germany, Deutsche Welle	9720as	15605as
2200	2300	vl	Ghana, Ghana BC Corp	3366do	4915do
2200	2300		Guyana, Voice of 3291do	5949do	
2200	2300		Malaysia, Radio 7295do		
2200	2300		Namibia, Namibian BC Corp 6060af	3270af	3290af
2200	2300		Nigeria, Radio/Abuja 7275do		
2200	2300		Nigeria, Radio/Enugu 6025do		
2200	2300		Nigeria, Radio/Ibadan	6050do	
2200	2300		Nigeria, Radio/Kaduna	4770do	6090do
2200	2300		Nigeria, Radio/Lagos 3326do	4990do	
2200	2300		Nigeria, Voice of 15120af		
2200	2300		Sierra Leone, Radio UNAMSIL	6139af	
2200	2300		Sierra Leone, SLBS 3316do		
2200	2300	vl	Solomon Islands, SIBC 5020do	9545do	
2200	2300	DRM	Sweden, Radio 9795eu		
2200	2300		Taiwan, Radio Taiwan Intl	15600eu	
2200	2300		UK, BBC World Service 6195as 7105as 7120af 12095sa 15400of 17830af	5965as 9740as	5975am 11955as
2200	2300		USA, AFRTS/ Armed Forces Radio 4319usb 4993usb 6350usb 12579usb 12689usb	3903usb 6458usb 13362usb	4278usb 10320usb 13855usb
2200	2300		USA, KAIJ Dallas TX 13815va		
2200	2300		USA, KTBN Salt Lake City UT	15590na	
2200	2300		USA, KWHR Naalehu HI	17510as	
2200	2300		USA, Voice of America 7215as 11760as 15185as 15290as 17820as	9705as 15305as	9770as 17740as
2200	2300		USA, WBCQ Kennebunk ME 9330va 17495va	5100va	7415na
2200	2300		USA, WBOH Newport NC	5920am	
2200	2300		USA, WEWN Birmingham AL	9975na	17595eu
2200	2300		USA, WHRA Greenbush ME	17650af	
2200	2300		USA, WHRI Noblesville IN	5745va	9495am
2200	2300		USA, WINB Red Lion PA	13570om	
2200	2300		USA, WJIE Louisville KY	7490am	13595om
2200	2300		USA, WRMI Miami FL 15725na		
2200	2300		USA, WSHB Cypress Creek SC	13770eu	15285sa
2200	2300		USA, WTJC Newport NC	9370na	
2200	2300		USA, WWCR Nashville TN 12160na 13845na	7465na	9475na
2200	2300		USA, WWRB Manchester TN 6890na	5050na	5085na
2200	2300		USA, WYFR Okeechobee FL 15770al 17845af	11740na	15695eu
2200	2300	vl	Vanuatu, Radio 3945al	7260do	
2205	2230		Italy, RAI Intl 11895va		
2216	2230		New Zealand, Radio NZ Intl	17675pa	
2230	2257		Czech Rep, Radio Prague Intl	11600na	13580na
2230	2259		Belgium, Radio Vlaanderen Intl	15565am	
2230	2300		Canada, Radio Canada Intl 15455na	9590na	13670na
2230	2300		Cuba, Radio Havana 6195am	9550na	
2230	2300		Papua New Guinea, NBC	4890do	9675irr
2245	2300		India, All India Radio 9705as 13605as	9950as	11620as

2300 UTC - 7PM E / 6PM C / 4PM P

2300	0000		Anguilla, Caribbean Beacon	6090am	
2300	0000		Australia, ABC NT Alice Springs	2310do	4835irr
2300	0000		Australia, ABC NT Katherine	5025do	
2300	0000		Australia, ABC NT Tennant Creek	4910do	
2300	0000		Australia, Radio 9660pa 13620as 15230as 15415as 21740va	11695as 17715va	12080va 17795va
2300	0000	vl	Botswana, Radio 3356da	4820da	7255do
2300	0000		Bulgaria, Radio 9400na	11900na	
2300	0000		Canada, CBC Northern Service	9625do	
2300	0000		Canada, CFRX Toronto ON	6070do	
2300	0000		Canada, CFVP Calgary AB	6030do	
2300	0000		Canada, CKZN St John's NF	6160do	
2300	0000		Canada, CKZU Vancouver BC	6160do	
2300	0000		Canada, Radio Canada Intl 15455na	9590na	13670na
2300	0000		Costa Rica, Radia for Peace Intl	7445am	15038am
2300	0000		Costa Rica, University Network 7375am 9725sa 11870am	5030na 13750na	6150am 17645as
2300	0000		Egypt, Radio Cairo 11725na		
2300	0000		Germany, Deutsche Welle	9890as	17860as
2300	0000	vl	Ghana, Ghana BC Corp	3366do	4915do
2300	0000		Guyana, Voice of 3291do	5949do	
2300	0000		India, All India Radio 9705as 13605as	9950as	11620as
2300	0000		Malaysia, Radio 7295do		
2300	0000		Namibia, Namibian BC Corp 6060af	3270af	3290af
2300	0000	DRM	Netherlands, Radio 15525na		
2300	0000		New Zealand, Radio NZ Intl	17675pa	
2300	0000		Papua New Guinea, NBC	4890do	9675irr
2300	0000		Sierra Leone, Radio UNAMSIL	6139af	
2300	0000		Sierra Leone, SLBS 3316do		
2300	0000		Singapore, Mediacorp Radio	6150do	
2300	0000	vl	Solomon Islands, SIBC 5020do	9545do	
2300	0000		UAE, Gospel For Asia 6145as		
2300	0000		UK, BBC World Service 5975am 6195as 7120af 11955as 12095sa 15280as	3915as 9580as	5965as 9740as
2300	0000	DRM	UK, BBC World Service	9795eu	
2300	0000		USA, AFRTS/ Armed Forces Radio 4319usb 4993usb 6350usb 12579usb 12689usb	3903usb 6458usb 13362usb	4278usb 10320usb 13855usb
2300	0000		USA, KAIJ Dallas TX 13815va		
2300	0000		USA, KTBN Salt Lake City UT	15590na	
2300	0000		USA, KWHR Naalehu HI	17510as	
2300	0000		USA, Voice of America 7215as 7260as 9545as 11760as 13725as 13775as 15185as 15305as 17740as 17820as	7200as 11805as 15205as	7225as 11925as 15290as
2300	0000		USA, WBCQ Kennebunk ME 9330va 17495va	5100va	7415na
2300	0000		USA, WBOH Newport NC	5920am	
2300	0000		USA, WEWN Birmingham AL	9975na	17595eu
2300	0000		USA, WHRA Greenbush ME	7580va	
2300	0000		USA, WHRI Noblesville IN	5745va	9495am
2300	0000		USA, WINB Red Lion PA	12160am	
2300	0000		USA, WJIE Louisville KY	7490am	13595na
2300	0000	as	USA, WRMI Miami FL 9955am		
2300	0000	mtwhf	USA, WRMI Miami FL 7385na		
2300	0000		USA, WTJC Newport NC	9370na	
2300	0000	as	USA, WWBS Macon GA	11910na	
2300	0000		USA, WWCR Nashville TN 9475na 13845na	5070na	7465na
2300	0000		USA, WWRB Manchester TN 6890na	5050na	5085na
2300	0000		USA, WYFR Okeechobee FL 11855sa 15255sa 17750sa	5985sa	11740na
2300	0000	vl	Vanuatu, Radio 3945al	7260do	
2300	2305		Nigeria, Radio/Abuja 7275do		
2300	2305		Nigeria, Radio/Enugu 6025da		
2300	2305		Nigeria, Radio/Ibadan	6050do	
2300	2305		Nigeria, Radio/Kaduna	4770do	6090do
2300	2305		Nigeria, Radio/Lagos 3326do	4990do	
2300	2330		China, China Radio Intl	5990na	13680na
2300	2330		Cuba, Radio Havana 6195am	9550na	
2300	2356		Romania, Radio Romania Intl 11775eu 15105na	9570eu	11740na
2305	2312		Croatia, Voice of 9925sa		
2315	2330	mtwhf	Austria, Radio Austria Intl	9870sa	13730sa
2320	2330		Kyrghyz, Kyrghyz Radio	4010as	4795as
2330	0000		Lithuania, Radio Vilnius	9875na	
2330	0000		Netherlands, Radio 6165na	9845na	
2330	0000	DRM	Netherlands, Radio 15525eu		
2330	0000		Switzerland, Swiss Radio Intl	9885sa	11905sa
2330	2345		Iraq, Radio Iraq Intl 11787irr		
2330	2356		China, China Radio Intl	5990na	13680na
2330	2357		Vietnam, Voice of 9840as	12019as	
2345	0000	mtwhf	Austria, Radio Austria Intl	9870sa	13730sa

Headnotes:

DW in NA - Some frequencies targeting other regions have proven reliable on the U.S. East Coast. (Best in bold.)

0400-0500 .... 7225, 11945 kHz
0500-0600 .... 9700, 11925, 12045 kHz
0600-0700 .... 15275, 17860 kHz
2100-2200 .... 11865, 15205 kHz

The Guide includes program listings for these broadcasts. West Coast readers are invited to share their experiences. Consult the frequency section of this Guide, check reception for each at your location, and submit your results to the MT program manager.

WRMI IBC Listings - (See page 42.) The program listings for the IBC Radio Network broadcasts now carried by WRMI were obtained from the IBC internet site; their accuracy has not yet been confirmed.

DRM Broadcasts - commenced in mid-July, but reception is possible at this time only via the combined use of software available from DRM, modified shortwave receivers and PCs. For further information, consult http://www.drm.org and http://www.drmrx.org.

0000 UTC/ 8pm E/5pm P - Page 43 Freqs

SUNDAY
0000　R. for Peace Int. .... World of Radio (Glenn Hauser's review of SW & int'l broadcasting)
　　　R. Netherlands .... Music 52/15 (musical styles from around the globe)
　　　WBCQ(7415kHz) ...... A Different Kind of Oldies Show (unique mix with "Big Steve" Cole)
　　　WINB .... DX Partyline (HCJB's longrunning program for DXers & SWLs hosted by Allen Graham)
0005　R. Prague .... Insight Central Europe (regional magazine jointly produced)
0006　BBCWS(am) .... The Ticket (the arts & entertainment around the globe)
　　　R. Australia .... Go Zone (Australian pop music with Kat Perdriau)
0010　R. Japan .... Hello from Tokyo (listener letters, music & short features)
　　　R. New Zealand Int. ...... The Week in Parliament (a weekly roundup of NZ political news)
0030　R. Netherlands .... Amsterdam Forum (an interactive discussion of topical issues)
　　　R. New Zealand Int. ...... Spectrum (the people, places & events around NZ)
　　　WINB .... World of Radio (Glenn Houser's review of SW & int'l broadcasting)
0045　R. Ext. de Espana .... Radio Waves (a weekly program for radio enthusiasts)

MONDAY-FRIDAY
0000　R. New Zealand Int. ...... Midday Report (news updates & in-depth reports)

MONDAY
0000　R. Netherlands .... Dutch Horizons (Bertine Krol chronicles life in Holland)
　　　WBCQ(7415kHz) ...... Radio New York International (Johnny Lightning plays classic rock)
0005　R. Prague .... Mailbox (see 0105 M)
0006　BBCWS(am) .... Everywoman (a weekly magazine about the world's women)
0010　R. Australia .... Awaye! (Aboriginal arts & culture program)
　　　R. Japan .... Weekend Square (conversations with guests & letters)
0015　R. Prague .... Czech Books [or] Encore [or] Magic Carpet (see 0115 M)
0030　R. for Peace Int. .... World of Radio (Glenn Hauser's review of SW & int'l broadcasting)
　　　R. Netherlands .... Aural Tapestry (David Swatling weaves stories through cultures & history)
0032　BBCWS(am) .... Westway Omnibus (the previous two episodes of this radio light drama)
0040　R. Ext. de Espana .... Radio Club (rebroadcast A0035)
0054　R. Japan .... Sights & Sounds of Japan

TUESDAY-SATURDAY
0000　VOA .... News Now (continuous, rolling news service)
0005　R. Prague .... Current Affairs (see 0105 T-A)
0010　R. Japan .... Songs for Everyone
0015　R. Ext. de Espana .... Spain Day by Day (daily magazine of reports, music & features)
　　　R. Japan .... 44 Minutes (daily current affairs magazine about Japan & Asia)
　　　VOA .... Focus (top news in perspective)
0032　VOA .... Coast to Coast (a magazine about American life)

TUESDAY
0000　R. for Peace Int. .... Middle East Radio Project
　　　R. Netherlands .... The Research File (the relevance of science to all our lives)

0005　BBCWS(am) .... Corruption (its causes, costs & remedies documented)
0010　R. Australia .... The Science Show ("a science program about ideas, not just facts")
0015　R. Prague .... Talking Point (see 0115 T)
0030　R. Netherlands .... EuroQuest (a magazine placing Europe in context)
0032　BBCWS(am) .... The Music Feature (features & documentaries on current musical genres)

WEDNESDAY
0000　R. for Peace Int. .... Counterspin (media analysis from Fairness & Accuracy in Reporting)
　　　R. Netherlands .... Music 52/15 (musical styles around globe)
　　　WBCQ(7415kHz) ...... Allan Weiner Worldwide (see 0000 A)
0005　BBCWS(am) .... Masterpiece (exploring major cultural ideas & great artistic endeavors)
0010　R. Prague .... Witness (see 0110 W)
0010　R. Australia .... The National Interest (Terry Lane's round-up of the week's major issues)
0015　R. Prague .... One on One (see 0115 W)
0030　R. Netherlands .... A Good Life (how development affects societies)
0032　BBCWS(am) .... Top of the Pops (the British rock & pop charts)

THURSDAY
0000　R. Netherlands .... The Weekly Documentary (sound essays & in-depth investigations)
0005　BBCWS(am) .... A documentary series
0010　R. Australia .... Background Briefing (award-winning current affairs radio documentary)
0015　R. Prague .... Czechs in History [or] Spotlight (see 0115 H)
0030　R. Netherlands .... Dutch Horizons (see Mon. 0000)
0032　BBCWS(am) .... Charlie Gillett (worldwide music)

FRIDAY
0000　R. Netherlands .... Aural Tapestry (see 0030 M)
0005　BBCWS(am) .. .. Omnibus (a series of feature documentaries)
0010　R. Australia .... Hindsight (social history from the memories of those who were there)
0015　R. Prague .... Economics Report (see 0115 F)
0030　R. Netherlands .... The Research File (see 0000 T)
0032　BBCWS(am) .... The Music Biz (the global music industry)

SATURDAY
0000　R. Netherlands .... A Good Life (see 0030 W)
　　　WBCQ(7415kHz) ...... Allan Weiner Worldwide (the station manager's show)
0005　BBCWS(am) .. .. Sports International (the issues & personalities behind the headlines)
　　　R. Australia .... Australian Express (a magazine of Australian culture, lifestyles & music)
0010　R. New Zealand Int. ...... Focus on Politics (a report on government & politics in NZ)
0015　R. Prague .... The Arts (see 0115 A)
0030　R. New Zealand Int. ...... The Sampler (Nick Bollinger reviews the latest CD offerings)
　　　R. Netherlands .... The Weekly Documentary (see 0000 H)
0032　BBCWS(am) .... John Peel (with his own unique & eclectic mix of new music)
0035　R. Exterior de Espana .... Radio Club (listeners' letters)

0100 UTC/ 9pm E/6pm P - Page 43 Freqs

SUNDAY
0100　WBCQ(7415kHz) ...... Marion's Attic (rare & vintage recordings presented by Marion Webster)
　　　WINB .... Wavescan (Adventist World Radio's program for DXers and SWLs)
0101　BBCWS(am) .... Play of the Week (classic & contemporary drama for radio)
0105　R. Australia ... ... Correspondents' Report (the week's events analyzed)
　　　R. Austria Int. .... Insight Central Europe (a regional magazine jointly produced)
　　　R. Canada Int. ... . Business Sense (Canadian companies in the global economy)
　　　R. Netherlands .... Europe Unzipped (the events of the past week in Europe, some unusual)
　　　R. New Zealand Int. ...... At the Movies (a weekly report on cinema with Simon Morris)
　　　R. Prague .... Magazine (Czech news stories you might have missed)
　　　R. Slovakia Int. .... Insight Central Europe (see 0105 S R. Austria Int.)
0110　R. Prague .... Letter from Prague (a personal view of life in & around the Czech capital)
0111　Voice of Russia .... Moscow Mailbag (Joe Adamov with answers, rumors & jokes)
0115　R. Prague .... One on One (an informal interview with an interesting Czech figure)

0120　China R. Int. .... In the Spotlight (Chinese arts & cultural magazine)
0130　R. Australia .... Oz Sounds (Australian music & performers)
　　　R. New Zealand Int. ...... Bookmarks (NZ books & writers)
　　　RTE Ireland .... Saturday View political developments at home & abroad / Rodney Rice)
0132　Voice of Russia .... Moscow Yesterday & Today (recalling interesting events in its history)
0135　R. Austria Int. .... Insight Central Europe (see 0105 S)
　　　R. Canada Int. .... Sci-Tech File (science & technology developments in Canada)
0140　R. Habana Cuba .... DXers Unlimited (Arnie Coro presents a program for radio enthusiasts)
0150　R. Austria Int. .... Listener Letters

MONDAY-FRIDAY
0100　R. Australia .... Asia-Pacific (RA's flagship current events & business report)
0105　R. New Zealand Int. ...... Cadenza (light classical music)

MONDAY
0100　R. Habana Cuba .... Weekly Review (Cuba's perspective on current events)
　　　WBCQ(7415kHz) ...... Radio New York International (continues from 0000)
0105　R. Austria Int. .... Insight Central Europe (see 0105 S)
　　　R. Budapest .... Spotlight (a monthly magazine) Europe Unlimited (Hungary's relations with the rest of Europe)(monthly) Heading for Hungary (a monthly travelogue) And the Gatepost (listener letters)(monthly)
　　　R. Canada Int. .... The Maple Leaf Mailbag (Ian Jones answers mail / fortnightly CIDX Report)
　　　R. Netherlands .... Wide Angle (a single issue examined in-depth)
　　　R. Prague .... Mailbox (replying to listener letters)
0106　BBCWS(am) .... Wright Around the World (reader messages & requests w/Steve Wright)
0110　R. Slovakia Int. .... Listeners' Tribune (magazine of letters, features & Slovak music)
　　　Voice of Vietnam .... Sunday Show (variety magazine with local reports & music)
0111　Voice of Russia .... Moscow Mailbag (see 0111 S)
0115　R. Prague .... Czech Books (a fortnightly look at Czech writing today) Encore (a monthly review of Czech classical music) Magic Carpet (monthly Czech world music program)
0130　China R. Int. .... People in the Know (interviews with prominent Chinese)
　　　R. Australia .... The Health Report (Dr. Norman Swan on health & medical issues)
　　　RTE Ireland .... This Week (Barry, Rafter & Duffy look back at the week)
0132　Voice of Russia .... Timelines (Estelle Winters' variety show on life in Moscow)
0135　R. Austria Int .... Insight Central Europe (see 0105 S)
　　　R. Canada Int. .... Spotlight (magazine of arts & culture in Canada)
0140　R. Habana Cuba .... The Mailbag Show (listener letters)
0150　R. Habana Cuba .... Breakthrough (Arnie Coro's weekly science report)

TUESDAY-SATURDAY
0100　R. Netherlands .... Newsline (news, analysis & background reports)
　　　VOA .... News Now (continuous rolling news service)
0105　R. Budapest .... Hungary Today (daily magazine covering current events in Hungary)
　　　R. Canada Int. .... Canada Today (daily magazine of interviews, correspondents' reports & Canadian views)
　　　Voice of Russia .... Commonwealth Update (comments on domestic developments & issues)
0105　R. Prague .... Current Affairs (issues & events in the Czech Republic & Europe)
0115　R. Austria Int. .... Report from Austria (15 min. magazine focusing on Austria & Europe)
0130　RTE Ireland .... Five Seven Live (information-packed evening magazine, current affairs & popular culture)
0145　R. Austria Int. .... Report from Austria (15 min. magazine)

TUESDAY
0106　BBCWS(am) .... Health Matters (reports on the latest research)
0115　R. Prague .... Talking Point (a closer look at issues affecting Czech life) ..
0130　BBCWS(am) .... A panel game or quiz show
　　　China R. Int. .... Biz China (Chinese business & economic development magazine)
　　　R. Australia .... The Law Report (Damien Carrick presents breaking legal stories)
0132　BBCWS(am) .... Inspiration (a quiz centered on scientific inventions & discoveries)
　　　Voice of Russia .... Folk Box (music from varied

Column 1:

		cultures of Russia & the CIS)
0135	R. Canada Int.	Media Zone (Ian Jones hosts forum with Canadian journalists)
0145	VOA News Now	Dateline (a daily short documentary)

WEDNESDAY
0105	BBCWS(am)	Go Digital (technology journalist Tracey Logan explains the latest in IT)
0110	R. Prague	Witness (recent Czech history through vivid personal memories)
0115	R. Prague	One on One (an informal interview with an interesting Czech figure)
0130	China R. Int.	China Horizons (life in China outside Beijing)
	R. Australia	The Religion Report (Stephen Crittenden on how religion & societies interact)
0132	BBCWS(am)	Music Review (personalities, views & issues from the world of music)
	Voice of Russia	The Jazz Show (recordings from the Russian world of jazz)
0135	R. Canada Int.	Spotlight (see M 0135)
0140	R. Habana Cuba	DXers Unlimited (see S 0140)
0145	VOA News Now	Dateline (daily documentary)

THURSDAY
0105	BBCWS(am)	Discovery (in-depth exploration of ideas & discoveries in sci/tech)
0115	R. Prague	Czechs in History (fortnightly) Spotlight (traveling around the Czech Republic)
0130	R. Australia	The Media Report (Mick O'Regan on developments in communications)
0132	BBCWS(am)	Westway (the week's first episode of this radio light drama)
	Voice of Russia	Musical Tales of St. Petersburg
0135	R. Canada Int.	Maple Leaf Mailbag (see M 0105)
0145	VOA News Now	Dateline (a daily short documentary)
0154	Voice of Russia	Russia: People & Events (history through events & personalities)

FRIDAY
0106	BBCWS(am)	The Proms (performances from the 109th season)
0115	R. Prague	Economics Report (business & technology news)
0130	R. Australia	The Sports Factor (Warwick Hadfield presents reports which debate & celebrate the cultural significance of sport)
0132	Voice of Russia	Music Around Us (popular contemporary Russian musicians)
0135	R. Canada Int.	Business Sense (see S 0105)
0145	VOA News Now	Dateline (a daily brief documentary)
0146		Music at Your Request (your choice of music)

SATURDAY
0100	R. for Peace Int.	Middle East Radio Project
	WBCQ(7415kHz)	Tasha Takes Control (upbeat progressive music)
0105	R. Australia	Asia-Pacific Weekend Edition (a weekly current events & business report)
	R. New Zealand Int.	Digital Life (technology issues, global news, and new techno-comedy drama)
0106	BBCWS(am)	Science in Action (current developments in sci/tech)
0115	R. Prague	The Arts (cultural life in the heart of Europe)
0120	R. Budapest	DX Corner (o report for radio hobbyists)
	China R. Int.	Cutting Edge (science & technology in China)
0130	China R. Int.	Listeners Garden (letters, language lesson & other features)
	R. Australia	Music Deli (folk, traditional, acoustic & world music with Paul Petran)
	R. for Peace Int.	World of Radio (Glenn Houser's review of SW & int'l broadcasting)
0132	BBCWS(am)	Westway (the week's second episode of this radio light drama)
	Voice of Russia	Christian Message from Moscow (the Russian Orthodox Church)
0133	VOA News Now	VOA News Review (report on the past week's news)
0135	R. Canada Int.	Sci-Tech File (see S 0135)
0145	VOA Special Eng.	American Stories (short stories by American authors)

0200 UTC/ 10pm E/7pm P - Page 44 Freqs

DAILY
0200	BBCWS(am)	The World Today (agenda-setting flagship global news program)

SUNDAY
0200	WBCQ(7415kHz)	Alan Sane (pirate radio "the way it used to be")
	WRMI(7385kHz)	Wavescan (see 0230 M)
	WWCR(5070kHz)	DX Partyline (see S 000)

Column 2:

0205	R. Australia	Margaret Throsby (a guest presents favorite musical pieces)
0211	Voice of Russia	News & Views (Russia's views on news developments)
0215	R. Korea Int.	Worldwide Friendship (RKI's interactive contact with listeners)
	R. Taiwan Int.	Great Wall Forum (the China-Taiwan issue from Taipei's perspective)
0224	Voice of Russia	Russia: People & Events (see 0154 H)
0230	R. New Zealand Int.	Health Matters or Environment Matters
	R. for Peace Int.	Daily Reading (o recap of the week's readings)
	R. Sweden	Network Europe (o magazine about Europe, 1st week of the month) Sweden Today (voices of Sweden, 2nd week) Spectrum (Swedish cultural scene, 3rd week) Studio 49 (ideas & long-term trends, 4th week)
	R. Taiwan Int.	Mailbag Time (see 0330 A)
	WHRA(7580kHz)	DXing with Cumbre (Marie Lamb with the latest DX catches)
	WRMI(7385kHz)	Viva Miami (R. Miami Int.'s listener magazine show)
	WWCR(5070kHz)	World of Radio (Glenn Hauser's review of SW & int'l broadcasting)
0232	BBCWS(am)	Global Business (trends & ideas shaping business)
	Voice of Russia	Songs from Russia (melodies & musical novelties from Russia's past)
0235	R. Habana Cuba	The World of Stamps (perhaps the only program on philatelic matters)
0246	Voice of Russia	You Write to Moscow (listeners comment about VoR)

MONDAY-FRIDAY
0205	R. New Zealand Int.	In Touch with NZ—Wayne's Music (domestic afternoon variety program w/Wayne Mowat)
0210	R. Australia	The World Today (a comprehensive current affairs program with Eleanor Hall)

MONDAY
0200	WBCQ(7415kHz)	Radio New York Internat onal (continues from 0000)
0210	R. Habana Cuba	From Havana (a showcase of contemporary Cuban music & musicians)
0211	Voice of Russia	Sunday Panorama (a magazine focusing on the past week in Russia)
0215	R. Korea Int.	Korean Pop Interactive (Korean cutting edge pop music, oldies & artist interviews)
	R. Taiwan Int.	Jade Bells & Bamboo Pipes (Carson Wong introduces selections of traditional Chinese music)
0230	R. Habana Cuba	The Jazz Place (the very best of Cuban jazz) or Top Tens (contemporary Cuban hits)
	R. Sweden	In Touch with Stockholm (an interactive listener contact program, 1st week) Sounds Nordic (youth music & trends w/Gaby Katz)[all exc. 1st week]
	WHRI(5745kHz)	DXing with Cumbre (see 0230 S)
	WRMI(7385kHz)	Wavescan (Adventist World Radio's program for dxers & shortwave radio enthusiasts)
0232	BBCWS(am)	World Business Review (analysis of global business developments)
	Voice of Russia	This is Russia (the cities & regions, culture & the arts, the countryside, religion & people)
0235	R. Budapest	(see M 0105)
0245	BBCWS(am)	The Instant Guide (concise explanations of topical subjects)

TUESDAY-SATURDAY
0215	R. Korea Int.	Seoul Calling (daily feature magazine of Korean people, places & events)
0211	Voice of Russia	News & Views (see 0211 S)
0230	R. Sweden	Sixty Degrees North (reports, interviews & analysis on the Nordic region)
0235	R. Budapest	Hungary Today (a daily magazine covering current events in Hungary)

TUESDAY
0232	BBCWS(am)	World Business Report (the main business issues of the day)
	Voice of Russia	Kaleidoscope (the latest economic, social & cultural events in Russia & the CIS)
0245	BBCWS(am)	Analysis (background to the stories in the news)
	R. Korea Int.	Korea Today & Tomorrow (the latest developments on the Korean peninsula)

WEDNESDAY
0232	BBCWS(am)	World Business Report (the main business issues of the day)
	Voice of Russia	Musical Tales of St. Petersburg
0245	BBCWS(am)	Analysis (see T 0245)
	R. Korea Int.	Korean Kaleidoscope (Korean social & economic life)
	R. Sweden	Close Up (profiles of people in Sweden from all walks of life)[1st/3rd wk.]
0254	Voice of Russia	Russia: People & Events (see 0154 H)

Column 3:

THURSDAY
0215	R. Taiwan Int.	Discover Taiwan (see 0330 F)
0232	BBCWS(am)	World Business Report (the main business issues of the day)
	Voice of Russia	Moscow Yesterday & Today (interesting events in the history of the city)
0245	BBCWS(am)	From Our Own Correspondent (the background to international events from BBC correspondents around the world)
0245	R. Korea Int.	Wonderful Korea (a travelogue)
	R. Sweden	Money Matters (a weekly economic report on the Nordic region)

FRIDAY
0200	R. for Peace Int.	Continent of Media (Glenn Houser's survey of US/Canadian radio spectrum)
0230	BBCWS(am)	World Business Report (the main business issues of the day)
0232	Voice of Russia	Russian by Radio
0245	BBCWS(am)	Analysis (see T 0211)
0245	R. Korea Int.	Seoul Report (interviews with Koreans & visitors to Korea from all walks of life)
	R. Sweden	Nordic Lights (a monthly magazine on Scandinavia, first week of the month) Greenscan (Azariah Kiros highlights Swedish environmental awareness & challenges, second week) Heart Beat (Gaby Katz hosts a monthly health & medical magazine, third week) The S-Files (Kris Baswell takes you to the Sweden behind the headlines, fourth week)

SATURDAY
0205	R. Australia	Background Briefing (see H 0010)
	R. New Zealand Int.	Eureka! (reports on science in NZ)
0230	R. New Zealand Int.	Health Matters or Environment Matters
0232	BBCWS(om)	World Business Report (the main business issues of the day)
	Voice of Russia	Audio Book Club (readings from the best of Russian classic & contemporary literature)

0300 UTC/ 11pm E/8pm P - Page 44 Freqs

SUNDAY
0300	R. Vlaanderen Int.	Music from Flanders (a half-hour of Flemish music, musicians & musical performances)
	WBCQ(7415kHz)	You Are What You Think (satire in the tradition of Firesign Theatre)
	WRMI(7385kHz)	IBC Radio Network
	WWCR(5070kHz)	Spectrum (communications magazine/phone-in)
0305	R. Australia	Feedback (Roger Broadbent answers listener questions & provides regular updates about RA)
	R. Prague	Magazine (Czech news stories you might have missed)
0306	BBCWS(om)	From Our Own Correspondent (the background to international events from BBC correspondents around the world)
0310	R. Prague	Letter from Prague (see 0110 S)
0311	Voice of Russia	Music & Musicians (concerts by world famous performers & composers)
0315	R. Prague	One on One (see 0115 S)
	R. Taiwan Int.	Great Wall Forum (see 0215 S)
0320	China R. Int.	In the Spotlight (see S 0120)
0330	R. Australia	Jazz Notes (with Ivan Lloyd)
	R. for Peace Int.	Continent of Media (Glenn Houser's survey of US/Canadian radio spectrum)
	R. Sweden	Weekend (see S 0230) Sweden Today (see S 0230) Spectrum (see S 0230) Studio 49 (see S 0230)
0332	BBCWS(am)	People & Politics (British politics)
	VOA Africa	Issues in the News (Three prominent Washington journalists discuss the week's top stories in the world & nation)
	Voice of Russia	Kaleidoscope (see T 0232)
0340	R. Habana Cuba	DXers Unlimited (Arnie Coro presents a program for radio enthusiasts)

MONDAY-FRIDAY
0300	VOA Africa	Daybreak Africa (morning news, music & features magazine for Africa)
0320	R. Australia	Life Matters (a daily interview program about social change & day-to-day life)
0345	BBCWS(am)	Off the Shelf (abridged serialized readings of novels, stories & other literature)

MONDAY
0300	KWHR(17510kHz)	DXing with Cumbre (see 0230 S)
	R. Habana Cuba	Weekly Review (Cuba's perspective on current events)
	R. Vlaanderen Int.	Radio World (Frans Vossen presents a weekly report about international radio)
	WBCQ(7415kHz)	Radio New York International (continues from 0000)
	WRMI(7385kHz)	Old Time Radio (classic shows from radio's early years)

0305 R. New Zealand Int. ...... Tagata o te Moana (Anita Purcell presents a weekly Pacific magazine with NZ & regional Pacific news, issues, information & music)
R. Prague .... Mailbox (see 0105 M)
0306 BBCWS(am) .... Talking Point (listeners & internet users put questions to guests on current affairs)
0311 Voice of Russia .... Science & Engineering (the latest developments in sci/tech)
0315 R. Prague .... Czech Books [or] Encore [or] Magic Carpet (see 0115 M)
Radio Taiwan Int. .... Taiwan Economic Journal
0330 China R. Int. .... People in the Know (see M 0130)
R. Sweden .... In Touch with Stockholm (see M 0230)
Sounds Nordic (see M 0230)
WHRI(7315kHz) .... Dxing with Cumbre (see 0230 S)

0332 Voice of Russia .... Audio Book Club (see A 0232)
0340 R. Habana Cuba .... The Mailbag Show (listener letters)
0350 R. Habana Cuba .... Breakthrough (Arnie Coro's weekly science report)

TUESDAY-SATURDAY
0300 R. for Peace Int. .... Daily Reading (serialized readings of selected novels)
R. Vlaanderen Int. .... Flanders Today (various reports from around the country, with a selection from the CD of the Week)
0305 R. Prague .... Current Affairs (see 0105 T-A)
0330 R. Sweden .... Sixty Degrees North (see T-A 0230)

TUESDAY
0305 R. New Zealand Int. ...... Top Five & New Releases (new music releases in NZ with Greg Tatere)
0306 BBCWS(am) .... Outlook (topical magazine of people & places)
0311 Voice of Russia .... Musical Tales of St. Petersburg
0315 R. Prague .... Talking Point (see 0115 T)
R. Taiwan Int. .... Jade Bells & Bamboo Pipes (see 0215 M)
0330 China R. Int. .... Biz China (see T 0130)
0332 Voice of Russia .... 20th Century: Footprints in History (significant events & prominent personalities)

WEDNESDAY
0305 R. New Zealand Int. ...... Pacific Report (RNZI correspondent Don Wiseman interviews & reports on regional matters)
0306 BBCWS(am) .... Outlook (topical magazine of people & places)
0310 R. Prague .... Witness (see 0110 W)
0311 Voice of Russia .... Moscow Mailbag (see 0111 S)
0315 R. Prague .... One on One (see 0115 W)
0330 R. New Zealand Int. ...... Tradewinds (Walter Zweifel with a weekly report on Pacific regional business & economic news & features)
0340 R. Habana Cuba .... DXers Unlimited (see S 0340)
0345 R. Sweden .... Close Up (see W 0245)

THURSDAY
0305 R. New Zealand Int. ...... RNZI Talk (introduction to RNZI, staff, developments, projects & programs, fortnightly) [or] Mailbag (program aimed at the serious shortwave listener, fortnightly)
0306 BBCWS(am) .... Outlook (topical magazine of people & places)
0311 Voice of Russia .... Science & Engineering (see 0311 M)
0315 R. Prague .... Czechs in History [or] Spotlight (see 0115 H)
R. Taiwan Int. .... Toipei Magazine (life in the capital)
0330 R. New Zealand Int. ...... The World in Sport (highlights of the week with emphasis on NZ & the Pacific)
0332 Voice of Russia .... 20th Century: Footprints in History (see 0332 T)

FRIDAY
0305 R. New Zealand Int. ...... Dateline Pacific (the major Pacific stories of the week, with background & reaction from the people making the news, presented by Don Wiseman)
0306 BBCWS(am) .... Outlook (topical magazine of people & places)
0311 Voice of Russia .... Newmarket (analyses of Russian business, domestic and international)
0315 R. Prague .... Economics Report (see 0115 F)
R. Taiwan Int. .... Taiwan Gourmet
0330 China R. Int. .... Life in China (see F 0130)
R. New Zealand Int. ...... Pacific Correspondent (RNZI's regional correspondents talk to Don Wiseman about political & social issues in their respective Pacific countries)
R. Taiwan Int. .... Discover Taiwan (sights and sounds of the island)
0340 R. Australia .... Jazz Notes (Australian jazz presented by Ivan Lloyd)
0345 R. Sweden .... Nordic Lights (see F 0245)
Greenscan (see F 0245)
Heart Beat(see F 0245)
The S-Files (see F 0245)

SATURDAY
0305 R. Australia .... Rural Reporter (ABC's rural reporters present stories from Australia)
R. New Zealand Irt. ...... The Mix (interviews & live recordings from contemporary pop musicians)
0306 BBCWS(am) .... Pick of the World (a revue of the BBC's best)
0311 Voice of Russia .... Moscow Mailbag (see 0111 A)
0315 R. Prague .... The Arts (see 0115 A)
R. Taiwan Int. .... Kaleidoscope (a magazine about life in Taiwan)
0330 R. Australia .... Australian Country Style (Australian country music with John Nutting)
R. Taiwan Int. .... Mailbag Time (letters to RTI)
0332 VOA Africa .... Our World (a broad range of current issues in science, technology, agriculture & the natural environment with Rob Sivak)
Voice of Russia .... 20th Century: Footprints in History (see 0332 T)
0345 BBCWS(am) .... Write On (Dilly Barlow & Penny Vine read your letters about the World Service)

0400 UTC/ 12am E/9pm P - Page 45 Freqs

DAILY
0400 BBCWS(am) .... World Briefing (extended newscast)

SUNDAY
0400 R. for Peace Int. .... Counterspin (media analysis from Fairness & Accuracy in Reporting)
WBCQ(7415kHz) ...... Tom & Darryl (discussing satellite TVRO, shortwave, low power FM & the Internet)
WRMI(7385kHz) .... The Twilight Zone (the classic tv show remixed for radio)
WWCR(5070kHz) ...... Cyberline (
0405 Deutsche Welle .... Inside Europe (hour-long newsmagazine exploring issues shaping the continent)
R. Australia .... All in the Mind (a weekly foray into the mental universe, the mind, brain & behavior)
R. New Zealand Int. ...... Playhouse (classic & contemporary radio drama)
0411 Voice of Russia .... Musical Tales of St. Petersburg
0420 China R. Int. .... In the Spotlight (see S 0120)
0430 KWHR(17780kHz) ..... Dxing with Cumbre (Marie Lamb with the hottest DX catches)
R. Australia .... In Conversation (Robyn Williams talks to those interested in science about what it's meant to their lives)
0432 BBCWS(am) .... Letter from America (Alistair Cooke's weekly essay on life in America)
Voice of Russia .... Kaleidoscope (see 0232 T)
0435 R. Habana Cuba .... The World of Stamps (see S 0235)
R. Netherlands .... Wide Angle (a single issue examined in-depth)
0445 BBCWS(am) .... The Instant Guide (see M 0245)
0455 R. Netherlands .... Insight (Rob Green casts a critical & humorous eye on the past week's headlines)

MONDAY-FRIDAY
0400 WBCQ(7415kHz) .... Amos 'n Andy (the classic radio comedy from America's radio past)
0405 Deutsche Welle .... Mailbag Africa (a listener contact program keying on DW's African audience)
R. New Zealand Int. ...... In Touch with New Zealand (continues from 0205, this hour including a daily report from one of NZ's regions)
0410 R. Australia .... Margaret Throsby (a guest is interviewed & presents favorite musical pieces)
0432 BBCWS(am) .... The World Today (agenda-setting flagship news program)

MONDAY
0400 WRMI(7385kHz) .... Old Time Radio (see 0300 M)
0410 R. Habana Cuba .... From Havana (see M 0210)
0411 Voice of Russia .... Musical Tales of St. Petersburg
0430 China R. Int. .... People in the Know (see M 0130)
R. Habana Cuba .... The Jazz Place or Top Tens (see M 0230)
0432 Voice of Russia .... The Jazz Show (see W 0132)
0435 R. Netherlands .... Sincerely Yours (RN's listener response program)
0445 WBCQ(7415kHz) ...... World of Radio (Glenn Hauser's review of SW & int'l broadcasting)
0455 R. Netherlands .... The Week Ahead (on RN the next seven days)

TUESDAY-SATURDAY
0400 R. for Peace Int. .... Democracy Now! (a daily independent, non-commercial news program)
0405 Deutsche Welle .... Newslink Africa (world events with special emphasis on the way they affect Africa)
0430 R. Netherlands .... Newsline (see T-A 0100)

TUESDAY
0411 Voice of Russia .... Moscow Mailbag (see 0111 S)
0415 WBCQ(7415kHz) ...... Planet World News Tonight
0430 China R. Int. .... Biz China (see T 0130)

Deutsche Welle .... Insight (putting the news in perspective)
0432 Voice of Russia .... Music Around Us (see 0132 F)
0445 Deutsche Welle .... Business German (the German language in the world marketplace)
0454 Voice of Russia .... Russia: People & Events (see 0132 H)

WEDNESDAY
0411 Voice of Russia .... Science & Engineering (see 0311 M)
0415 WBCQ(7415kHz) ...... Planet World News Tonight
0430 Deutsche Welle .... World in Progress (a fresh look at development issues)
0432 Voice of Russia .... Moscow Yesterday & Today (see 0132 S)

THURSDAY
0411 Voice of Russia .... Newmarket (see 0311 F)
0415 WBCQ(7415kHz) ...... Planet World News Tonight
0430 Deutsche Welle .... Money Talks (a weekly finance & economics magazine from the heart of Europe)
0432 Voice of Russia .... Folk Box (see 0132 T)

FRIDAY
0411 Voice of Russia .... Moscow Mailbag (see 0111 S)
0415 WBCQ(7415kHz) ...... Planet World News Tonight
0430 China R. Int. .... Life in China (see F 0130)
Deutsche Welle .... Man & Environment (a weekly magazine examining major environmental developments)
0432 Voice of Russia .... Audio Book Club (see 0232 A)

SATURDAY
0400 WBCQ(7415kHz) ...... Amos 'n Andy (see 0400 M-F)
0405 R. Australia .... The Business Report (a comprehensive round up of the latest business news)
R. New Zealand Int. ...... Home Grown (Liz Barry plays contemporary Kiwi music)
0411 Voice of Russia .... Science & Engineering (see 0311 M)
0430 Deutsche Welle .... Spectrum (a weekly look at developments in the fields of science & technology)
R. Australia .... The Australian Music Show (the latest Australian music with Kat Perdriau)
R. New Zealand Int. ...... Musical Chairs (the music & background of a featured NZ musician)
WHRA(7415kHz) .... Dxing with Cumbre (Marie Lamb with the hottest DX catches)
0432 BBCWS(am) .... Reporting Religion (Trevor Barnes on religion & the world)
Voice of Russia .... Timelines (see 0132 M)

0500 UTC/ 1am E/10pm P - Page 45 Freqs

SUNDAY
0500 R. Netherlands .... Amsterdam Forum (an interactive discussion of topical issues)
WBCQ(7415kHz) ...... Juliet's Wild Kingdom (on eclectic show in the pirate radio tradition)
WRMI(7385kHz) .... Lou Gentile (the paranormal & supernatural)(to 0800)
0505 Deutsche Welle .... Religion & Society (insight into religious events throughout the world)
R. Australia .... The Europeans (political, cultural, economic & social developments across Europe)
0510 R. Japan .... Pop Joins the World (Asian countries through their popular music)
R. New Zealand .... Feature on religion & spirituality
0515 Deutsche Welle .... German by Radio (a weekly language lesson)
0520 China R. Int. .... In the Spotlight (see S 0120)
0530 Deutsche Welle .... Africa This Week (a weekly comprehensive look at Africa hosted by Carla Gehrmann-Zellen)
R. Australia .... The Ark (Rachael Kohn talks to some of the world's leading religious historians about curious moments in religious history)
R. for Peace Int. .... World of Radio (Glenn Houser's review of SW & int'l broadcasting)
0540 R. Habana Cuba .... DXers Unlimited (see S 0140)

MONDAY-FRIDAY
0500 Channel Africa .... Dateline Africa (a daily actuality magazine focusing on African events & issues)
0505 R. New Zealand Int. ...... Checkpoint (RNZ National Radio's flagship evening news program)
0510 R. Australia .... Pacific Beat (one of RA's primary programs, this daily current events & features magazine focuses in on the Pacific island nations)
0515 R. Japan .... 44 Minutes (a daily current affairs magazine about Japan & Asia)

MONDAY
0500 R. Habana Cuba .... Weekly Review (see S 0100)
R. Netherlands .... Dutch Horizons (Bertine Krol chronicles life in Holland)
WRMI(7385kHz) .... IBC Radio Network (to 0900)

0505 Deutsche Welle .... Hard to Beat (the latest in sports from Germany & the world)
0515 Deutsche Welle .... Inspired Minds (profiles of & interviews with creative & industrious people)
0530 China R. Int. .... People in the Know (see M 0130)
Deutsche Welle .... Hits in Germany (with Deborah Friedman)(fortnightly)
Melody Time (light classical favorites with Diane Erickson) (fortnightly)
0540 R. Habana Cuba .... The Mailbag Show (listener letters)
0550 R. Habana Cuba .... Breakthrough (Arnie Coro with a report on science)

TUESDAY-SATURDAY
0505 Deutsche Welle .... Newslink Africa (see T-A 0405)

TUESDAY
0500 R. Netherlands .... The Research File (the relevance of science to all our lives)
0530 China R. Int. .... Biz China (see T 0130)
Deutsche Welle .... World Music Live

WEDNESDAY
0500 R. Netherlands .... Music 52/15 (musical styles from around the globe)
0530 Deutsche Welle .... Arts on the Air (on award-winning weekly cultural magazine)
0540 R. Habana Cuba .... DXers Unlimited (see S 0140)

THURSDAY
0500 R. Netherlands .... The Weekly Documentary (sound essays & in-depth investigations)
0530 Deutsche Welle .... Living in Germany (aspects of life in Germany)
0545 Deutsche Welle .... Europe on Stage

FRIDAY
0500 R. Netherlands .... Aural Tapestry (see M 0030)
0530 China R. Int. .... Life in China (a weekly magazine focusing on the lives of ordinary people in China)
Deutsche Welle .... Cool! (the latest in youth culture in Germany & abroad)
R. New Zealand Int. .... The Pacific Report (a report on trends & events in the Pacific region)

SATURDAY
0500 R. Netherlands .... A Good Life (how development affects societies)
WHRI .... Dxing with Cumbre (Marie Lamb with the hottest DX catches)
0505 R. Australia .... Ockham's Razor (a "sharp" commentary on a science-related issue)
R. New Zealand Int. .... Home Grown (continues from 0405)
0510 R. Japan .... Hello from Tokyo (listener letters, music & short features)
0520 R. Australia .... Lingua Franca (a program about language & its social, cultural & historical ramifications)
0530 Deutsche Welle .... Focus on Folk (real German folk music, the places it comes from & the people who make it)
R. Australia .... Fine Music Australia (Australian classical artists with Charles Southwood)

0600 UTC/ 2am E/11pm P - Page 46 Freqs

SUNDAY
0605 Deutsche Welle .... Inside Europe (see S 0405)
R. Australia .... The Arts on RA (an arts-related interview & film review)
R. New Zealand Int. .... Whenua! (people, issues & music in Aotearoa, with Henare te Ua & Libby Hokaraia)
0610 R. Japan .... Weekend Japanology (conversation with guests & letters from listeners)
0630 R. Australia .... Blocktracker (Aboriginal contemporary music with Mal Honess)
WHRI(5745kHz) .... Dxing with Cumbre (Marie Lamb with the hottest DX catches)
0633 VOA Africa .... Main Street (lively half hour of ideas, information, people & places across America)
0635 R. Habana Cuba .... The World of Stamps (see S 0135)
0654 R. Japan .... Sights & Sounds of Japan

MONDAY-FRIDAY
0600 Channel Africa .... Dateline Africa (a daily actuality magazine focusing on African events & issues)
0605 R. New Zealand Int. .... What's Going On? (daily NZ entertainment & arts calendar)
0610 R. Japan .... Songs for Everyone
0615 R. Japan .... Asian Top News (the day's major stories as reported by the region's radio stations)
0630 R. New Zealand Int. .... Worldwatch (the stories behind international headlines)
0645 R. New Zealand Int. .... Storytime (children's stories)

MONDAY
0605 Deutsche Welle .... Mailbag Africa (see M 0405)
0610 R. Habana Cuba .... From Havana (see M 0210)

0620 R. Australia .... Ockham's Razor (a "sharp" commentary on a science-related issue)
0625 R. Japan .... Japan Music Treasure Box (classic Japanese popular music)
0630 R. for Peace Int. .... World of Radio (Glenn Hauser's review of SW & int'l broadcasting)
R. Habana Cuba .... The Jazz Place or Top Tens (see M 0230)
0640 R. Australia .... The Australian Music Show (the latest Australian music with Kat Perdriau)

TUESDAY-SATURDAY
0605 Deutsche Welle .... Newslink Africa (see T-A 0405)

TUESDAY
0600 R. for Peace Int. .... Middle East Radio Project
0620 R. Australia .... In Conversation (see S 0430)
0625 R. Japan .... Basic Japanese for You (a Japanese language lesson for beginners)
0630 Deutsche Welle .... Insight (see T 0430)
0640 R. Australia .... Music Deli (see A 0130)
0645 Deutsche Welle .... Business German (see T 0445)

WEDNESDAY
0600 R. for Peace Int. .... Counterspin (media analysis from Fairness & Accuracy in Reporting)
0620 R. Australia .... Lingua Franca (see A 0520)
0625 R. Japan .... Japan Musicscape (life in Japan presented through music & writings on a selected theme)
0630 Deutsche Welle .... World in Progress (see W 0430)
0640 R. Australia .... Blocktracker (see S 0630)

THURSDAY
0620 R. Australia .... The Ark (see S 0530)
0625 R. Japan .... Brush Up Your Japanese (an intermediate course in Japanese)
0630 Deutsche Welle .... Money Talks (see H 0430)
0640 R. Australia .... Australian Country Style (see A 0330)

FRIDAY
0620 R. Australia .... The Makers (an interview with an Australian artist)
0625 R. Japan .... Music Beat (contemporary Japanese popular music)
0630 Deutsche Welle .... Man & Environment (see F 0430)
0640 R. Australia .... Jazz Notes (with Ivan Lloyd)

SATURDAY
0600 KWHR(17780kHz) .... Dxing with Cumbre (see 0630 A)
0605 R. Australia .... Feedback (Roger Broadbent answers questions about RA)
R. New Zealand Int. .... Tagata o te Moana (magazine with Pacific issues, information & music)
0610 R. Japan .... Pop Joins the World (Asian countries through their popular music)
0630 Deutsche Welle .... Spectrum (see A 0430)
R. Australia .... Oz Sounds (Australian new music releases)
WHRI .... Dxing with Cumbre (Marie Lamb with the hottest DX catches)

1100 UTC/ 7am E/4am P - Page 48 Freqs

DAILY
1100 BBCWS(am) .... World Briefing (a comprehensive report on the latest news)

SUNDAY
1100 R. Netherlands .... Aural Tapestry (see M 0030)
1105 R. Australia .... Correspondents' Report (the week's events analyzed)
R. New Zealand Int. .... New Zealand Forces Program (2-hour package of programs for NZ personnel)
1110 R. Japan .... Hello from Tokyo (listener letters, music & short features)
1120 BBCWS(am) .... British News
1130 R. Australia .... The Arts on RA (an arts-related interview & film review)
R. for Peace Int. .... World of Radio (Glenn Hauser's review of SW & int'l broadcasting)
R. Netherlands .... Dutch Horizons (Bertine Krol chronicles life in Holland)
R. Sweden .... In Touch with Stockholm (interactive listener contact program, 1st week)
Sounds Nordic (youth music & trends magazine, every weekend but 1st)
1132 BBCWS(am) .... The Instant Guide (see 04 & 5 S)
1140 R. Korea Int. .... Korean Pop Interactive (Korean cutting edge pop music, oldies & artist interviews)
1145 BBCWS(am) .... Sports Round-up (all the daily sporting news worldwide)

MONDAY-FRIDAY
1105 BBCWS(am) .... Caribbean Morning Report (the latest news in the Caribbean)
R. Australia .... Asia-Pacific (Radio Australia's flagship current events & business report)

1110 BBCWS(am) .... Sports Caribbean
R. Japan .... Songs for Everyone
1115 BBCWS(am) .... Caribbean Magazine (a regional current affairs & feature program)
R. Japan .... Asian Top News (the day's major stories as reported by the region's radio stations)
1130 R. Australia .... Bush Telegraph (an entertaining look at rural & regional issues in Australia)
1130 R. Sweden .... Sixty Degrees North (reports, interviews & analysis on the Nordic region)
1145 BBCWS(am) .... Sports Round-up (all the daily sporting news worldwide)
R. Korea Int. .... Seoul Calling (daily feature magazine of Korean people, places & events)

MONDAY
1100 R. Netherlands .... EuroQuest (a magazine placing Europe in context)
1105 R. New Zealand Int. .... Nine to Noon (domestic program featuring news & topics of interest)
1125 R. Japan .... Japan Music Treasure Box (see M 0625)
1130 R. Netherlands .... The Research File (the relevance of science to all our lives)
1132 BBCWS(am) .... Letter from America (Alistair Cooke's weekly essay about life in America)
1145 R. Sweden .... Sports Scan (a weekly report on sports in the Nordic region)

TUESDAY
1100 R. Netherlands .... A Good Life (how development affects societies)
1105 R. New Zealand Int. .... Nine to Noon (see 1105 M)
1125 R. Japan .... Basic Japanese for You (see T 0625)
1130 R. Netherlands .... Music 52-15 (Martha Hawley or Max Ohlenschlager presents musical styles from around the globe)
1132 BBCWS(am) .... Analysis (background to stories in the news)
1145 R. Sweden .... Close Up (profiles of people in Sweden from all walks of life)(1st/3rd T)

WEDNESDAY
1100 R. Netherlands .... Dutch Horizons (Bertine Krol chronicles life in Holland)
1105 R. New Zealand Int. .... Nine to Noon (domestic program featuring news & topics of interest)
1125 R. Japan .... Japan Musicscape (see W 0625)
1130 R. Netherlands .... The Weekly Documentary (sound essays & in-depth investigations)
1132 BBCWS(am) .... Analysis (background to stories in the news)

THURSDAY
1100 R. Netherlands .... The Research File (the relevance of science to all our lives)
1105 R. New Zealand Int. .... Nine to Noon (see 1105 M)
1125 R. Japan .... Brush Up Your Japanese (see H 0625)
1130 R. Netherlands .... Aural Tapestry (see M 0030)
1132 BBCWS(am) .... From Our Own Correspondent (background to the news around the world)
1145 BBCWS(am) .... Sports Round-up (all the daily sporting news worldwide)
R. Sweden .... Nordic Lights (magazine on Scandinavia, 1st week)
Greenscan (Azonah Kiros on environmental awareness & challenges, 2nd week)
Heart Beat (Gaby Katz hosts a monthly health & medical magazine, 3rd week)
The S-Files (Kris Boswellon the Sweden behind the headlines, 4th week)

FRIDAY
1100 R. Netherlands .... The Weekly Documentary (sound essays & in-depth investigations)
1105 R. New Zealand Int. .... Sports Story (a sport profile or documentary)
1125 R. Japan .... Music Beat (see F 0625)
1130 R. Netherlands .... A Good Life (how development affects societies)
R. New Zealand Int. .... RNZI Top Five (the best-selling music in NZ)
1132 BBCWS(am) .... Analysis (background to stories in the news)
1145 R. Sweden .... A Report on the Nordic Newsweek (the week's main news stories)

SATURDAY
1100 R. Netherlands .... Amsterdam Forum (an interactive discussion of topical issues)
1105 R. Australia .... Asia Pacific Weekend Edition (weekly current events & business report for & about Asia & the Pacific region)
R. New Zealand Int. .... New Zealand Forces Program (2-hour package of programs for NZ personnel)
1110 R. Japan .... Pop Joins the World (see A 0610)
1120 BBCWS(am) .... British News

1130 R. Australia .... The Europeans (Gary Bryson looks at political, cultural, economic & social developments)
  R. Netherlands .... Music 52-15 (Hawley or Ohlenschlager present global musical styles)
  R. Sweden .... Weekend (Europe from the Radio E consortium, 1st week)
  Sweden Today (voices of Sweden, 2nd week)
  Spectrum (Swedish cultural scene, 3rd week)
  Studio 49 (ideas & long-term trends, 4th week)
1132 BBCWS(am) .... World Football (soccer around the world with Alan Greene)
1135 R. New Zealand Int. ...... Dateline Pacific (major Pacific stories of the week, with background & reaction)
1140 R. Korea Int. .... Worldwide Friendship (promoting interactive contact with listeners)
1145 BBCWS(am) .... Sports Round-up (all the daily sporting news worldwide)

1200 UTC/ 8am E/5am P - Page 48 Freqs

DAILY
1200 BBCWS(am) .... Newshour (an hour of news & analysis from around the globe)

SUNDAY
1205 R. Australia .... The Spirit of Things (contemporary beliefs through ritual, art, music, & sacred texts)
  R. Netherlands .... Sincerely Yours (RN's listener response program)
  R. New Zealand Int. ...... Sportsworld (a round-up of the weekend's regional sporting events)
1230 R. Sweden .... In Touch with Stockholm (interactive listener contact program, 1st week)
  Sounds Nordic (youth music & trends, all exc. 1st)
  WRMI (15725kHz) ..... Viva Miami (R. Miami Int'l.'s listener magazine)

MONDAY-FRIDAY
1200 R. Netherlands .... Newsline (news, analysis & background reports)
1205 BBCWS(am) .... Caribbean Business (a report on regional commerce & economics)
  R. New Zealand Int. ...... Late Edition (repeat of 1005 program)
1210 BBCWS(am) .... Caribbean Morning Report (the latest news in the Caribbean)
1210 R. Canada Int. .... The Current (Anna Maria Tremonti on issues affecting Canadians today)
1230 R. Sweden .... Sixty Degrees North (reports, interviews & analysis on the Nordic region)

MONDAY
1205 R. Australia .... Late Night Live (interviews with major newsmakers, philosophers, artists & trendsetters)
1215 R. Korea Int. .... Korea Today & Tomorrow (latest developments on the Korean peninsula)
1230 R. for Peace Int. .... World of Radio (Glenn Hauser's review of SW & int'l broadcasting)
1245 R. Sweden .... Sports Scan (a weekly report on sports in the Nordic region)

TUESDAY
1200 R. for Peace Int. .... Middle East Radio Project
1205 R. Australia .... Late Night Live (see M 1205)
1215 R. Korea Int. .... Korean Kaleidoscope (a magazine of Korean social & economic life)
1245 R. Sweden .... Close Up (profiles of people in Sweden from all walks of life)(1st/3rd T)

WEDNESDAY
1200 R. for Peace Int. .... Counterspin (media analysis from Fairness & Accuracy in Reporting)
1205 R. Australia .... Late Night Live (see M 1205)
1215 R. Korea Int. .... Wonderful Korea (touring Korea)

THURSDAY
1205 R. Australia .... Late Night Live (see M 1205)
1215 R. Korea Int. .... Seoul Report (interviews with Koreans & visitors to Korea)
1245 R. Sweden .... Nordic Lights (magazine on Scandinavia, 1st week)
  Greenscan (Azariah Kiros on environmental awareness & challenges, 2nd week)
  Heart Beat (Gaby Katz hosts health & medical magazine, 3rd week)
  The S-Files (Kris Boswell, Sweden behind the headlines, 4th week)

FRIDAY
1205 R. Australia .... Sound Quality (the interesting, the evolutionary, the inaccessible & the wonderful in music)
1245 R. Sweden .... A Report on the Nordic Newsweek (the week's main news stories)

SATURDAY
1200 WRMI(15725kHz) ...... Shortwave Radio Network (programs from worldwide SW)

1205 R. Australia .... The Music Show (Andrew Ford with music, interviews & information)
  R. Netherlands .... Wide Angle (one topic examined in-depth)
  R. New Zealand Int. ...... New Zealand Forces Program (continues from 1105)
1230 HCJB Ecuador .... DX Partyline (see S 000)
  R. Sweden .... Weekend (magazine about Europe, 1st week)
  Sweden Today (George Wood presents the voices of Sweden, 2nd week)
  Spectrum (Bill Schiller covers the Swedish cultural scene, 3rd week)
  Studio 49 ((ideas & long-term trends in the Nordic region, 4th week)
  WHRI(9495kHz) .... Dxing with Cumbre (Morie Lamb with the hottest DX catches)

1300 UTC/ 9am E/6am P - Page 49 Freqs

SUNDAY
1300 Channel Africa .... Channel Africa Extra (a weekend magazine with news, sports, music, & features)
  WRMI(15725kHz) ...... Wavescan (Adventist World Radio's program for DXers & SWLs)
  WWCR(12160kHz) .... Golden Age of Radio (classic programs from radio's early years)
1305 R. Australia .... The Science Show (one of the longest running programs on ABC Radio)
1306 BBCWS(am) .... The Ticket (the arts & entertainment around the globe)
1310 R. Canada Int. .... The Sunday Edition (magazine on political, social & cultural matters, Michael Enright)
1320 China R. Int. .... In the Spotlight (Chinese arts & cultural magazine)
1330 R. Sweden .... In Touch with Stockholm (an interactive listener contact program, 1st week)
  Sounds Nordic (youth music & trends magazine, all exc. 1st)

MONDAY-FRIDAY
1305 R. Australia .... The Planet (inspiring music from around the word, jazz, blues, folk styles, artfully arranged for radio)
1306 BBCWS(am) .... Outlook (topical magazine of people, places & events)
1310 R. Canada Int. .... Sounds Like Canada (a lively mix of voices & sound)
1330 R. Sweden .... Sixty Degrees North (reports, interviews & analysis on the Nordic region)
1345 BBCWS(am) .... Off the Shelf (abridged serialized readings of novels, stories, etc)

MONDAY
1330 China R. Int. .... People in the Know (interviews with prominent Chinese)
1345 R. Sweden .... Sports Scan (a weekly report on sports in the Nordic region)

TUESDAY
1330 China R. Int. .... Biz China (see T 0130)
1345 R. Sweden .... Close Up (profiles of people in Sweden from all walks of life)(1st/3rd T)

WEDNESDAY
1300 R. for Peace Int. .... World of Radio (see S 1200)

THURSDAY
1345 R. Sweden .... Nordic Lights (magazine on Scandinavia, 1st week)
  Greenscan (Azariah Kiros on Swedish environmental awareness & challenges, 2nd week)
  Heart Beat (Gaby Katz hosts health & medical magazine, 3rd week)
  The S-Files (Kris Boswell on the Sweden behind the headlines, 4th week)

FRIDAY
1330 China R. Int. .... Life in China (magazine on the lives of ordinary people in China)
1345 R. Sweden .... A Report on the Nordic Newsweek (the week's main news stories)

SATURDAY
1300 Channel Africa .... Channel Africa Extra (magazine & variety show with news, sports, music, regular reports & features)
  R. for Peace Int. .... Middle East Radio Project
  WRMI(15725kHz) ...... Shortwave Radio Network (cont'd from 1200)
1305 BBCWS(am) .... Pick of the World (o revue from the past week's WS programs)
  R. Australia .... The Music Show (cont'd from 1205)
1310 R. Canada Int. .... The House (o review of the week in Canadian national politics)
1330 R. for Peace Int. .... World of Radio (see S 1200)

  R. Sweden .... Weekend (magazine about Europe from Radio E consortium, 1st week)
  Sweden Today (George Wood presents the voices of Sweden, 2nd week)
  Spectrum (Bill Schiller covers the Swedish cultural scene, 3rd week)
  Studio 49 ((ideas & long-term trends in the Nordic region, 4th week)
1345 BBCWS(am) .... Write On (Dilly Barlow & Penny Vine read your letters about the WS)

1400 UTC/ 10am E/7am P - Page 49 Freqs

SUNDAY
1400 Channel Africa .... Channel Africa Extra (continued from 1300)
  WRMI(15725kHz) ...... Shortwave Radio Network (see 1200 A)
1405 R. Australia .... Books & Writing (Ramona Koval conducts in-depth discussions)
  R. Canada Int. .... The Sunday Edition (continues from 1310, usually with a documentary)
1406 BBCWS(am) .... Talking Point (live, global phone-in where listeners & internet users can share their views on the issues of the day & question guests)
1410 R. Japan .... Pop Joins the World (Asian countries through their popular music)
1420 China R. Int. .... In the Spotlight (Chinese arts & cultural magazine)
1430 R. for Peace Int. .... Daily Reading (a recap of the week's readings)
1435 R. Netherlands .... Wide Angle (one topic examined in-depth)
1455 R. Netherlands .... The Week Ahead (on RN the next seven days)

MONDAY-FRIDAY
1405 R. Australia .... Margaret Throsby (a guest is interviewed & presents favorite musical pieces)
  R. Canada Int. .... Sounds Like Canada (continues from 1310)
1415 R. Japan .... 44 Minutes (current affairs magazine about Japan & Asia)
1430 R.Netherlands .... Newsline (news, analysis & background reports)

MONDAY
1406 BBCWS(am) .... Corruption (its causes, costs & remedies documented)
1430 China R. Int. .... People in the Know (interviews with prominent Chinese who are shaping the nation's future)
1432 BBCWS(am) .... The Music Feature (features & documentaries on current musical genres)

TUESDAY
1406 BBCWS(am) .... Masterpiece (exploring major cultural ideas & great artistic endeavors)
1430 China R. Int. .... Biz China (see T 0130)
1432 BBCWS(am) .... Top of the Pops (the British rock & pop charts)

WEDNESDAY
1406 BBCWS(am) .... Various documentary series
1432 BBCWS(am) .... Charlie Gillett (world music selections)

THURSDAY
1406 BBCWS(am) .... Omnibus (a series of feature documentaries)
1432 BBCWS(am) .... The Music Biz (the global music imdustry)

FRIDAY
1400 R. for Peace Int. .... Continent of Media (Glenn Hauser's survey of US/Canadian radio spectrum)
1406 BBCWS(am) .... Sports International (the issues & personalities behind the headlines)
1430 China R. Int. .... Life in China (magazine focusing on the lives of ordinary people in China)
1432 BBCWS(am) .... John Peel (with his own unique & eclectic mix of new music)

SATURDAY
1400 Channel Africa .... Channel Africa Extra (continued from 1300)
  WRMI(15725kHz) ...... Shortwave Radio Network (cont'd from 1200)
1405 R. Australia .... New Dimensions (intimate conversations with many of this century's leading thinkers & social innovators)
  R. Canada Int. .... The Vinyl Cafe (Canadian humorist & storyteller Stuart McLean plays music he's found at a mythical record store & weaves tales centered around the store's neighborhood)
1406 BBCWS(am) .... Sportsworld (live commentary on major sports events, results from Britain & Europe, & sports news worldwide)

1410   R. Japan .... Weekend Japanology (a
     multifaceted exploration of Japan through pleasant
     conversation with guests & letters from listeners)
1435   R. Netherlands .... Europe Unzipped (the events of the
     past week in Europe, some unusual)
1455   R. Netherlands .... Insight (Rob Green casts a critical
     & humorous eye on the past week's headlines)

1500 UTC/ 11am E/8am P - Page 50 Freqs

SUNDAY
1500   R. Netherlands .... Aural Tapestry (see M 0030)
     WRMI(15725kHz) ...... Shortwave Radio Network (see
     1200 A)
1505   R. Australia .... Encounter (a highly acclaimed
     series exploring the connections between religion & life
     while reflecting on the religious experience of multicultural
     Australia)
     R. Austria Int. .... Insight Central Europe (a regional
     magazine jointly produced)
     R. Canada Int. .... The Sunday Edition (continues from
     1310)
1506   BBCWS(am) .... Omnibus (see 1406 H)
1510   R. Japan .... Hello from Tokyo (see S 1110)
1530   R. for Peace Int. .... Continent of Media (Glenn
     Hauser's survey of US/Canadian radio spectrum)
     R. Netherlands .... Dutch Horizons (Bertine Krol
     chronicles life in Holland)
1532   BBCWS(am) .... Various documentary series
1535   R. Austria Int. .... Network Europe (see 1505 S)

MONDAY-FRIDAY
1505   R. Australia .... Asia-Pacific (Radio Australia's
     flagship current events & business report)
1510   R. Austria Int. .... Report from Austria (15 min.
     magazine focusing on Austria & Europe)
     R. Japan .... Songs for Everyone
1515   R. Japan .... Asian Top News (major stories
     reported by the region's radio stations)
1540   R. Austria Int. .... Report from Austria (15 min.
     magazine)

MONDAY
1500   R. Netherlands .... EuroQuest (a magazine placing
     Europe in context)
1506   BBCWS(am) .... Health Matters (reports on medical
     research)
1525   R. Japan .... Japan Music Treasure Box (classic
     Japanese popular music)
1530   R. Australia .... The Health Report (Dr. Norman
     Swan on health & medical issues)
     R. Netherlands .... The Research File (the relevance of
     science to all our lives)
1532   BBCWS(am) .... Inspiration (a quiz centered on
     scientific inventions & discoveries)
1545   R. Canada Int. .... Out Front (a place for new ideas,
     new ways of making radio & new voices from across
     Canada)

TUESDAY
1500   R. Netherlands .... A Good Life (how development
     affects societies)
1506   BBCWS(am) .... Go Digital (technology journalist
     Tracey Logan explains the latest in IT)
1525   R. Japan .... Basic Japanese for You (a language
     course for beginners)
1530   R. Australia .... The Law Report (Damien Carrick
     presents breaking legal stories)
     R. Netherlands .... Music 52-15 (Hawley or
     Ohlenschlager present music from around the globe)
1532   BBCWS(am) .... Music Review (personalities, views
     & issues from the world of music)
1545   R. Canada Int. .... Out Front (see M 1545)

TUESDAY-SATURDAY
1500   R. for Peace Int. .... Daily Reading (serialized readings
     of selected novels)

WEDNESDAY
1500   R. Netherlands .... Dutch Horizons (Bertine Krol
     chronicles life in Holland)
1506   BBCWS(am) .... Discovery (in-depth exploration of
     ideas & discoveries in sci/tech)
1525   R. Japan .... Japan Musicscape (life in Japan
     presented through music & writings)
1530   R. Australia .... The Religion Report (Stephen
     Crittenden on religion & societies)
     R. Netherlands .... The Weekly Documentary (sound
     essays & in-depth investigations)
1532   BBCWS(am) .... Westway (the week's first episode of
     this light drama)
1545   BBCWS(am) .... Heart & Soul (beliefs, values &
     religion)
     R. Canada Int. .... Out Front (see M 1545)

THURSDAY
1500   R. Netherlands .... The Research File (the relevance of

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     science to all our lives)
1505   BBCWS(am) .... One Planet (stories about the
     environment, development, agriculture & human impact on
     the natural world)
1525   R. Japan .... Brush Up Your Japanese (an
     intermediate language course)
1530   R. Australia .... The Media Report (Mick O'Regan
     on developments in communications)
     R. Netherlands .... Aural Tapestry (see M 0030)
1532   BBCWS(am) .... The Word (Harriett Gilbert looks at
     the myriad world of writing)
     [exc. last H] World Book Club (an author answers listener
     questions about a featured book)
1545   R. Canada Int. .... Out Front (see M 1545)

FRIDAY
1500   R. Netherlands .... The Weekly Documentary (sound
     essays & in-depth investigations)
1506   BBCWS(am) .... Science in Action (reports on
     science & technology)
1525   R. Japan .... Music Beat (contemporary
     Japanese hits)
1530   R. Australia .... The Sports Factor ((see Friday
     o130)
     R. Canada Int. .... C'est La Vie (a program about life in
     Quebec & French-speaking Canada)
     R. Netherlands .... A Good Life (how development
     affects societies)
1532   BBCWS(am) .... Westway (the week's second
     episode of this light drama)
1545   BBCWS(am) .... What's the Problem? (advice about
     common problems)

SATURDAY
1500   R. Netherlands .... Amsterdam Forum (an interactive
     discussion of topical issues)
     WHRI(13760kHz) ...... Dxing with Cumbre (Mane Lamb
     with the hottest DX catches)
     WRMI(15725kHz) ...... Shortwave Radio Network (cont'd
     from 1200)
1505   BBCWS(am) .... Sportsworld (continues from 1405)
     R. Australia .... Nocturne (a "beautifully woven
     tapestry of sound" presented by Robyn Johnston)
     R. Austria Int. .... Insight Central Europe (see 1505
     S)
     R. Canada Int. .... Quirks & Quarks (what's new &
     next in science)
     R. Japan .... Hello from Tokyo (see S 1110)
1530   R. Netherlands .... Music 52-15 (Martha Hawley or
     Max Ohlenschlager present musical styles from around the
     globe)
1535   R. Austria Int. .... Insight Central Europe (see 1505
     S)

1600 UTC/ 12pm E/9am P - Page 50 Freqs

SUNDAY
1600   KWHR(9930kHz) .... Dxing with Cumbre (Marie Lamb
     with the hottest DX catches)
     WRMI(15725kHz) ...... Shortwave Radio Network (see
     1200 A)
1605   R. Australia .... The National Interest (Terry Lane's
     round-up of the week's major issues)
     R. Netherlands .... Sincerely Yours (RN's listener
     response program)
1606   BBCWS(am) .... Sunday Sportsworld (live
     commentary on major sports events, results from Britain &
     Europe, & sports news worldwide)

MONDAY-FRIDAY
1600   BBCWS(am) .... Europe Today (news, analysis &
     comment on issues & events)
     R. for Peace Int. .... Democracy Now! (a daily
     independent, non-commercial news program)
     R. Netherlands .... Newsline (news, analysis &
     background reports)
1605   R. Australia .... Bush Telegraph (an entertaining
     look at rural & regional issues)

SATURDAY
1600   R. for Peace Int. .... Counterspin (media analysis from
     Fairness & Accuracy in Reporting)
     WBCQ(17495kHz) .... Allon Weiner Worldwide
     WRMI(15725kHz) ...... Shortwave Radio Network (cont'd
     from 1200)
1605   BBCWS(am) .... Sportsworld (continues from 1405)
     R. Australia .... Nocturne (continues from 1505)
     R. Netherlands .... Wide Angle (one topic examined in-
     depth)

1700 UTC/ 1pm E/10am P - Page 51 Freqs

DAILY
1700   R. Japan .... News (a round-up of Asian & world
     news)

SUNDAY
1700   WRMI(15725kHz) ...... Changesurfer Radio (see 1700 A)
1705   R. Australia .... New Dimensions (syndicated
     program of interviews with leading thinkers & social
     innovators)
     VOA Africa .... Reporters Roundtable (VOA
     journalists in roundtable on developments in Africa)
1710   R. Japan .... Pop Joins the World (see S 1410)
1730   VOA Africa .... Music Time in Africa (Rita Rochelle
     highlights traditional & modern African music)[part two airs
     at 1930]
     WRMI(15725kHz) ...... The Shortwave Report (see 1730 A)

MONDAY-FRIDAY
1705   R. Australia .... Australia Talks Back (a daily
     countrywide call-in on topical issues)
     VOA News Now .... Talk to America (worldwide call-in
     show with American decision-makers, personalities &
     experts)
1710   R. Japan .... Songs for Everyone
1715   R. Japan .... 44 Minutes (current affairs
     magazine about Japan & Asia)

SATURDAY
1700   WBCQ(17495kHz) .... Zombo's Mondo Record Party
     WRMI(15725kHz) ...... Changesurfer Radio (high tech
     visions of the future)
1705   R. Australia .... The Spirit of Things (contemporary
     beliefs through ritual, art, music, & sacred texts)
     VOA Africa .... Hip Hop Connections (Rod Murray
     with US hip hop music, interviews & information of interest
     to youth)
1710   R. Japan .... Hello from Tokyo (see S 1110)
1730   R. for Peace Int. .... World of Radio (Glenn Hauser's
     review of SW & int'l broadcasting)
     WRMI(15725kHz) ...... The Shortwave Report (news as
     reported by global shortwave broadcasters)

2100 UTC/ 5pm E/2pm P - Page 53 Freqs

SUNDAY
2100   WBCQ(7415kHz) ...... Radio Free Euphoria (Captain
     Ganja's unique form of "variety" show)
     WHRI(5745kHz) .... Dxing with Cumbre (Mane Lamb
     with the hottest DX catches)
2105   Deutsche Welle .... Hard to Beat (the latest in sports
     from Germany & the world)
2106   BBCWS(am) .... Various documentary series
2110   R. Australia .... AM (ABC Radio's flagship morning
     news magazine)
2115   Deutsche Welle .... Inspired Minds (creative &
     industrious people, profiles & interviews)
2130   Deutsche Welle .... Hits in Germany (with Deborah
     Friedman)[fortnightly]
     Melody Time (light classical favorites with Diane Erickson)
     [fortnightly]
     R. Australia .... Country Breakfast (Australia beyond
     the urban fringe)
2132   BBCWS(am) .... In Praise of God (services of
     worship from around the UK)

MONDAY-FRIDAY
2100   R. for Peace Int. .... Daily Reading (serialized readings
     of selected novels)
2105   Deutsche Welle .... Newslink Africa (world events with
     special emphasis on the way they affect Africa)

MONDAY
2100   WBCQ(7415kHz) ...... Jean Shepherd (the noted
     humorist's classic radio programs)
2106   BBCWS(am) .... Health Matters (see 1506 M)
2110   R. Australia .... AM (ABC Radio's flagship morning
     news magazine)
2130   Deutsche Welle .... World Music Live
     R. Australia .... Rural Reporter (news & stories from
     rural & regional Australia)
2132   BBCWS(am) .... Inspiration (see 1532 M)

TUESDAY
2106   BBCWS(am) .... Go Digital (see 1506 T)
2110   R. Australia .... AM (ABC Radio's flagship morning
     news magazine)
2130   Deutsche Welle .... Arts on the Air (an award-winning
     weekly cultural magazine)
     R. Australia .... Innovations (Australian invention,
     enterprise & ingenuity)
2132   BBCWS(am) .... Music Review (see 1532 T)

WEDNESDAY
2106   BBCWS(am) .... Discovery (see 1506 W)
2110   R. Australia .... AM (ABC Radio's flagship morning
     news magazine)
2130   Deutsche Welle .... Living in Germany (aspects of life in
     Germany)
     R. Australia .... Educational series
2132   BBCWS(am) .... Westway (see 1532 W)

2145 BBCWS(am) .... Heart & Soul (see 1545 W)
Deutsche Welle .... Europe on Stage

THURSDAY
2106 BBCWS(am) .... One Planet (see 1506 H)
2110 R. Australia .... AM (ABC Radio's flagship morning news magazine)
2130 Deutsche Welle .... Cool! (the latest in youth culture in Germany & abroad)
R. Australia .... All in the Mind (see A 2305)
2132 BBCWS(am) .... The Word [or] World Book Club (see 1532 H)
2145 BBCWS(am) .... Analysis (background to the stories in the news)

FRIDAY
2100 WBCQ(7415kHz) ...... Pan Global Wireless
WHRA(17650kHz) ..... Dxing with Cumbre (Mane Lamb with the hottest DX catches)
2105 R. Australia .... Feedback (Roger Broadbent answers questions & updates about RA)
2106 BBCWS(am) .... Science in Action (see 1506 F)
2130 Deutsche Welle .... Focus on Folk (German folk music, the places it comes from & the people who make it)
R. Australia .... Oz Sounds (Australian new music releases)
WBCQ(7415kHz) ...... Pab Sungenis Project (stand-up comedy & sketches)
2132 BBCWS(am) .... Westway (see 1532 F)
2145 BBCWS(am) .... What's the Problem? (see 1545 F)

SATURDAY
2100 R. for Peace Int. .... Daily Reading (a recap of the week's readings)[began at 2030]
WBCQ(9330kHz) ...... Allan Weiner Worldwide
WRMI(15725kHz) ...... Shortwave Radio Network (programs from worldwide SW)
2101 BBCWS(am) .... Play of the Week (classic & contemporary drama for radio)
2105 Deutsche Welle .... Religion & Society (insight into religious events throughout the world)
R. Australia .... Australia All Over (Ian McNamara hosts celebration of Australiana)
2115 Deutsche Welle .... German by Radio (a weekly language lesson)
2130 Deutsche Welle .... Africa This Week (hosted by Carla Gehrmann-Zellen)
R. for Peace Int. .... Continent of Media (Glenn Hauser's survey of US/Canadian radio spectrum)
WHRA(17650kHz) ..... Dxing with Cumbre (see 2100 F)
2145 R. Australia .... Asia Sunday (a roundup of the week's news from Asia)

2200 UTC/ 6pm E/3pm P - Page 54 Freqs

DAILY
2200 BBCWS(am) .... The World Today (agenda-setting flagship global news program)

SUNDAY
2200 R. Canada Int. .... The World This Weekend (CBC weekend news magazine)
WWCR(12160kHz) .... Travel Channel Radio
2210 R. Australia .... AM (ABC Radio's flagship morning news magazine)
2230 R. Canada Int. .... The Inside Track (anthologies & documentaries about sports)
R. Vlaanderen Int. .... Radio World (Frans Vossen report about international radio)
2235 R. Prague .... Mailbox (replying to listener letters)
2240 R. Australia .... Australia Wide (a roundup of "home" news from ABC Newsradio)
2245 R. Prague .... Czech Books (a fortnightly look at Czech writing today)
Encore (a monthly review of Czech classical music)
Magic Carpet (monthly Czech world music program)

MONDAY-FRIDAY
2200 R. Canada Int. .... The World at Six (the CBC's flagship evening newscast)
R. for Peace Int. .... Democracy Now! (a daily independent, non-commercial news program)
WBCQ(5100usb) .... Radio Caroline (the original British pirate station)
2230 R. Canada Int. .... As It Happens (interviews with eyewitnesses to news in the making)
R. Vlaanderen Int. .... Flanders Today (various reports from the country, and CD of the Week)
0105 R. Prague .... Current Affairs (issues & events in the Czech Republic & Europe)

MONDAY
R. Australia .... AM (ABC Radio's flagship morning news magazine)
2240 R. Australia .... Australia Wide (see S 2240)
2245 R. Prague .... Talking Point (a closer look at issues affecting Czech life)

TUESDAY
2210 R. Australia .... AM (ABC Radio's flagship morning news magazine)
2240 R. Australia .... Australia Wide (see S 2240)
R. Prague .... Witness (recent Czech history through personal memories)
2245 R. Prague . ... One on One (informal interview with an interesting Czech figure)

WEDNESDAY
2200 WBCQ .... World of Radio (Glenn Hauser's comprehensive review of international broadcasting)[on 7415 & 9330 kHz]
2210 R. Australia .... AM (ABC Radio's flagship morning news magazine)
2230 WBCQ(7415kHz) ...... Think Tank North America (described as "bizarre")
2240 R. Australia .... Australia Wide (see S 2240)
2245 R. Prague .... Czechs in History (fortnightly) Spotlight (traveling around the Czech Republic)

THURSDAY
2210 R. Australia .... AM (ABC Radio's flagship morning news magazine)
2230 WBCQ(7415kHz) ...... Uncle Ed's Musical Memories
2240 R. Australia .... Australia Wide (see S 2240)
2245 R. Prague .... Economics Report (business & technology news)

FRIDAY
2205 R. Australia .... Asia-Pacific Weekend Edition (regional news & business report)
2230 R. Australia .... AM Saturday (ABC Radio's weekend morning news magazine)
WBCQ(7415kHz) ...... Wanton Display of Control & Disruption
2245 R. Prague .... The Arts (cultural life in the heart of Europe)

SATURDAY
2200 R. Canada Int. .... The World This Weekend (CBC weekend news magazine)
R. for Peace Int. .... Counterspin (media analysis from Fairness & Accuracy in Reporting)
WBCQ(7415kHz) ...... Radio Timtron Worldwide (comedy, rock music & skits)
2205 R. Australia .... Correspondents Report (overseas reporters analyze major events)
2230 R. Australia .... The Business Report (round-up of business news & information by Narelle Hooper)
R. Canada Int .... Madly Off in All Directions (satire & comedy)
R. Vlaanderen Int. .... Music from Flanders (a half-hour of Flemish musicians & music)
WHRI(9495kHz) .... DXing with Cumbre (Mane Lamb with the hottest DX catches)
2232 BBCWS(am) .... The Interview (conversations)
2235 R. Prague .... Insight Central Europe (a regional magazine jointly produced)

2300 UTC/ 7pm E/4pm P - Page 54 Freqs

SUNDAY
2300 WBCQ(7415kHz) ...... Le Show (Harry Shearer with a tour-de-force variety show)
2305 R. Austria Int. .... Insight Central Europe (a regional magazine jointly produced)
R. Canada Int. .... Global Village (reports & music from global venues)
2306 BBCWS(am) .... One Planet (see 1506 H)
2310 R. Australia ... . Asia-Pacific (current events & business report)
2320 China R. Int .... In the Spotlight (Chinese arts & cultural magazine)
2330 BBCWS(am) .... Panel game or quiz show
R. Australia .... The Business Report (see A 2230)
2332 BBCWS(am) .... Inspiration (see 1532 M)
2335 R. Austria Int .... Insight Central Europe (see 2305 S)
R. Netherlands .... Sincerely Yours (RN's listener response program)
2355 R. Netherlands .... The Week Ahead (on RN the next seven days)

MONDAY-FRIDAY
2305 BBCWS(am) .... Outlook (topical magazine of people, places & events)
2305 R. Canada Int. .... As It Happens (continues from 2230)
2315 R. Austria Int. .... Report from Austria (15 min. magazine)
2330 R. Netherlands .... Newsline (news, analysis & background reports)
2345 BBCWS(am) .... Off the Shelf (abridged serialized readings)

R. Austria Int. .... Report from Austria (15 min. magazine)

MONDAY
2310 R. Australia .... Asia-Pacific (current events & business report)
2330 China R. Int. .... People in the Know (interviews with prominent Chinese)
R. Australia .... The Europeans (political, cultural, economic & social developments)

TUESDAY
2310 R. Australia .... Asia-Pacific (current events & business report)
2330 China R. Int. .... Biz China (see T 0130)
R. Australia .... Earthbeat (diverse environment program)

WEDNESDAY
2300 WBCQ(7415kHz) ...... Off the Hook (a hacker's view of emerging technology)
2310 R. Australia .... Asia-Pacific (current events & business report)
2330 R. Australia .... The Arts on RA (on arts-related interview & film review)
R. Canada Int. .... Dispatches (Canadian perspective on international news)

THURSDAY
2310 R. Australia .... Asia-Pacific (current events & business report)
2330 R. Australia .... The Buzz (technology news & issues)

FRIDAY
2300 WBCQ(7415kHz) ...... The Lost Discs Radio Show (obscure oldies & "B" sides from 1955-70)
2305 R. Australia .... Country Breakfast (Australia beyond the urban fringe)
2330 China R. Int. .... Life in China (magazine on the lives of ordinary people in China)
R. Australia .... Lingua Franca (language & its social, cultural & historical ramifications)
2345 BBCWS(am) .... Westway (drama serial)

SATURDAY
2300 WBCQ(7415kHz) ...... The Real Amateur Radio Show
WBCQ(9930kHz) ...... Split Secs (free form music & entertainment)
2305 R. Australia .... All in the Mind (the mind, brain & behavior)
R. Austria Int. .. .. Insight Central Europe (see 2305 S)
R. Canada Int. .... Quirks & Quarks (what's new & next in science)
2306 BBCWS(am) .... Pick of the World (a revue from the past week's WS programs)
2330 R. Australia .... Innovations (Australian invention, enterprise & ingenuity)
R. for Peace Int. .... World of Radio (Glenn Hauser's review of SW & int'l broadcasting)
WBCQ(7415kHz) ...... Fred Flintstone's Music Show
2335 R. Austria Int. .... Insight Central Europe (see 2305 S)
R. Netherlands .... Europe Unzipped (the events of the past week in Europe, some unusual)
R. Netherlands .... Insight (critical & humorous eye on the past week's headlines)
2345 BBCWS(am) .... Write On (your letters about the WS)

Milcom Mailbag

T ime to dig into ye ole *Milcom* mailbag this month and see what some of our readers are reporting from the field. Our first report comes from a regular reporter, Jack "Grunt" NeSmith down in **Deltona, Florida.**

143.825 Supervisor of Flying Moody AFB Georgia
227.075 125 FW Air-to-Air, Jacksonville International Airport, Florida
227.675 Dutch AF Training (*Believe this Dutch unit was working out of Melbourne-LVH*)
228.900 125 FW Air-to-Air (*This is a NORAD Southeast, Jack, no doubt the 125ᵗʰ was working a Combat Air Patrol for them-LVH*)
245.300 Army (*Nothing in my records other than a US Army assignment-LVH*)
252.800 Patrick AFB, Florida (*Search and Rescue-LVH*)
254.200 USN (*This is another Southeast NORAD region frequency-LVH*)
254.250 FAA Unknown (*Miami ARTCC Avon Park RCAG-LVH*)
254.325 FAA RCAG Lake City, Florida (*Jacksonville ARTCC-LVH*)
267.500 FACSFAC Jacksonville, Florida Callsign SEALORD
269.250 FAA Orlando, Florida (*Probable Miami ARTCC, this is part of an FAA block-LVH*)
269.375 FAA Unknown (*Patrick AFB Tower and Pensacola Approach/Departure Control are now here-LVH*)
269.600 FAA RCAG (*Big FAA frequency with quite a bit here-LVH*)
273.375 Dutch AF Training (*See 227.675-LVH*)
276.400 NAS Jacksonville, Florida (*Ground Controlled Approach-LVH*)
277.600 Tyndall AFB, Florida Callsign-OAKGROVE (*NORAD Southeast-LVH*)
281.425 FAA Daytona, Florida Approach/Departure Control
282.300 FAA RCAG Alma, Georgia (*Jacksonville ARTCC-LVH*)
282.425 U.S. Custom Service (*Jacksonville, Callsign Jackpot-LVH*)
285.000 NAS Jacksonville, Florida (*Tactical Support Center, Callsign Fiddle-LVH*)
285.725 Avon Park Range, Florida Charlie Range Control
291.700 FAA RCAG Gainesville, Florida (*Jacksonville ARTCC-LVH*)
292.200 Avon Park Range, Florida (*Range Target Scoring-LVH*)
307.000 Orlando, Florida Approach/Departure Control
307.200 FAA RCAG Tallahassee, Florida (*Jacksonville ARTCC-LVH*)
307.250 FAA RCAG St. Augustine, Florida (*Jacksonville ARTCC-LVH*)
316.300 USAF (*This is a Southeast NORAD frequency that has had both Jstars and AWACS activity on it-LVH*)
317.600 FAA RCAG Lowell, Florida (*Jacksonville ARTCC-LVH*)
319.000 FAA RCAG Vero Beach (*Miami ARTCC-LVH*)
320.600 USAF (*Nationwide AWACS Tadil A and C voice coordination frequency-LVH*)
323.050 FAA RCAG Crestview, Florida (*Jacksonville ARTCC-LVH*)
323.100 FAA RCAG Key West, Florida (*Miami ARTCC-LVH*)
339.700 FACSFAC Jacksonville, Florida
350.400 Pinecastle Range, Florida Range Operations (*Lake George Target-LVH*)
357.000 Pinecastle Range, Florida Range Operations (*Palatka Range-LVH*)
364.200 Tyndall AFB, Florida Callsign-OAKGROVE (*AICC NORAD Southeast-LVH*)
383.000 Patrick AFB, Florida, Consolidated Command. Post
383.400 NAS Jacksonville, Florida (*VP-16 and VP-45 Squadron Commons have been reported here-LVH*)
385.600 FAA RCAG Gainesville, Florida (*Jacksonville ARTCC-LVH*)
387.000 Daytona, Florida Approach/Departure Control

Thanks a million for the frequencies, Jack, be sure to check in often.

❖ Airshow Reports

Another Milcom regular, Ken Windyka, attended the **Rhode Island Air Show** and collected frequency card information from CG 6014 (HH-60) on display on the flightline.

Channel	Freq	Usage
1	381.800	Cape Air
2	121.000	Otis Tower (VHF)
3	294.700	Otis Tower (UHF)
4	118.200	Cape Approach (VHF)
5	128.750	Boston Center
6	156.300	VHF Marine Channel 6 (FM)
7	124.725	Baston Skyways
8	166.225	Coast Guard Maintenance (FM)
9	364.200	Huntress ID
10	119.500	Hyannis Tower
11	121.400	Vineyard Tower
12	118.300	Nantucket Tower
13	164.550	Cape Air (FM)
14	123.050	Massachusetts State Police Air-to-Air
15	383.900	Air/WPB LI
16	156.800	VHF Marine Guard (FM)
17	123.050	Connecticut State Police Air-to-Air
18	157.075	VHF Marine Channel 81 Group Boston//Sandy (FM)
19	157.175	VHF Marine Channel 83 Group Long Island Sound/SW Harbor (FM)
20	123.100	New York State Police/NOAA Air-to-Air
21	157.050	VHF Marine Channel 21 Group WH/ACT NY (FM)
22	157.100	VHF Marine Channel 22 Coast Guard Working (FM)
23	157.150	VHF Marine Channel 23 Group PORT/MOR (FM)
24	121.600	Otis Ground

Another regular reporter to this column is Mark Zurovski in California. Mark managed to collect some information off a KC-135 tanker frequency card from the 128ARW (Aerial refueling Wing) based at General Mitchell International Airport in Wisconsin displayed at the **Vandenberg AFB Airshow.**

VHF Radio

Channel	Frequency	Usage
1	126.400	General Mitchell International Airport (KMKE) ATIS
2	120.800	General Mitchell International Airport (KMKE) Clearance
3	121.800	General Mitchell International Airport (KMKE) Ground Control
4	119.100	General Mitchell International Airport (KMKE) Tower
5	127.850	General Mitchell International Airport (KMKE) Final Radar
6	126.500	General Mitchell International Airport (KMKE) Approach Control West
7	118.000	General Mitchell International Airport (KMKE) Approach Control East
8	119.650	General Mitchell International Airport (KMKE) Departure Control
9	125.350	General Mitchell International Airport (KMKE) Departure Control
10	122.200	Flight Service Station Green Bay
11	139.500	128ARW/126ARS Command Post Callsign - UPSET Control
12	125.100	Chicago ARTCC
13	132.300	Chicago ARTCC
14	134.750	Chicago ARTCC
15	120.375	Chicago ARTCC
16	118.300	Greater Rockford Airport (KRFD) Tower
17	133.700	—UnreadableB (*Probably Grissom ARB Tower-LVH*)
18	127.500	Camp Douglas/Volk AAF (KVOK) Tower
19	135.650	Grand Rapids/Kent County International Airport (KGRR) Tower
20	Open	

UHF Radio

Channel	Frequency	Usage
1	346.800	General Mitchell International Airport (KMKE) Ground Control
2	325.800	General Mitchell International Airport (KMKE) Tower
3	307.000	General Mitchell International Airport (KMKE) De-

4	255.400	parture Control Flight Service Station Radio (*Nationwide-LVH*)
5	379.800	General Mitchell International Airport (KMKE) Departure Control
6	236.600	Camp Douglas/Volk AAF (KVOK) Tower
7	351.200	128ARW/126ARS Command Post Callsign - UPSET Control
8	384.700	128ARW/126ARS Maintenance Control, Callsign - UPSET Maintenance
9	311.000	Air Mobility Command/Air Combat Command (AMC/ACC) Command Post (*Nationwide-LVH*)
10	364.200	Air Defense Command/Air Combat Command (ADC/ACC) (*NORAD AICC Nationwide-LVH*)
11	321.000	Air Mobility Command/Air Combat Command (AMC/ACC) Command Post (*Nationwide-LVH*)
12	344.600	Metro (Weather) (*Nationwide-LVH*)
13	372.200	Pilot-to-Dispatcher (PTD) (*Nationwide-LVH*)
14	324.600	Aerial Refueling Track AR-107 (Primary)
15	238.900	Aerial Refueling Track AR-105 (Primary)
16	235.100	Aerial Refueling Anchor AR-607 (Primary)
17	238.900	Aerial Refueling Anchor AR-632 (Primary)
18	305.500	Aerial Refueling Anchor AR-640A (Primary)
19	291.900	Aerial Refueling Anchor AR-640B (Primary)
20	Open	

Mark also got a partial look at the freq card on an Orbital Science Corp (OSC) L-1011 aircraft (N14OSC). Here is the partial list he passes along.

Channel	Frequency	Usage
0	395.100	Edwards AFB NASA Flight Test Support
1	269.900	Edwards AFB (KEDW) ATIS
2	304.000	Edwards AFB, 412TW Command Post, Callsign - CONFORM
3	225.400	Edwards AFB (KEDW) Ground Control
4	318.100	Edwards AFB (KEDW) Tower
5	343.700	Edward AFB AFFTC RCF (R-2515) Local Control, Callsign - SPORT
6	347.100	Edwards AFB NASA Test, Callsign - JOSHUA
7	237.000	Edwards AFB NASA Test
8	373.550	Edwards AFB NASA Test
9	373.150	Edwards AFB NASA 4

Mark also passes along this nice list of NAS **Point Mugu** squadron frequencies.

Frequency	Squadron	Nickname Callsign(s)
250.300	VAW-116	Sunkings KING (Sun King Base)
257.400	VP-65	Tridents PAPA GOLF (Trident Base)
265.300	VX-9	Vampires VANDY *
277.900	VAW-117	Wallbangers BANGER (Wallbanger

		Base)
299.400	VAW-113	Black Eagles EAGLE (Black Eagle Base)
304.250	VX-30	Bloodhounds BLOODHOUND ** (Bloodhound Base)
305.600	146AW/115AS	COACH, OCEAN, ISLAND, MAFFS
344.500	VR-55	Minutemen TRACTOR, ROMEO UNIFORM
346.100	VAW-112	Goldenhawks GHOST

*Split into two detachments, F-14 (Callsign-VANDY) aircraft at Point Mugu, everything else (F-18, AV-8, EA-6, AH-1 etc.) at China Lake. I believe all the China Lake aircraft use the VAMPIRE.callsign.
**BLOODHOUND is used by all the types of aircraft assigned to the squadron (NF-14, NP-3, NC-130, QF-4 and even on occasion the little Metroliners) and flown by the Bloodhounds.

Squadron Discretes
234.2 EAGLE discrete
264.4 VX-30 BLOODHOUND discrete*
307.7 VAW-117 BANGER discrete
341.2 VX-30 BLOODHOUND discrete

Mark notes, "The four frequencies above are the only ones I've heard anything on, all have been used more than once. I know there are a bunch for VX-9 out there floating around, but I have yet to hear a squeak on any of them. With the exception of the frequency marked with an "*" which has been around forever and is used quite frequently, the other three I found are in use when two or more aircraft from the respective squadrons are launched from Point Mugu. There was no fleet exercise taking place at the time I found them.

"I mention this because according to my notes (recently computerized, boy, are they easier to read), I've never heard BANGER or EAGLE on 272.9 or KING on 253.1 and am 99.95% sure 256.25 was an air wing tactical used during a recent round of work-ups. Everyone and their dog was on this one for the duration of the exercise, but it has been silent since they left town."

Mark also passes along some **land mobile** (FM) channels he monitors.

121.400 Airshow discrete, all players
127.650 Airshow Airboss/Showground, all players
138.850 Navy Point Mugu line maintenance
140.025 Military Police Port Hueneme and Point Mugu.
140.250 Crash/Fire/Rescue Port Hueneme and Point Mugu.
140.300 Ramp control for the airfield.
149.265 146th line maintenance

Many thanks, Mark, for the fine update from the West Coast. We look forward to hearing from you again real soon.

Greg Brooks attended this year's **Vidalia, Georgia, Airshow** in April and passes along the following Blue Angels frequencies that he monitored during the event. He also noted that the show Airboss was on 126.050 MHz.

164.900   170.900   238.150   263.350
275.350   345.900 MHz

Jonathan Melton attended the **Huntsville Airshow** this year and monitored the event with his scanner. The Blue Angels also performed at that show and he notes they were using the same frequencies he monitored during the April 2002 Tupelo, Mississippi, Airshow.

164.900 Blue Angels comm cart
170.900 Blue Angels comm cart
238.150 Blue Angel six plane formation
263.350 Blue Angels "Fat Albert" C-130
275.350 Blue Angel four plane formation
345.900 Blue Angel Solo aircraft

Jonathan also passes along, "As always, thanks to you and the entire staff of *Monitoring Times* for a job very well done!"

We appreciate your comments, Jonathan, and thanks to you and all our reporters for taking the time to share your monitoring results with all of our *MT* readers.

◆ Spectrum Holes

Over the years I have kept close tabs on spectrum usage in the 223-400 MHz range. Through all these years of monitoring, I have found certain frequencies with absolutely no apparent activity on them. I call these frequencies "spectrum holes."

Starting with this issue I will list some of these spectrum holes; if you have additional information or have heard anything on any of the frequencies below I would love to hear from you. I have stated in the past that these frequencies will probably be very quiet, but when active could offer some exciting listening. I would also like to have some of our military satellite enthusiasts do a sky sweep on these frequencies for activity.

This month I compiled a complete list of the 100kHz-spaced spectrum holes in my files:

225.200 230.600 235.600 237.100 240.300
240.400 240.700 242.300 242.800 242.900
243.100 243.700 246.100 246.400 246.600
246.900 247.100 247.600 252.300 252.400
252.600 256.100 270.700 273.300 278.900
279.300 293.300 293.900 298.200 309.600
312.600 316.000 316.500 316.600 336.700
345.300 345.700 354.500 358.500 364.300
364.400 364.700 366.400 368.200 369.300
369.700 370.800 371.300 371.400 371.700
372.400 373.200 374.600 374.700 375.300
377.300 377.600 377.700 378.600 378.700
382.300 382.400 386.100 387.300 387.600
387.700 388.300 389.600 390.700 391.300
391.400 391.600 392.300 392.400 392.600
392.700 393.900 396.400 396.600 398.300
398.800 399.300 399.900

Plus, 100kHz-spaced spectrum holes in the Glide Slope navigation sub-band:

328.600 328.700 328.800 328.900 329.100
329.200 329.400 329.500 329.700 329.800
330.000 330.100 330.400 330.600 330.700
330.900 331.000 331.200 331.300 331.500
331.600 331.800 331.900 332.100 332.200
332.400 332.500 332.700 332.800 333.000
333.100 333.600 333.700 333.900 334.000
334.200 334.300 334.500 334.600 334.800
334.900

That does it for this month's column. Until next month, 73 and good hunting.

Radio Communications on the Internet

The Internet has greatly expanded the options and resources available to the scanner listener. Search engines like Google (http://www.google.com) allow web surfers to locate many different types of radio-related material. Hobby web sites like Strong Signals (http://www.strongsignals.net) and Trunked Radio Information (http://www.trunkedradio.net) provide information, frequency lists and forums for conversation. Even the web page of the Federal Communications Commission (http://www.fcc.gov) are becoming more user-friendly. In addition to all of the help and assistance for local monitoring, the Internet is also enabling web surfers to hear scanner activity from distant cities and states.

◆ Streaming Audio

Hi Dan,
Do you know of any scanner that will allow me to listen to police activity going on in LA from Milwaukee, Wisconsin?
Thanks.
Rose

I don't know of any earth-bound scanner (or antenna) capable of covering the 1,700 miles between southern California and southeast Wisconsin that would let you listen to the Los Angeles Police Department. That kind of distance is just too great for the LA radio transmissions to make it to the Midwest, regardless of how high up you mount the antenna.

Even though you won't be able to receive the transmissions directly, it doesn't mean you're out of luck. You can listen to the LAPD, as well as other departments and cities, from anywhere as long as you have access to the Internet. Volunteers in dozens of cities have hooked their own scanners up to the Internet and are providing real-time "streaming audio" to listeners around the world.

These setups have three main components: a scanner, a personal computer (PC), and a modem. The scanner is typically either tuned to a main dispatch frequency or programmed to scan a trunked system. The audio output from the scanner is connected through a patch cable to a sound card installed inside the PC. Software running on

Scanner → PC (sound card encoder) → Modem → Internet
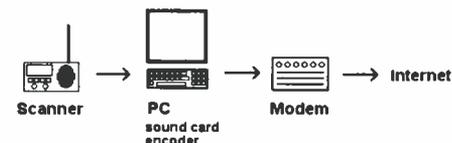
the PC converts that audio into a continuous digital stream. The stream, in turn, is fed out of the PC to the modem and from there onto the Internet.

Some of these digital audio streams may require a "helper application" or a "plug-in" that gives your web browser the ability to understand the feed and play it through your computer's speakers. There are several different types of audio conversion software commonly used by these volunteers and the specific type of software will determine the plug-in that you'll need. Most web sites with audio feeds explain which plug-in is needed and how to get the latest version.

There are a number of places on the Internet that maintain lists of different audio feeds. Some of the more popular and comprehensive ones are listed below.

◆ Public Safety Internet Audio Feeds
http://www.policescan.us/
More than 40 entries, including police and fire departments, air traffic control

http://www.freqofnature.com/live_bottom.html
Sorted by state with a graphic icon indicating the type of plug-in required to hear that feed.

http://www.livedispatch.com/live_dispatch.htm
Also has links to scanner feeds in Canada and the Netherlands.

You can also use a search engine like Google to locate other feeds. Use search terms such as "live feed" and "police" to bring up possible sites. Don't be discouraged if you don't locate what you want on the first try. Because these feeds are provided by volunteers, you may find that they come and go and may be "down" (unavailable) at any particular time.

◆ Computer-Aided Dispatch
If you don't want to listen to an audio feed but still want to keep up with what's going on, many of the larger departments across the country maintain Computer-Aided Dispatch (CAD) web pages with textual descriptions of incidents and activity.

For instance, the California Highway Patrol (CHP) operates a CAD page that lists traffic accidents and related ambulance calls, including rescues and car fires. You can see the current activity at the cad.chp.ca.gov web page. Pinellas County, Florida, has a similar page set up at **http://www.co.pinellas.fl.us/ces/ActCallsPub.htm**.

◆ South Dakota

Hi Dan,
I just read your article on the Internet. I found it very interesting. I will tell you first what I have, then my question. I have a new Uniden BC785D Scanner. I have had it since March and have been working on getting it programmed.
I live in Redfield, South Dakota, which is in Spink County. I think I have all frequencies but I get all over the state pretty good; my problem is getting good reception from our local radios in close to me – they are sort of hard to understand. I am wondering if I am missing a channel or I am too close. The ambulance will use the Miller tower (159.4650 MHz,) that is good; then the deputies will use 156.2400 or 159.6900, which are not very good. Can you help me with more?
I have 8 frequencies on Crandall tower, 7 on Miller and 5 on Aberdeen. Does Redfield have a tower they are using? Can you provide me with a complete frequency chart and any other help? Oh, I have a Radio Shack antenna, the ham discone antenna that covers 25 to 1300 MHz.
Ally

For frequency and location information, the first place to check is the Federal Communications Commission (FCC). The FCC is responsible for licensing public safety radio systems and they maintain a web site where you can check up on local towers and frequencies.

FCC Frequency Database
Open up your favorite web browser and go to **http://wireless.fcc.gov/uls/**
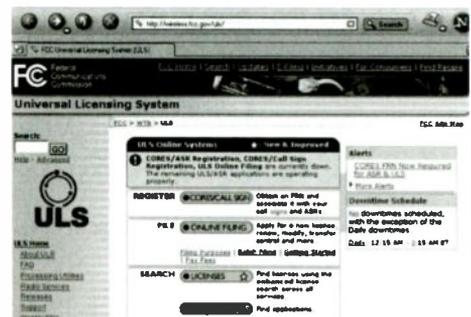
Click on the Licenses button in the Search section.

Clicking on the Advanced License Search on the left-hand side of the page will bring you to **http://wireless2.fcc.gov/UlsApp/UlsSearch/searchAdvanced.jsp**, which you can also type directly, but it's longer and more difficult to re-

member.
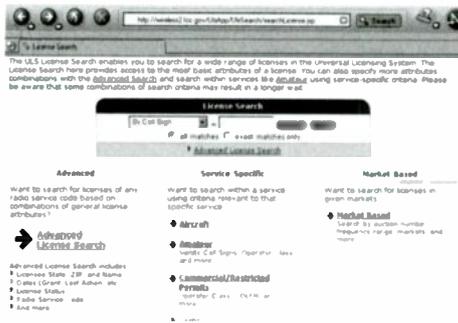
In the Service Group selection list, scroll down and click on "YW - Public Safety Pool, Trunked" then click on the GEOSEARCH button.

Go to the State/County section and scroll down in the first window until you see "South Dakota" then click on it. A list of counties in South Dakota will then appear in the lower window. Scroll down in that one and click on "SD - Spink." Then click on the SUBMIT button.

You should get back a list of licenses associated with Spink County.

Here are the frequencies that I have for the three counties you mentioned, as taken from the FCC database:

Aberdeen (Brown County): 155.475, 156.015, 156.150, 159.225 and 159.375 MHz
Crandall (Day County): 155.475, 156.015,

156.240, 159.150, 159.690 and 160.140 MHz
Miller (Hand County): 155.475, 156.015, 159.270, 159.465, 159.495, 160.065 and 173.325 MHz

From your letter it appears you're having trouble hearing two frequencies on the Crandall site.

Using the FCC's geographic search feature you can run a search specifically on the town of Redfield. There are several conventional (non-trunked) frequencies transmitting from the top of the Redfield County Courthouse on 7th Avenue, including 154.085 and 154.250 MHz. Other frequencies in the county are also listed in the FCC database (as they should be!), such as 158.76 MHz on U.S. Route 281 and 154.055 MHz from the Redfield State Hospital.

Those local frequencies might give you a chance to check whether *attenuation* might help your reception problem. If you really are too close to a repeater you should hear an improvement by using the RF attenuation feature on the BC785D. You can read the details in your Owner's Manual on page 31.

◆ EDACS and the PRO-92

I think that I have come across a major short-coming in the Radio Shack PRO-92: it can only decode and track EDACS AFS codes 00-000 through 31-157.

When entering EDACS talk group IDs, they have to be entered in 4 digit decimal format, for example 0289.

And the scanner only takes numbers from 0000 to 4095, which corresponds to AFS codes 00-000 thru 31-157.

Does EDACS use AFS number higher than 31-157? I suspect that it does, because some EDACS systems must have many thousands of individual users.

Ever since I bought my PRO-92 a few years ago, I have never been able to pick up the city buses on the EDACS system.

I can pick up the bus supervisors and maintenance on a range of 0289 to 0294 talk group IDs, but whenever the individual buses talk, the scanner will not decode them. If I use another radio in conventional mode, I can hear the individual buses. And during one conversation, I heard the dispatcher describe how each bus's ID shows up on the data terminal in the office.

So, I suspect that the buses are using an ID that is greater than the max 31-157 that the PRO-92 takes.

Via the Internet, I checked the user manual for the PRO 94, and talk group ID is entered in AFS format. The manual does not mention any limit to the numbers, and so I would suspect that something like 60-000 could be entered. So, the problem that I have encountered may be common only to the PRO-92.

It is time to buy a new scanner. I wonder what other agencies and fleets are on the system above 31-157.

I like the PRO-92, though, because it tracks LTR, and the electric company here uses LTR.

William

I happen to like the PRO-92 as well, and the

LTR (Logic Trunked Radio) tracking is a nice feature. But you asked about EDACS talkgroups.

Enhanced Digital Access Communications System (EDACS) radios have two main types of message traffic. The first is the *group call*, which is the case when a user wishes to communicate with other users in a group. Group call messages use talkgroup identifiers to indicate which group should participate in the conversation.

EDACS
Agency - Fleet - Subfleet

A	A	A	A	F	F	F	F	S	S	S

11 bits

A	A	A	A		F	F	F	F		S	S	S
4 bits					**4 bits**					**3 bits**		
00..15					00..15					0..7		

EDACS talkgroup identifiers are usually represented as either a 4-digit decimal number or in Agency-Fleet-Subfleet (AFS) format.

AFS identifiers are composed of 11 binary digits (bits). The first four bits are assigned as the agency number. The next four bits are the fleet number. The final three bits are the subfleet number.

Rather than display eleven 1's and 0's, AFS identifiers are shown as two decimal numbers separated by a dash. The number before the dash is the agency number and can range from 00 to 15 (the first four of 11 bits). The number to the right of the dash has two parts. The first two digits represent the fleet number, which again can range from 00 to 15 (the second four of 11 bits). The final digit is the subfleet number and can go from 0 to 7 (the last three of 11 bits). So, AFS identifiers go from 00-000 to 15-157.

The second type of common EDACS message traffic is the *individual call*, which allows two users to talk privately with each other. In this case talkgroup identifiers are not used – individual radio identifiers are used instead.

The PRO-92 tracks talkgroups. It does not track individual calls, although, as you've discovered, you can hear the voice traffic of individual calls if you listen in conventional mode.

What appears to be happening is that dispatch calls are sent out to the buses as group calls, so they use a talkgroup and the PRO-92 can track them. When the bus responds, it uses an individual call and the PRO-92 in trunking mode ignores those types of calls.

◆ Seasonal Checklist

For those of you living in climates with seasonal change, autumn is just around the corner. Now is the time to check your outdoor equipment and make sure everything is ready for winter. Much better to make repairs and recheck connections now, while the weather is nice, than when it's cold and blustery outside.

That's all for this month. As always, more information is available on my website at **http://www.signalharbor.com**, including updated APCO-25 system frequencies and tower locations. I also welcome your electronic mail at *dan @ monitoringtimes.com*. Until next month, happy monitoring!

Update on Space Center Trunk System

As we move into the fall and winter months, the buzz in space publications is that the space shuttle mission STS-114 could resume launching from the Kennedy Space Center (KSC) as early as this month.

It has been quite some time since we originally published the first information on the trunk system being implemented in and around the Kennedy Space Center area. Not much could be done as far as analysis is concerned, since this was an APCO P-25 compliant digital system.

But early this year the new Uniden digital trunk trackers entered the monitoring world and all that has now changed! We are also very fortunate to have a reporter in the area (who wishes to remain anonymous), who has monitored the system directly and provides us with the following report.

"The Kennedy Space Center trunk system is a 400 MHz Motorola SmartZone, using the APCO P-25 ASTRO digital mode. This system covers an area spread over 70 miles from the north end of the Canaveral National Seashore to the Malabar Annex in Palm Bay. Within this SmartZone system are one two-simulcast site, one non-simulcast site and interfaces to three Air Force leased non-simulcast sites. In this system there are seven dispatcher consoles, three system manager terminals, networks, computers, tone remote, and audio interfaces. The radio count on this system as of March 31, 2003, was 1600 handhelds, 800 vehicle mounted and 25 base station radios.

"System users include a variety of civilian, military and government entities including both NASA and Air Force units. There are various talk groups that encompass a wide variety of operations in the area such as: Administrative (Fire, Security, Medical, Public Affairs Office-PAO, Transportation, General Services Administration-GSA, etc.); Tactical (Crane, Shuttle Landing Facility Landing and Transporter operations); Air-to-Ground (Shuttle, Commercial and Military); and other groups (ALS, outside agencies, etc.)

"The majority of the activity observed so far has been from the Kennedy Space Center, Cape Canaveral Air Force Station, and Patrick AFB areas and is generally heard on their respective sites. Many of the active talk groups heard on the system are being patched from their existing VHF/UHF nets into the trunk system (talk group ID +3). There are some talk groups that appear to be actually operating on the trunk system instead of being patched to it.

"Some previously heard VHF nets have gone quiet, mostly from Cape Canaveral AFS

and Patrick AFB:

149.8000	Patrick MOSC
164.7000	Patrick Fire
165.0375	CCAFS Weather Base
171.2625	NASA TV Ops
171.3875	Patrick Engineers
173.0250	Patrick Security

"There have been times when the VHF nets used by security, fire and others have moved, seemingly at random, to other talk group IDs. These changes generally appear to stay within the same group of talk group IDs.

"Individual sites that are part of this Smartzone system are:

Site 1 - Kennedy Space Center (2 remote sites at 500 ft Weather Tower and Communication Tower Shop)
Site 2 - North Kennedy Space Center (Shiloh Tower)
Site 3 - Cape Canaveral AFS (Timing Tower)
Site 4 - Patrick AFB (Microwave Tower)
Site 5 - Malabar Annex (Malabar Tower)

"The above sites all have active control channels; however, very little voice activity has been observed on the North KSC and Malabar sites.

Known Frequency assignments
(c=control channel)

Smartzone Site 1 - Kennedy Space Center
(2 sites 12 channel simulcast -500 foot Weather Tower remote site 1 and Communication Shop Tower remote site 2)

406.2375c	406.3750c
406.4375c	406.6375c
406.8375	407.0375
407.2375	407.8375
408.0375	408.4375
408.6375	409.0250

Smartzone Site 2 - North Kennedy Space Center
(Shiloh Tower - 3 channels)

406.1750c	409.4250c
409.6375c	

Smartzone Site 3 - Cape Canaveral AFS
(Timing Tower - 10 channels)

406.5625c	406.9625c
408.5625	408.9625
409.3625	409.7625
410.1625	Probable: 407.7625c
408.1625c	410.5625

Smartzone Site 4 - Patrick AFB
(Microwave Tower 8 channels)

407.9625c	408.3625c
408.7625c	409.1625c
409.5625	409.9625
410.3625	

Smartzone Site 5 - Malabar Annex
(Tower - 3 channels)

406.3625c	406.7625c	Other
Possibles: 407.1625c or 410.7625		

"The base frequency and offset used throughout this system is 406.100 MHz and 12.5-kHz respectively."

Talk Group Identifications

336	Kennedy Space Center Base Communications (NASA Net 107 patch from 170.150 MHz)
496	Kennedy Space Center Security "400 Net" (Security shift commanders and supervisors)
544	Unidentified
656	Kennedy Space Center Rail Operations (patch from 413.125 MHz)
672	Kennedy Space Center X-Ray Operations
832	Kennedy Space Center Transportation - Special Rail & Truck Net (NASA Net 206 patch from 170.175 MHz)
848	Unidentified (patch with unidentified)
1936	Kennedy Space Center Security (NASA Net 101 patch from 173.6875 MHz)
1952	Cape Canaveral AFS Security (ETR Net Z patch from 165.0875 MHz)
2576	Kennedy Space Center Telemetrics (NASA Net 102 patch from 165.1875 MHz)
4496	Kennedy Space Center Base Communications (NASA Net 107 patch from 170.150 MHz)
5472	Unidentified (patch with unidentified)
10256	Kennedy Space Center Security (NASA Net 101 patch from 173.6875 MHz)/Cape Canaveral AFS Security (ETR Net Z patch from 165.0875 MHz)
10272	Kennedy Space Center Safety (NASA Net 105 patch from 173.6625 MHz)
10288	Kennedy Space Center Fire (NASA Net 116 patch from 173.5625 MHz)/Kennedy Space Center Security (NASA Net 101 patch from 173.6875 MHz)
10304	Kennedy Space Center Safety (NASA Net 105 patch from 173.6625 MHz)
10320	Kennedy Space Center Fire (NASA Net 116 patch from 173.5625 MHz)/Cape Canaveral AFS Security (ETR Net Z patch from 165.0875 MHz)
10384	Kennedy Space Center OPF Safety (NASA Net 205 patch from 173.4625 MHz)
11536	Kennedy Space Center NASA Tower (NASA Net 202 patch from 165.6125 MHz)
11696	Kennedy Space Center Rover Operations
11760	Kennedy Space Center MLP/Crawler Operations

12496	Kennedy Space Center Launch Support (NASA Net 104 patch from 162.6125 MHz)
13776	Kennedy Space Center Television (from former NASA Net 408 patch on 171.2625 MHz)
14096	Kennedy Space Center Utilities (NASA Net 101 patch from 171.000 MHz)
17344	Unidentified Safety 11, Safety 35
18000	Cape Canaveral AFS unidentified
18080	Cape Canaveral AFS TVOC Net
18112	Cape Canaveral AFS Metrics 19, Metrics 32
18192	Cape Canaveral AFS Weather Base
32336	Patrick AFB Security
32656	Patrick AFB Fire Control
34576	Patrick AFB Maintenance
34592	Patrick AFB Trans Operations Center
34896	Patrick AFB unidentified
34928	Patrick AFB unidentified
35536	Patrick AFB unidentified
35856	Patrick AFB Tower
36496	Patrick AFB unidentified
36512	Patrick AFB MOSC
37136	Patrick AFB unidentified

"And one other update of note for Spacecoast monitors. The US Fish and Wildlife Service Merritt Island National Wildlife Refuge has changed repeater frequencies and is now using both analog and ASTRO digital.

"The new pairing is 165.450 MHz output/ 166.725 MHz input. Also, 168.350 MHz has been used for simplex communications during controlled burns."

◆ More NASA Trunk Systems

It has been quite some time since we published a list of trunk radio systems at the various NASA Centers. Here is the latest information we have. As always, any additions or corrections and talkgroup information is always appreciated.

Marshall Space Flight Center, Huntsville, Alabama
System: Motorola Type II SmartNet
Motorola System ID: 3513
Base Frequency: 406.350 MHz, Spacing: 25-kHz
Control Tome: 105.88 Hz
Frequencies: 406.350 407.150 407.950 408.750 409.550

Ames Research Center/Moffett Federal Airfield, California
System: EDACS Regular
Frequencies: 406.550 (LCN01) 407.350 (LCN02) 408.350 (LCN03) 408.950 (LCN04) 409.750 (LCN05) 411.350 (LCN06) 412.800 (LCN07)

Goddard Space Flight Center, Greenbelt, Maryland
System: Motorola Type II Smartnet
Motorola System ID: 4631
Base Frequency: 407.000 MHz, Spacing: 25-kHz
Control Tone: 97.3-Hz
Frequencies: 407.000 408.150 408.625 409.525 410.275

John C. Stennis Space Flight Center, Mississippi
System: Motorola Type II Smartnet
Base Frequency: 406.000 MHz, Spacing: 25-kHz
Frequencies: 406.350 407.150 407.950 408.750 409.550

John Glenn Research Center, Cleveland, Ohio
System: EDACS Regular
Frequencies: 406.350 (LCN01) 407.150 (LCN02) 407.950 (LCN03) 408.750 (LCN04) 409.550 (LCN05)

Johnson Space Flight Center, Houston, Texas
Notes: Current reports indicated that this system is not on-the-air.
Frequencies (Assigned): 406.350 407.150 407.950 408.550 408.750 408.950 409.150 409.550 409.750 409.950

◆ More Government APCO 25 Uncovered

I have begun to receive a steady stream of notes from monitors across the country monitoring various government agencies using the APCO 25 digital protocol. Here is a sampling of what has been reported.

Kenny in Massachusetts says, "Here in Boston the TSA (Transportation Safety Administration) are using their 172.900 MHz repeater with P-25 not encrypted. I have not been able to confirm the input."

Kenny passes along the additional list below of other P-25 transmissions he has monitored in the Boston area.

163.4625	Hanscom Field Security
163.7500	Border and Transportation Security (old INS) - Encrypted
165.2875	Alcohol, Tobacco and Firearms (ATF)
165.9500	Internal Revenue Service (IRS)
170.6250	Unknown agency, have heard both encoded and clear (This is a Justice Department assignment, but it could also be the Border and Transportation Security)
417.2000	General Services Administration/ Federal Protection Service - Base in the clear and mobile units are encrypted.
418.6250	DEA mostly encrypted, but some radio checks in the clear
418.9000	DEA encrypted
418.7500	DEA clear and encrypted, although recently not much heard in the clear
418.6750	DEA clear and encrypted
418.8750	DEA encrypted

Kenny also notes that many different agencies have been heard recently on the local Customs 165.2375 repeater conducting radio checks with "Sector" including: Federal Fish and Wildlife Service, Veterans Administration and ATF units.

Thanks for the report, Kenny.

Regular *Fed File* reporter Chris Parris checks in again with some more info on the APCO 25 communications he has been monitoring, Chris says, "Add the DEA to the list of APCO P-25 users. I started hearing them using unencrypted P-25 on 418.900 MHz in the Pittsburgh area this last week. Interesting, as any previous coded communications I have heard on DEA frequencies has been DES or something similar sounding. Must be getting new radios out there..."

Another anonymous reporter from Florida has confirmed through monitoring that the TSA is using APCO 25 at the Orlando International Airport. He also confirms the IRS is using P-25 on their 169.950 repeater output (165.700 repeater input) in the clear and encrypted. He has

also monitored P-25 encrypted communications on 166.7375 MHz in the central Florida area. My notes indicate that this is a U.S. Fish and Wildlife Service frequency and that might be what he is hearing.

Eddie Muro in New York has verified that the TSA is using 172.900 P-25 communications at the John F. Kennedy International Airport.

◆ TIGTA

And finally, Chris Parris passes along this interesting tidbit of information.

"A few months ago, a friend was working up at one of the many tower sites along Skyline Drive on the west side of Portland. He spotted a new repeater cabinet labeled 'TIGTA 164.5375 / 172.6375.' He didn't know what TIGTA was, but a quick Google search shows: http://www.ustreas.gov/tigta/. Sure enough, TIGTA stands for Treasury Inspector General for Tax Administration.

"I have had the frequencies in for a while now, but nothing until this morning. 164.5375 MHz (repeater out) came up in unencrypted P-25 digital with some guys playing with the new radios and seeing if they could hear each other."

As you can see, monitors across the country are uncovering some great fed comms using the new Uniden digital scanners. If you own one of these new radios and have the digital board installed, how about swinging through the federal bands and let us know what you are hearing?

Until next time, 73 to all and good hunting.

AMERICAN BANDSCAN
THE WORLD OF DOMESTIC BROADCASTING

Doug Smith, W9WI
dougsmith@monitoringtimes.com

Moving Day Part 3

A few months ago I wrote about stations moving on the radio dial to new frequencies. This month, I'm writing about stations that move in the traditional sense – from one city to another. These moves are usually trivial – moving from one suburb to another, etc.. But, occasionally the moves are significant. These changes can seriously affect your ability to DX certain frequencies.

An example: WHTE-1690 is the expanded-band permit for WDDD-810 Johnson City, Illinois. Johnson City is in extreme southern Illinois, roughly 80 miles southeast of St. Louis and roughly 300 miles south of Chicago. Obviously this station will not be a serious impediment to DXing 1690 in Chicago. Indeed, WHTE could actually be DX for a Chicago listener.

However, WHTE has applied to move to Berwyn, Illinois. Berwyn is in northern Illinois; it actually borders on the city of Chicago. If the move is granted, 1690 won't stay open in Chicago for long.

AM moves are relatively simple. The station must show that it can operate with the requested power and antenna at the new location without interfering with other stations, and while providing a "city grade" signal across the new city. These are essentially the same conditions that would need to be met if a completely new station were proposed. Only one additional requirement is imposed: the move cannot deprive the original city of its only operating radio station. (WHTE has applied to move co-owned station WDDD-FM from Marion, Illinois, to Johnson City. This would ensure Johnson City would have a radio station. Marion would still have WGGH-AM and WAWJ-FM.)

For FM and television, another step is necessary. FM and TV stations can only be established on channels that are "allotted" to the community from which the station proposes to operate. For example, the owners of station WJOI-FM Springfield, Tennessee, have applied to move the station to Oak Grove, Kentucky. Before they can move the station itself, they must move the station's 94.3 FM allotment. Only after the new allotment is granted can the station apply to modify its license to specify the new city. It should be noted that translators and low-power TV stations are not required to use allotted channels. They may change city at will (provided interference-protection limits are met).

As I noted above with regard to WHTE-1690, sometimes one change in one community triggers more changes. (Some recent moves in Alabama have triggered nearly a dozen changes

WHTE-1690 proposes a 284-mile move from Johnson City, IL, to Berwyn

in two states.) Often these "cascading" changes are purely administrative. In WHTE's case, WDDD-FM already provides a "city-grade" signal to both its existing city (Marion) and the proposed new city. (Johnson City). The WDDD tower won't move, and the station will remain on 107.3 FM. Chances are the only things that will change at WDDD-FM are the hourly identification announcement and the location of the "public file."

A number of major AM moves are "in the offing" this fall. I already mentioned the proposed move of WHTE-1690 from southern Illinois to the Chicago area. In California, KTRB-860 has been granted permission to move to San Francisco. They aren't <u>required</u> to replace the 860 frequency (two other AM stations and six FMs will continue to cover Modesto), but they do plan to replace it with a new station on 840. And in Oklahoma, KGYN-1210 in Guymon (in the center of the Panhandle) is moving to Oklahoma City.

On FM, listeners in northern Alabama and within a 100-mile radius of Dallas, Texas, should expect to hear major changes on their FM dial. I suspect Dallas-area listeners are already used to the idea of stations shuffling around the dial!

◆ Expanded Band Countdown

When the expanded AM band was first opened, we (and the stations) were told the second frequencies would be valid for only five years. At that time, stations would be required to choose one frequency or the other – they could

either remain in the expanded band, or surrender their expanded-band frequency and move back to their original frequency. For some stations, that period has now expired. I count eight stations that have been on the expanded band for more than five years:

KDIA-1640 Vallejo, CA: old 1190 still on as KDYA.
KDDZ-1690 Arvada, CO: old 1550 signed off in June.
WJCC-1700 Miami Springs, FL: old 1210 still on as WNMA.
WPTX-1690 Lexington Park, MD: old 920 cancelled several years ago.
WWRU-1660 Jersey City, NJ: old 1530 still on as WJDM.
KDZR-1640 Lake Oswego, OR: old 1290 still on as KKSL
WTDY-1670 Madison, WI: old 1480 still on as WLMV.
WKSH-1640 Sussex, WI: old 1370 license cancelled several years ago.

KDIA and WWRU have special exemptions. These stations received expanded-band allotments as the result of an act of Congress requiring the FCC to grant an expanded-band frequency to any daytime-only station that was the only station in a city of more than 100,000 population. Congress intended the law to apply only to WWRU, but failed to realize population increases allowed KDIA to qualify as well.

It is hard for me to explain why WNMA, KKSL, and WLMV are still on. I'm not aware of any plans by any of these stations to shut down. All three are programmed independently of their expanded-band counterparts.

◆ Wierd Science

There is no new news about digital TV DX, but the FM dials have been hopping. On June 13th, rare double-hop skip was noted when KCBS channel 2 Los Angeles made the trip to Kentucky. Rare skip above channel 7 was reported in Europe on June 20th, and in several locations in the eastern USA on the 24th. On the 16th, a 220 MHz ham contact between Idaho and Las Vegas seems to smash some of the technical assumptions we've made about sporadic-E skip. And to top it off, at the end of June exotic long-haul tropospheric propagation was reported. Alabama to Ontario and Boston to Kentucky are usually sporadic-E paths. It's not very often they're DXed via tropospheric propagation!

Write me at 7540 Highway 64 West, Brasstown NC 28902-0098, or by email to dougsmith@monitoringtimes.com. Good DX!

OUTER LIMITS

George Zeller

georgezeller@monitoringtimes.com

Trailer Park Ministries Mystery Solved

One of the longest running mysteries in North American pirate radio DX circles has revolved around **The Voice of Trailer Park Ministries.** First appearing on the shortwave bands in October 1989, this unusual religious pirate broadcaster created controversy right from the beginning. Host R. F. Fields transmitted religious sermons along with frequent station identifications. Those lengthy identifications normally were, "Hello and good evening to all our radio friends, American Forces everywhere, and all the ships at sea. You are tuned in to Radio Voice of Trailer Park Ministry, America's first shortwave pirate religious broadcaster. This is Rev. R. F. Fields."

However, for more than a decade there has been some controversy about what the actual identification of this station is. Some DXers, including your editor, heard the ID as **Radio Voice of Kramer's Park Ministry.** The station announced no address, and thus it had no means of responding to correspondence from listeners. Further, R. F. Fields did not provide any answers to this puzzle by publicizing his station.

All of this coy mystery has now come to an end. As we see here, R. F. Fields has now been sending out QSL sheets for ancient receptions of his station by many DXers. They clearly show that Rev. R. F. Fields' station actually is called **The Voice of Trailer Park Ministries.** Further, Fields claims to be "The only certified sane radio preacher." The text of his QSL sheet reads, in part:

THE VOICE OF TRAILER PARK MINISTRIES

Reverend Doctor R. F. Fields
"The only certified sane radio preacher"

"I am sorry to take so long to send this QSL. My radio station has been off the air for over 4 years because an evil neighbor at the Shady Grove Trailer Park called the Orlando Police and said that my radio station interfered with watching Saturday Night Live and the police came out and talked to me and then they came back with a socialist worker and talked to me again and then they came back with the socialist worker and a ambulance and the ambulance drivers chased me and caught me where I was hiding under a double-wide down the street and strapped me down to a stretcher and took me to the hospital and the doctors at the hospital said that I has (sic) loose screws in the steel plate that the Army doctors put in my head after I was shot in the head by an artillery shell in the Vietnam War and that they needed to fix the screws and that my brain needed a rest. They fixed the screws and put me

in the State Hospital for my brain to rest and the nurses at the State Hospital would not let me get online because they said that I got agitated too easy and that my brain would not rest if I got online so I didn't get to look up my reception reports until now because a doctor at the state hospital gave me a piece of paper that says I am certified sane and told me that they were letting me loose and I can get online now."

"I am sending out QSLs to my old listeners now and I want you to know that I am going to get me a new True Light Trailer and Emergency Drive-In Church after I get out of the half-way house where I live now and I will be able to return to the airwaves this fall or winter with an improved station and better coverage so listen for me around 6955 kHz on holiday weekends and other weekend nights around November and December 2003."

Fields' QSLs also reveal that the station uses a B&W 5100B transmitter with crystal control and 120 watts. The signal is fed into a vertical antenna. As you see here, Fields has future plans to return to the shortwave broadcasting bands. If you hear this one, you will tune in one of the most mysterious pirate stations that has ever bounced a signal off the ionosphere. Also, you will know that the operator of this one actually has a sheet of paper providing medical certification that Rev. Fields is in fact "The only certified sane radio preacher." If you hear him, let us know!

◆ Pirate Frequencies Still Variable

A fairly steady stream of pirate radio broadcasting has continued even during the summer months, despite the fact that this is not normally a prime DX season. A majority of North American pirate broadcasters have abandoned the 6955 kHz standard pirate band frequency. The stations that we list here this month operated on a variety of frequencies, including 6925, 6950, and 6955 kHz. The presence of licensed broadcaster **La Voz de Campesino** in Huarmenco, Peru, on a frequency just above 6955 kHz, often caused pirates to move their frequencies down 5 to 10 kHz or more after dark to avoid interference.

The resulting chaos in pirate frequency selections has had two impacts. First of all, pirate DXing now requires considerable tuning up and down the pirate bands, meaning that virtually all pirate radio stations are now tougher DX catches than used to be the case. Second, the size of the audience that actually hears pirate broadcasters

has certainly decreased. Many station operators have forgotten that the main purpose of radio broadcasting is to provide programming that is heard by listeners.

The tension between hard core DXers who enjoy the chase after pirate signals and a much larger number of shortwave listeners who want to hear the broadcasts but who have difficulty finding them is a quandary that has not yet been resolved in shortwave radio.

◆ What We Are Hearing

Our readers heard all of these North American pirate broadcasters this month, indicating that pirate activity remains vigorous. All pirates operate on a sporadic schedule, but shortwave pirate broadcasting increases noticeably on weekends, and during major holiday periods. As we note above, you have to tune around the pirate radio band to find the stations. Descriptions are abbreviated for space considerations.

Big Thunder Radio- Rock music (bigthunderradio@hotmail.com e-mail)

Buckwheat Radio- QSLs imply operation from southern US (buckwheatradio@hotmail.com e-mail)

Canadian Free Radio- This new one appeared on Canada Day (None)

Grasscutter Radio- Rock music and station IDs (None)

Iron Man Radio- Rock music and pirate radio commentary (Belfast)

KIPM- Alan Maxwell's drama programming (Elkhorn)

Lounge Lizard Radio- Insipid pop music (Providence)

Psyco Radio- Spelling? The ID is pronounced "Psycho." Bill McClintock heard with a **WSKO** call letter ID (None, but recently asked for reports on the Free Radio Network web site)

Radio Cochiguaz- South American pirate has been active during the summer, often relaying other South American pirates on 11440 kHz or on a new frequency of 11430 kHz. The operator reminds us that sufficient return postage is necessary for QSLs, and that the station normally uses either upper or lower sideband mode. (Santiago)

Radio Free Speech- Bill O. Rights stresses constitutional rights and free speech (Belfast and Blue Ridge Summit)

Radio Pigmeat International- Pigmeat Martin says station will respond to reception reports. (Belfast)

Panamsat Galaxy 1R

C-Band - 133 degrees West longitude

1(H)	3720	Comedy Central – West (VC2+)
2(V)	3740	Univision East and West / Telefutura East and West (digital)
3(H)	3760	Encore Networks (digital)
		Love Stories – East
		Westerns – East
		Mystery – East
		Action – East
		True Stories – East
		Love Stories – West
		Westerns – West
		Mystery – West
		Action – West
		True Stories – West
		Encore - East
4(V)	3780	Scripps Networks (digital)
		TV Food Network – East
		Do-It-Yourself Network
		Fine Living Network
5(H)	3800	Classic Arts Showcase
6(V)	3820	Spike TV – West (VC2+)
7(H)	3840	Disney Channel – West (VC2+)
8(V)	3860	Cartoon Network (VC2+)
9(H)	3880	ESPN (digital)
10(V)	3900	MSNBC (VC2+)
11(H)	3920	Eternal Word Television Network (EWTN)
		5.40 WEWN – Worldwide Catholic Radio 1 (English)
		7.38 WEWN – Worldwide Catholic Radio 2 (English)
		5.58 WEWN – Worldwide Catholic Radio (Spanish)
		5.76 EWTN Spanish-language SAP
12(V)	3940	ShopNBC
13(H)	3960	STARZ! Networks (digital)
		STARZ! – East
		STARZ! Theater – East
		Black STARZ! – East
		Encore – East
		WAM – West
		STARZ! – West
		STARZ! Family – West
		STARZ! Cinema – East
		Encore – West
		STARZ! Cinema - West
14(V)	3980	ESPN Deportes (VC2+) / ESPN feeds
15(H)	4000	AOL Time Warner Networks (digital)
16(V)	4020	AOL Time Warner Networks (digital)
		Airport Network
		Turner South
17(H)	4040	INSP – The Inspirational Network
		5.58 Genesis Communications Network
		7.92 WNMX-FM Waxhaw, NC - Variety
		INSP – The Inspirational Network, Inspirational Life TV (i-Lifetv) (digital)
18(V)	4060	Home Box Office / Cinemax Networks (digital)
		HBO Comedy – East
		HBO Zone – East
		Wmax – East
		@Max – East
		HBO Comedy – West
		HBO Zone – West
		ThrillerMax – East
		OuterMax – East
		ThrillerMax – West
		Wmax – West
		@Max – West
		5-Star Max – East
		OuterMax – West
		5-Star Max - West
19(H)	4080	Cinemax – East (VC2+)
20(V)	4100	Home and Garden Network – East (VC2+)
21(H)	4120	USA Network – West (VC2+)
22(V)	4140	Headend in the Sky (digital)
23(H)	4160	Home Box Office / Cinemax Networks (digital)
		HBO – East
		HBO 2 – East
		HBO Signature – East
		HBO Family – East
		HBO Latino – East
		HBO – West
		HBO 2 – West
		HBO Signature – West
		HBO Family – West
		HBO Latino – West
		Cinemax – East
		MoreMax – East
		ActionMax – East
		Cinemax – West
		MoreMax – West
		ActionMax - West
24(V)	4180	Data Transmissions

SES Americom Satcom C4

C-Band - 135 degrees West longitude

1(V)	3720	American Movie Classics – East (VC2+) / American Movie Classics – West (digital)
2(H)	3740	Headend in the Sky (HITS) (digital)
3(V)	3760	Nickelodeon – East (VC2+)
4(H)	3780	Univision / Galavision / Telefutura (digital)
5(V)	3800	STARZ! Networks (digital)
		STARZ! Plex – East
		STARZ! Plex – West
		STARZ! Cinema – West
		STARZ! – West
		STARZ! Theater – West
		Black STARZ! – West
		STARZ! Family – West
		Encore – West
		WAM – West
6(H)	3820	History Channel – West (VC2+)
7(V)	3840	Bravo – East (VC2+) / Bravo – West (digital)
8(H)	3860	TV Guide Channel (digital)
9(V)	3880	QVC Network
10(H)	3900	Home Shopping Network (HSN)
11(V)	3920	Speed Channel (VC2+)
12(H)	3940	techtv
13(V)	3960	Travel Channel (VC2+)
14(H)	3980	Discovery Channel HDTV, TV Games Network (digital)
15(V)	4000	Animal Planet (VC2+)
16(H)	4020	Headend in the Sky (HITS) – Canales Ñ Pod (digital)
17(V)	4040	MTV – East (VC2+)
18(H)	4060	In-Demond PPV (digital)
19(V)	4080	C-SPAN 2 (analog) / C-SPAN 3 (digital)
20(H)	4100	Sundance Channel (VC2+)
21(V)	4120	Discovery Channel – East (VC2+)
22(H)	4140	FLIX – East (VC2+)
23(V)	4160	VH-1 – East (VC2+)
24(H)	4180	Country Music Television (VC2+)

SES Americom Americom-7

C-Band - 137 degrees West longitude

1(H)	3720	(none)
2(V)	3740	KMGH-TV ABC – Denver (VC2+)
		7.50 C-band Talk (Dana Pretzer)
3(H)	3760	(none)
4(V)	3780	Data Transmissions
5(H)	3800	KDVR-TV Fox – Denver (VC2+)
		5.58 Colorado Talking Book Network
		7.50 WOKIE Satellite Radio Network
6(V)	3820	KCNC-TV CBS – Denver (VC2+)
7(H)	3840	Fox Movie Channel (VC2+)
		8.00 Cable Radio Network
8(V)	3860	(none)
9(H)	3880	(none)
10(V)	3900	(none)
11(H)	3920	(none)
12(V)	3940	(none)
13(H)	3960	(none)
14(V)	3980	KUSA-TV NBC – Denver (VC2+)
15(H)	4000	(none)
16(V)	4020	(none)
17(H)	4040	(none)
18(V)	4060	Data Transmissions

SES Americom Americom-8

C-Band - 139 degrees West longitude

1(V)	3720	Data Transmissions
2(H)	3740	Data Transmissions
3(V)	3760	Data Transmissions / Analog SCPC Audio Services / Digital SCPC Audio Services
		1404.60 55.40 Northern News Network / Northern Ag Network
		1396.60 63.40 Kansas Info. Network / Kansas AgNet
		1396.05 63.95 Northern Sports Network
		1395.90 64.10 Western Montana Radio Network / Red River Farm Network
		1395.70 64.30 Missourinet / Learfield Communications
		1383.80 76.20 Genesis Communication Network
4(H)	3780	Data Transmissions
5(V)	3800	Data Transmissions
6(H)	3820	Data Transmissions
7(V)	3840	Data Transmissions
8(H)	3860	Data Transmissions
9(V)	3880	Data Transmissions
10(H)	3900	Data Transmissions
11(V)	3920	Data Transmissions
12(H)	3940	Data Transmissions
13(V)	3960	Data Transmissions
14(H)	3980	Data Transmissions
15(V)	4000	Westwood One radio / CNN radio / CBS radio (digital)
16(H)	4020	Data Transmissions
17(V)	4040	Data Transmissions
		Learfield Communications (digital)
		Jones Radio Network (digital)
18(H)	4060	Data Transmissions
19(V)	4080	Data Transmissions
20(H)	4100	Data Transmissions
21(V)	4120	Premiere Radio Networks (digital)
		NSN-ClearChannel Networks (digital)
22(H)	4140	Data Transmissions
23(H)	4160	ABC Radio (digital)
24(V)	4180	Alaskan Rural Communication Service (digital)

SES Americom Americom-6

C-Band - 72 degrees West longitude

1(V)	3720	Data Transmissions
2(H)	3740	(none)
3(V)	3760	Data Transmissions
4(H)	3780	(none)
5(V)	3800	(none)
6(V)	3820	(none)
7(V)	3840	Data Transmissions
8(H)	3860	(none)
9(V)	3880	(none)
10(H)	3900	(none)
11(V)	3920	Data Transmissions
12(H)	3940	(none)
13(V)	3960	(none)
14(H)	3980	(none)
15(V)	4000	(none)
16(H)	4020	(none)
17(V)	4040	(none)
18(H)	4060	(none)
19(V)	4080	(none)
20(H)	4100	(none)
21(V)	4120	(none)
22(H)	4140	(none)
23(V)	4160	Occasional video
24(H)	4180	La Cadena de Milagro

Americom-6 Ku band next month

Panamsat Galaxy 1R (continued — third column top)

19(H)	4080	FoxNet (VC2+)
20(V)	4100	Data Transmissions
21(H)	4120	(none)
22(V)	4140	(none)
23(H)	4160	KMGH-TV WB – Denver (VC2+)
24(V)	4180	(none)

LF Noise (Part I: Identification)

The biggest complaint I hear from LF listeners – both newcomers and veterans alike – is "noise." Unfortunately, many types of interference can play havoc on the lower frequencies, and the noise floor seems to grow as more and more electrical and electronic devices are placed in service. I know at least four DXers who have had to give up or severely limit their operating habits because of noise.

The situation is not hopeless, though, and with a bit of persistence, it should be possible to reduce or eliminate many types of radio interference.

◆ Natural vs. Man-Made Noise

When discussing noise, we should make a distinction between the two major types: Natural (QRN) and Man-made (QRM). Natural noise is perhaps the easiest to identify, yet it is the hardest to remedy. Natural noise typically consists of the "static crashes" so commonly heard during the summer months. Even a lightning storm a few hundred miles away can generate enough interference to tear up the LF band, especially when you're trying for weak signals. A local thunderstorm can completely overwhelm your receiver and is a good time to ground all antennas and pull the power plug!

Your choice of an antenna can have some effect on how severely you are affected by static crashes. The common "longwire" antenna is perhaps the most vulnerable to noise pickup. Typically, these antennas are just random lengths of wire, 50-150 feet in length, and they can act as effective "noise collectors" in static-charged environments. A better choice would be a loop antenna, or an active antenna specifically designed for LF/MF operation.

The smaller aperture of these antennas reduces their susceptibility to noise pick-up, and they will often yield much higher signal-to-noise ratios than wire antennas. Also, in the case of a loop, its directional properties can be used to null static coming from a particular direction, such as a distant lightning storm. This may help lower the noise to a more tolerable level.

Using a DC-grounded antenna can also help lower noise, regardless of the type antenna used. In these designs, the antenna is connected to ground through an RF choke (which prevents the desired radio signals from being grounded), and the desired radio signals are picked off the antenna through a coupling capacitor installed just before the choke.
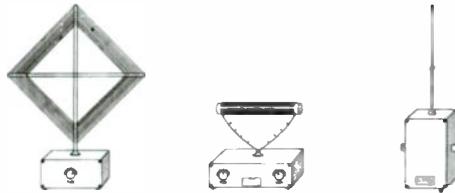
Three types of low-noise receiving antennas. Left to right: Box-frame loop, Ferrite Loop, and Active Antenna.

A far less common form of natural noise is Precipitation Static. I've experienced this type of interference during heavy snowfall, but it can also occur during duststorms, rainfall or hail. It is caused by electrical charges building up on an antenna as it comes in contact with precipitation. Corona Discharge is a related form of static that can occur in highly charged environments, such as under a thunderstorm cloud.

Precipitation static and Corona Discharge produce what can best be described as a "screaming" sound on your receiver. The sound often varies in pitch with the severity of the charge build-up. Fortunately, precipitation static is usually short-lived (10 seconds to a minute in length) but it can re-appear several times before the interference clears up completely. The use of a DC-grounded antenna can help reduce this type of noise.

◆ Man-made Noise (QRM)

Man-made noise can come in many forms. In general, anything that makes a spark or generates RF energy during its operation is a potential source of RF interference. A partial list of offending devices is given below:

Electric fences
Automobile ignitions
Television sets
Computers
Switching power supplies
Power lines & transformers
Fluorescent & neon lights
Touch-control lamps
Motors
Power transformers
Arc welders
Power tools
Poor electrical connections
Light dimmers
Thermostats

The first step in dealing with a noise problem is to locate its source. It is surprising how many times the source of a problem can be found right inside a listener's home. Prior to doing any extensive hunting, try shutting off suspect household devices, especially those in the list above. It may be helpful to carry a portable AM radio with you as a "sniffer" during your search. For the best results, tune the radio to the low end of the AM band.

If you can't locate a specific offender, try shutting off the main breaker at your power box. If the noise goes away on the portable receiver, it confirms that the troublesome device is located in your home. More hunting will be required. On the other hand, if the noise remains, it is time to look for noise sources outside of your home.

Your portable receiver will again come in handy during this search. Power lines and transformers are a common source of trouble, and should be observed for defective insulators that may be arcing. A nighttime search may be helpful in finding such problems. Remember that you may have to look beyond your immediate area to find defective lines. I once found a sparking insulator that was causing significant interference in a one-mile radius.

For all power line problems, call your electric utility to report the situation. They are usually very interested in solving these problems, because a sparking line could result in a pole fire and/or complete shutdown of a line. Be sure to give the complete pole number when calling. This number is usually located near the bottom of the pole, and will help the utility deal with the problem most effectively.

For less obvious power line problems, where no sparking is observed, you should still report the trouble. Most utility companies have RF interference experts on staff that can assist in finding and curing problems that occur along their lines. When calling, explain that the problem is causing "interference to radio communications" and request that an interference expert contact you to further discuss the problem.

It may take a bit of persistence to bring utility action, but it is in their best interest to resolve the problem. The RF noise could be a precursor to a more serious problem with the line, and they do not want to raise concerns with the FCC, which has been known to get involved in cases of persistent power line interference.

◆ Next Month

In October, we'll continue our discussion of interference, with an emphasis on other types of man-made noise. We'll address the subject of dealing with neighbors and discuss simple ways of curing interference on your own household equipment. Until then, 73, and best LW DX.

Fall Clean-up

September is often the month when hams that are oriented to outdoor activities (amateur radio related or otherwise) begin to return to their shacks. I've found myself in this situation many times. If you were to look at my office/shack you would see one desk with a computer and piles of books where I do my various writing projects. One hundred and eighty degrees from this is a second desk that is my primary operating position. In those summer months when most of my operating is done from the car, bike, campground, beach – heck, almost anyplace *but* my primary operating position – that operating desk becomes a sort of catchall for all manner of effluvia. As time goes by, my regular radio place gets buried under stacks of paper, computer parts, bonsai trees, cat fur, small arms and even a few things that to this day remain unidentified. It usually takes me a long weekend to dig down to a place where I can once again put my hand to a key and get a signal out from something other than a portable location.

While most other people on the planet have some sort of spring cleaning regimen, hams tend more toward a time of Autumnal preparation. So, for most of us September is when we dust off the dials and get ready for a great winter of chasing DX.

❖ Antennas and Feedlines

I have said many times in this column and other places: Nobody wants to climb up on their roof or tower during and ice storm to get back on the air. As the weather begins to turn cooler, now is the time to go over every inch of antenna wire, coax, twinlead – whatever you are using as a skywire. You are also going to want to pay very close attention to the condition of any insulators, connectors and waterproofing materials you are using.

In my neck of the woods, even the tiniest crack or crevice is an invitation for various critters from the insect world. The bugs crawl in and build their nests, and the nests almost always exhibit some level of conductivity. Going key down with a multiband antenna trap full of arachnids will most certainly ruin those little critters' day. It will also cause an arc-over that can wreak havoc all the way back to your final amplifier stage.

Never underestimate the power of oxidation, UV radiation or the acidity of rainwater. These things can do quite a job on almost anything you have hanging out there in nature.

I had a dipole made of standard copperweld wire up for a number of years at one location. It always loaded, but when I finally took it down I discovered that large sections of the wire had the cooper plating eroded off. I was essentially loading the steel center core of the wire. Funny thing though, the antenna got out fairly well. Had I paid more attention to the wire's condition I might have worked a lot more countries.

Good quality coax can last up to ten years if its connectors were properly installed from the outset, preventing any possibility of moisture migrating into the dielectric materials.

My "gold standard" is to replace any corroded or damaged items outright. Oxidized parts are more of a judgment call. If a good polishing with a ScotchBrite (tm) pad and a coat of clear Krylon (also tm) can take care of business, that is usually good enough for me.

Remember, too, that your ground system is also part of your antenna system. Check to make sure all of your ground connections are solid and free from corrosion. Don't forget to check and test any surge suppressors in your antenna system according to manufacturers specifications. It is always possible that one of these devices has done its job and bravely given up its life so that your other equipment wasn't damaged. If so, replace it immediately and bury that failed unit with full honors.

❖ Radios

Most people operate on the principal of "If it lights up when I turn it on everything is fine." But is it really? I've yet to run across any electrical device that hasn't managed to gather way too much dust in its innards for its own good. Even a modest transmitter will have voltages present inside that this dust can cause to arc over with the subsequent expensive repairs. Even if you do not feel technically competent to lift the lid on your rig and poke around, a good vacuuming around the vents will do a bit of good.

Look Closely ... You don't often see Uncle Skip's Operating Position looking so neat.

If you do go inside, remember that receivers and transmitters can exhibit dangerous voltages even when unplugged. If you are not sure of yourself in terms of safety take your equipment to a trained professional for any servicing or cleaning.

For me, fall is when I bring all my regular use rigs down to the bench and give them a tuning and tweaking session. If you know your way around a meter and scope, the radio's shop manual should give you all the information you need to bring things up to specs for the coming season. This is also the time when I might finally get around to adding some little modification or other that I read about during the past year. If I am really enjoying myself I might not get out of the basement until Thanksgiving!

❖ Accessories

It's been my experience that outboard accessories fail far more frequently than the radios they are attached to. This can be for any number of reasons, but part of your seasonal shack preparation should include checking all those ancillary devices over. It is also a good time to reread the manuals. You might rediscover a feature or two that will improve your operating throughout the winter.

❖ Power Connections

While it may seem like a commonsense sort of thing, when was the last time you checked the power cords on your equipment for damage or fraying? Modern line cords are fairly sturdy items, but when they accidently get caught under the sharp edge of a file cabinet that gets banged open and shut twenty times a day there could be problems.

I must confess it has been a long time since I have seen a failed AC power cord on anything that was not in my antique radio collection. However, I routinely seem to find broken or frayed wires related to the power cords on low voltage devices run by "wall wart" transformers. I guess these things are just subject to a higher level of abuse during normal use. While you're poking around your other power connections give these a good going over as well.

❖ Other Connections

Most shacks have more than a few antenna, audio, computer or other patch cords hooked up in various ways. It seems that the majority of "show stopping" events around the shack can be traced to problems with these cables and connectors.

I once had a hard time tracking an odd intermittent problem with one of my transceivers. The audio would sound low and then, after I keyed the rig for the first time, the audio would come up to normal levels. I eventually traced the problem to a poor soldering job on the center conductor of a coax patch cord that ran between the rig and an antenna tuning unit. Nothing special would happen when tuning up with low power into the dummy load. But when full power was applied, it would break through the corrosion on the connector just enough to establish a good path. While you're doing your fall preparation it's a good time to examine and test any such shack cabling.

❖ Alternative Power

Ever since we arrived at "The New Normal" after September 11, 2001, folks have talked a lot about making sure at least some of their gear was set up to operate under emergency conditions. I have said in this column in the past that I have a solar panel and battery setup that can keep me on the air at low power for several days to a week depending on demand.

Fall is the time of year I recheck this alternative power system and others. I make sure my solar panel is performing to specifications and its mounting is properly aligned to take best advantage of the sun at my latitude. I run the batteries through a power cycle to check their quality and recharging rate.

While that process is going on, I check the quality and charge rate on the rechargeable power packs associated with most of my handheld gear.

I also go over my emergency "jump kit" to make sure that I have alternate power connectors to run my nominal 12 volt gear off of other power sources such as car batteries. Finally I empty out my drawer of "back up" alkaline cells (I give them to number two son for his video games) and restock my supply with fresh cells.

❖ Supplies

How many radio sessions have been spoiled for want of a pencil with a sharp point on it? Part of your preparation for hunting all that DX over the next couple of months is making sure your shack is appointed with all the paper, pens, pencils, log books, 3x5 cards, or whatever else you use to keep things recorded for future reference. This time of year I also head to the local office supply outlet and pick up a big box of "security" envelopes so I don't run out when it comes time to fill out my QSL cards.

❖ Space

Lots of folks haven't changed their shack situation since the sixties. I take a more radical approach. At least once a year, usually in the fall, I disconnect *everything* and bring my operating position down to the bare desk top. This accomplishes a number of things. First off, it facilitates all the above-mentioned checking and testing. Secondly (and invariably) I find one or two small items I have been looking for for months. I usually lose at least one callsign badge down behind my radios every year. I've developed quite a collection at this point.

Also, while the station is fully dismounted

I can reevaluate how I want things configured. I usually set things up with my primary general coverage receiver and amateur transmitter at the center position with their various accessories to either side. I then work out what passes for a logical pattern with the rest of my gear, usually ending with the power supplies to the far right where the main power comes in and the antenna tuners to the far left (in this case closest to where my antennas come into the shack). Sometimes even a little adjustment in how things are set up can make you feel like you have a whole new station to play with.

Also, while you have your station broken down, it is a good time to do any carpentry or furniture modifications. It's a bit messy to add bookshelves over top of a stack of radios. That gets back to the whole idea of dust and such getting into places where it can do damage.

❖ Goals

And while I am bringing everything at the operating position in my shack up to snuff, I am giving some thought to what I plan to do with my gear this coming winter. My main goals for this year are to finish up the last handful of countries for my QRP DXCC award. I also want to start in earnest on QRPp WAS using 1 watt SSB. (It's a bit more challenging that way than with CW.)

I have quite a few gaps in my 5 Band WAS log and I plan to use the state QSO parties to help me to close the gap on this award. Also each year a shoot for adding between 5 and 10 Honor Roll entities to my log.

But the main thing I want to be set up for is all those nightly ragchews on the lower end of 40 meters. That's the most fun of all.

UNCLE SKIP'S CONTEST CORNER

YLRL Howdy Days
1400 UTC, Sept 10 to 0200 UTC, Sept 12

ARRL September VHF QSO Party
1800 UTC, Sept 13 to 0300 UTC, Sept 15

North American Sprint, SSB
0000 UTC to 0400 UTC, Sept 14

FISTS Coast to Coast Contest
0000 UTC to 2400 UTC, Sept 14

Tennessee QSO Party
1800 UTC, Sept 14 to 0100 UTC, Sept 15

Panama Anniversary Contest
1200 UTC to 2359 UTC, Sept 21

Fall QRP Homebrewer Sprint
0000 UTC to 0400UTC, Sept 22

Texas QSO Party
1400 UTC, Sept 28 to 0200 UTC, Sept 29
and 1400 UTC 2000 UTC, Sept 29

Alabama QSO Party
1800 UTC to 2400 UTC, Sep 27

Louisiana QSO Party
1400 UTC, Sept 27 to 0200 UTC, Sept 28
and 1400 UTC 2000 UTC, Set 28

CQ/RJ Worldwide DX Contest (RTTY)
0000 UTC to 2400 UTC, Sep 28

Sunshine Radio- Accent makes this two-syllable ID difficult to decipher; rock music (None)

Undercover Radio- Dr. Benway's rock music; colorful QSLs (Merlin and undercoverradio@mail.com e-mail)

United Patriot Militia Bingo- Parody pirate for Steve Anderson's **KSMR** (Merlin)

Voice of Captain Ron Shortwave- Captain Ron added a contest to name his girlfriend; standard rock music. (captainron6955@hotmail.com e-mail)

Voodoo Radio- Sometimes uses **VUDU** call sign; rock music; QSLs (Elkhorn and uses vudu11@hotmail.com e-mail)

WHYP- The James Brownyard memorial station; pirate DX commentary, rock music, and occasional different IDs, such as **WA&P** and perhaps even **WHYZ**. (Providence, and also uses whyp6925@yahoo.com e-mail)

WMFQ- Typical pirate rock radio format; profane IDs wonder where their QSLs are. (Providence)

WMPR- "Micropower Radio" techno rock music; do not correspond (None)

❖ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or $2 US to foreign locations. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14711; PO Box 28413, Providence, RI 02908; and PO Box 293, Merlin, Ontario N0P 1W0.

Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. The best bulletins for sending pirate loggings remain *The ACE* ($2 US for sample copies via the Belfast address above) and the e-mailed *Free Radio Weekly* newsletter, still free to contributors via niel@ican.net. The Free Radio Network web site, another outstanding source of content about pirate radio, is found at **http://www.frn.net** on the internet.

❖ Thanks

Your loggings and news about unlicensed broadcasting stations are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors: Dave Balint, Wooster, OH; Scott R Barbour Jr., Intervale, NH; Artie Bigley, Columbus, OH; Cachito, Santiago, Chile; John Calabro; Ross Comeau, Andover, MA; Rich D'Angelo, Wyomissing, PA; Gerry Dexter, Lake Geneva, WI; Brian Duddy, Nyack, NY; Harold Frodge, Midland, MI; William Hassig, Mount Prospect, IL; Harry Helms, Las Vegas. NV; Chris Lobdell, Stoneham, MA; Greg Majewski, Oakdale, CT; Pigmeat Martin, Belfast, NY; Bill McClintock, Wellington, OH; Mark Morgan, Cincinnati OH; Lee Reynolds, Lempster, NH; Mike Roth, Bantam, CT; Martin Schoech, Merseburg, Germany; John Sedlacek, Omaha, NE; Ronnie Stroup, Wooster, OH; Paul Terlecki, Plainfield NJ; Niel Wolfish, Toronto, Ontario; and Joe Wood, Gray, TN.

What is a "DX Antenna?"

In radio operator lingo the term "DX" means "distance," or "distant stations." "DXing" is the receiving of radio signals from, or transmitting them to distant places on earth. And DXing is for many of us a part of the mystique which attracts us to radio operation. Doing really well at DXing can be so demanding that DXing is sometimes referred to as an "art." On the other hand there's a lot of technology involved in DXing as well as art. Nevertheless, even an inexperienced beginner can often receive many distant stations with ordinary equipment. And with just a little attention to detail they can even improve that DXing success considerably.

One factor in successful DXing is using an appropriate antenna. However, so that we don't give the wrong idea here, let's admit that almost any antenna can give us some good DX signals at times. And when conditions are right, even with an inexpensive receiver, a short antenna can often do surprisingly well at receiving DX signals.

The flip side of this is that, when propagation conditions are not so good for DX, and when atmospheric noise and interfering signals are strong, some antennas are better than others at helping dig out those signals from far away places with strange-sounding names.

◆ Antenna Factors in DXing

Vertical-Angle Performance:

One favorite DX antenna below 30 MHz is the grounded vertical, a design known for its ample radiation and reception at low vertical angles (i.e., signals launched relatively close to the earth). The lower its vertical angle of radiation or reception, the better this antenna's DX performance on HF

and into the MF band. Progressively increasing the antenna's element length from 1/4 to 1/2 to 5/8 wavelengths gives increasingly lower-angle performance, further enhancing its DX performance.

Other vertically-oriented antennas also generally give good DX performance. These include vertically-polarized full-wavelength loops and vertical dipoles. Ground plane designs are good, too, and progressively increasing DX performance is obtained from the 1/4, 1/2, 5/8 wavelength, and collinear designs.

Horizontal Angle Directivity, and Focusing of RF Energy:

Antennas which focus their radiation or reception over a relatively narrow path in a particular compass direction are called "beam antennas." This focusing gives "directivity" to the signals. A beam legendary among AM broadcast DXers is the low-gain, highly-directive "Beverage," or "wave" antenna. However, the Beverage is hundreds or even thousands of feet long, and so not too many people put one up.

More practical for the AM DXers are the small table-top loops. Sharp nulls (directions of minimal response) in their reception patterns offer a useful "negative directivity" for rejecting interference from stations on the same frequency as the desired station but arriving from a different direction.

Most other beam antennas have medium to high gain levels. Curtain beams, phased-arrays and long-wire beam designs generally take up too much space for most hobby-radio installations. But at HF and higher frequencies, designs like the Yagi-

Uda, the quads, and the log periodic directional antennas (LPDAs) can be built small enough to be electrically rotated atop a mast or tower. This allows the operator to change the direction of DXing at will. Many hams are fond of DXing with such beams.

For DXing on shorter wavelengths like the FM and TV broadcast bands, fairly high-gain beams, such as a Yagi-Uda with three or more elements, are small and practical. DXing success on these bands is highly dependent on special propagation conditions which occur relatively infrequently and are hard to predict. Although it is best to do your DXing at times of optimum propagation for any band, finding propagation openings on these bands is probably more important than having an elegant antenna.

Height Above Earth:

Depending on their height above earth, antennas mounted horizontally over earth radiate and receive varying proportions of their RF power at low vertical angles. Horizontal antennas mounted at 1/4 wavelength above earth lead to relatively more high-angle radiation which is useful for close-in communication. However, the same antenna mounted at 1/2 wavelength above earth gives relatively more of the low-angle radiation desirable for DX at HF and MF frequencies.

Some DXers suggest that 40 feet in height is a minimum for horizontal, multiband, HF DX antennas. Antennas mounted up a hundred feet or more are sometimes reported capable of receiving DX signals which are just are not present at lower heights – signals which would otherwise go by overhead undetected.

Diversity-Reception:

One problem in listening to HF DX stations is signal fading. Various kinds of "diversity reception" have been designed to combat fading. One kind of "space-diversity" reception system uses multiple antennas with a separate receiver for each antenna. When a signal is faded from one antenna it may be stronger at another antenna. Comparator circuits (voters) constantly monitor the outputs from the different receivers, and select the strongest signal or the signal with the best signal-to-noise ratio (fig. 1) for routing to an audio amplifier, or other output device.

HF skip signals often change polarity as the ionosphere changes, and this can cause fading. For "polarization diversity," antennas with different polarizations replace the spatially-separated antennas of space diversity.
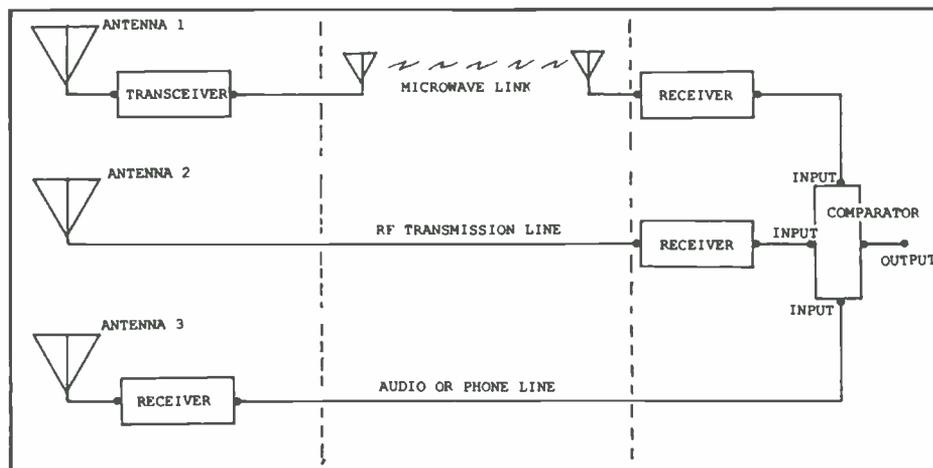
Fig. 1 - Block diagram of a diversity receiving system showing three different ways of routing received signals from the diversity antennas to the comparator.

www.dxing.com, http://www.dxing.info/, http://www.cybercomm.net/~slapshot/speedx.html. For a free program which predicts propagation conditions try:
http://www.elbert.its.bldrdoc.gov/hf.html

◆ DX Transmitting

Some broadcasting stations also engage in DX transmitting to reach a far-away audience. On the AM broadcast band some stations remain on at night when ionospheric skip can transport their medium-wavelength signals great distances. Other stations on the same frequency, whose signals might interfere with the DX transmitter's signals at night, are licensed only for daytime operation. Thus at night the DX stations have a clear channel to facilitate their DX transmitting. A third factor that gives these DX stations an edge is the high level of RF power at which they launch. And, of course, some of them are using beam antennas to direct their programs to their intended audience.

Shortwave broadcasters typically have beams to assist their signals in reaching distant lands. Often different antennas are used at different times of day as propagation changes. Of course, since frequency of transmission is often changed to accommodate changing propagation conditions, this often means changing antennas as well. The various large curtain beams, such as the Sturba Curtain, were once the broadcast favorites; however, a variety of beam designs are now utilized. In fact, the cubical quad beam was designed in response to a particular problem in the shortwave broadcast service (corona arcing, destroying an antenna with linear elements).

DX transmitting is practiced even into the lowest frequencies utilized for radio communications. At one such station tremendous levels of RF power are launched by an antenna strung between mountain tops! Real DX is involved here: broadcasting to submerged submarines anywhere in the world! The receiving antenna the sub uses is not a really elegant affair, but signal-to-noise ratio is much more important on those low frequencies than is absolute signal strength.

There are frequency diversity systems which require special circuits at the transmitter as well as at the receiver. For this kind of frequency-diversity transmission, identical multiple signals are simultaneously transmitted on different frequencies. Generally, the different frequencies each require a different antenna. At the receiver the frequency producing the best signal is automatically selected as in the diversity systems discussed above.

❖ In Sum

Obviously there are many different antenna designs which can be of use for DXing. The particular design chosen will depend on the requirements of the specific situation.

RADIO RIDDLES

Last Month:

I said: "Ordinarily, strength of signals which we receive are at the microvolt (a millionth of a volt) or millivolt (a thousandth of a volt) level. On the other hand there are situations which sometimes occur in which there are no signals on the band to be received, and yet there may be an input of many volts from the antenna to the receiver. What situations can cause this?"

Well, obviously a direct lightning strike can do this with disastrous results. But even lightning which occurs at a distance from your antenna can induce significant and damaging voltages and currents in your system. And tiny charged particles such as snow or dust blowing against the antenna can charge an antenna to a high voltage level. This is called a "precipitation static" charge. I've heard that the dust storms of the deserts of the Middle East play havoc with radios and radio communications due to the precipitation charges they put on antennas.

These various charges on your antenna can be detected by the flashes of a neon bulb or the "snapping" sounds of a closely-spaced spark gap when one of these devices is connected in series with your outdoor antenna and your ground connection. But install the bulb or gap before the storm starts, not while it is in progress!

This Month:

Because VHF and UHF signals don't usually reflect well from the ionosphere, there is relatively little ionospheric skip communication on these bands. And they don't bend down over the horizon much, so they are known as "line of sight" bands. But DX communication far beyond the horizon is possible on these bands. How is it accomplished?

You'll find 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.

RADIO RESTORATIONS

The Hallicrafters S-40A:
Tuning Drive Reassembly

I'm beginning to think of this Hallicrafters S-40A restoration as a jinxed project! Readers of last month's column will recall my troubles with the accidentally erased dial markings and wiped-off panel paint. After the panel disaster, I was tempted to terminate the project, apologize to the readers, and go on to something else. But realizing that you could learn as much or more from my mistakes as from my successes, I patched the panel and went on.

◆ Reinstalling the Tuning Cap

The next steps would be to clean and reinstall the tuning capacitor and restring the main tuning and bandspread dial controls. Most of the dust and gunk on and in the tuning capacitor went away after sloshing the unit vigorously in a small container of gasoline. Obviously, this treatment had to be done in the open air to avoid the buildup of explosive fumes. A quick handwashing followed the procedure; gas can be really irritating to the skin.

The capacitor soon dried off and was ready for reinstallation. Before fastening the unit in place, I reconnected the three leads running to solder lugs (from the three stators) under the capacitor. For this work, it was handy to be able to tilt the capacitor somewhat to get better access to the lugs. After the capacitor was fastened down, I soldered the remaining several leads – which were all grounds fastened to various spots on the capacitor frame.

The mounting for this main tuning/bandspread capacitor is designed so that the unit "floats" on three rubber grommets. A small rod protruding from the rear of the capacitor slides into a grommet-lined hole in a rear mounting bracket. This grommet had dried out and become brittle, so I replaced it. A front mounting bracket, to which the front of the capacitor is fastened, is cushioned from the chassis by two more rubber grommets. These were ok and I left them alone.

Now, after replacing the bracket holding the shafts for the drive controls, I was ready to restring the controls. And here is where the S-40 jinx kicked in again. It was caused by a couple of the many small mechanical design changes that seem to crop up on various models of S-40 series – variations that really seem to have little to do with those implemented for the actual model change.

◆ Dial Cord Dilemma

One of the changes was in the rotation of the bandspread section of the tuning/bandspread capacitor. In the two other examples of the S-40 series in my possession, rotating the bandspread tuning shaft counterclockwise (as one faces the front panel) closes the plates, thereby increasing capacity in the bandspread tuned circuit. But in my S-40A, *clockwise* rotation increases the capacity. To code properly with the operating instructions, it is necessary for the bandspread dial scale to progress from zero to 100 as the capacity of the bandspread capacitor increases. If the dial cord stringing diagram in the manual I have is followed correctly, that's what will happen (in the case of those other examples).

Take a look at that diagram as reproduced here. The main tuning drum (at left) of the capacitor operates from the left-hand tuning shaft – and is driven directly from the shaft. The right-hand tuning shaft operates not only the bandspread tuning drum (just to right of main tuning drum), but also makes a loop around another pulley that moves the bandspread dial drive shaft. (The main tuning dial does not require an extra pulley because it is fastened directly to a shaft extending from the main tuning drum.)

The main tuning dial drive was no problem, but I noticed in dismantling these assemblies for cleaning (see "before and after" pictures) that my bandspread dial cord was not set up like that in the diagram, but crossed and changed direction before looping around the bandspread tuning drum. I realized, of course, that this was because of the previously-noted reversed rotation direction of the bandspread capacitor.

That in itself might not have been too hard to follow – even using the diagram for the other system – but there was another dif-
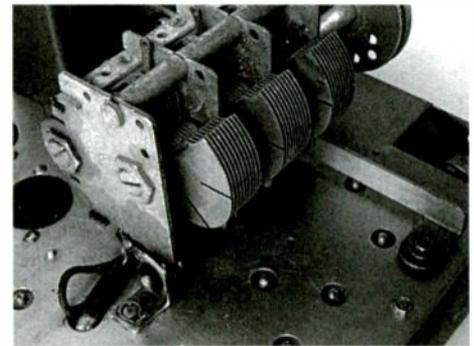
Tuning capacitor assembly "floats" on rubber grommets. Rod at rear of capacitor (lower left) slides through grommet on angle bracket. At right is a portion of the front capacitor mounting bracket showing one of the grommets on which it rests.

ference. Note on the diagram that the bandspread dial drum has a little lug designed so that the dial cord can be tied off on it (see location "D") partway through the stringing procedure. My drum had no such lug – just an eyelet through which the cord could pass. In disassembling the old setup, I noticed that a loop of cord had been passed from the outside in through this eyelet and been tied off around a small washer. That left two free ends – each of which had to be strung separately in opposite directions – instead of the single strand progressing from "A" to "H," as shown in the diagram.

I found it quite tough to adapt the old dial cord stringing instructions to work with this different drive system. I don't even want to think about how much dial cord I wasted trying to make it work out. Rule of thumb: no matter how long you cut your length of dial cord, it will always be just a tad too short to tie the final knot in the right place. It took me much of one afternoon and some of the next morning to arrive at an operating bandspread drive (I'm sure I shouldn't admit this!), but I did eventually prevail.

The bandspread dial shaft and capacitor plates now move smoothly in the proper directions as the control shaft is turned. And by the way, since the bandspread tuning drum was set up to accommodate it, I added an extra dial spring so each of the cord segments coming off the bandspread dial drum
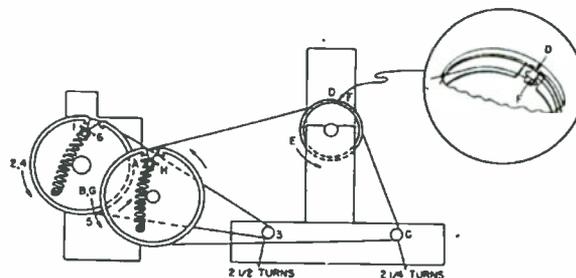
Service manual dial cord stringing guide was for the opposite bandspread capacitor rotation (see text), and so wasn't a lot of help.
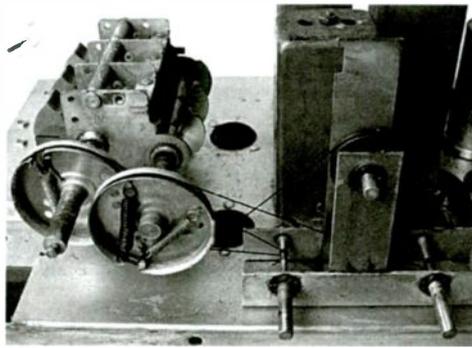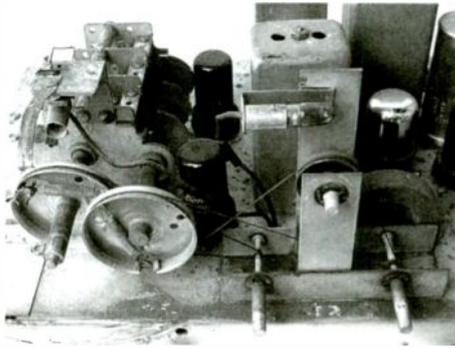
Main tuning and bandspread drive system prior to restoration (left) and after chassis painting, capacitor cleaning and drive restringing. Note extra spring added to bandspread dial drum (see text).

could be separately tensioned. I also added an extra turn or two (beyond the 2-1/4 turns specified) to the loops around the control shaft. Those expedients really improved traction and made the drive more positive.

Next time, we'll reassemble the panel to the chassis, begin to work on changing the capacitors, and look into restoring the wiring to its original state (reversing any user mods). If the work session goes really well, maybe we can even give this set a preliminary "smoke test."

❖ How Much is Too Much?

A reader named Steve (ham call N0CRS) just e-mailed me a query about how far one should go in carrying out a radio restoration. He had read about a case where a person had removed all of the wiring from a radio so that he could refinish the metal chassis. The short answer, of course, is "Whatever floats your boat!" Do as much restoration as your interests, capabilities, and inclinations dictate. This, after all, is a hobby for most of us and not a business. Of course I'd hate it if you did something so expedient that it ruined the character of a fine old set – such as removing the guts and substituting a Japanese transistor radio.

Oddly enough I've heard of an extreme case, similar to Steve's, actually involving an S-40. A reader of my old column in *Popular Electronics* once wrote to tell me of the lengths he went to restore his set to mint condition. It happened to be a model that meant a lot to him personally. Not only was the chassis rusted, but also the front panel paint was in wretched condition.

This restorer began by drilling out all the rivets fastening the tube sockets to the chassis. He also disconnected the i.f. and power transformers and other parts, as needed, so that he could remove all of the wiring, more or less intact. He photographed the front panel as a first step in making a silk screen that would be used to restore all of the control markings after the cabinet and panel were repainted.

The chassis went to an electroplating shop for re-anodizing and the panel and cabinet to an auto body shop for repainting in a color matched to the original. The wiring was replaced with new capacitors carefully installed inside the housings of the old ones

and the new control markings were silk screened onto the panel (in the original two colors).

I might possibly go to lengths like that for a radio of great sentimental value, but so far I have to admit that I've never been even close to being tempted. My own interests and abilities lie more towards electronic troubleshooting and repair than towards cosmetic restoration. Of course I do enjoy it when a dingy relic comes to life, appearance wise, through my own ministrations. But I do tend to stay away from radios cosmetically too far gone for me to be able to make a difference.

As a regular attender of the Antique Wireless Association Rochester (NY) conference (held every year towards the end of August), I've had the opportunity to view some incredibly astounding restorations. We have members who can take a few scraps of surviving cabinet and a badly cannibalized chassis and turn them into a radio that looks fresh from the factory. They have the skills, the time to scrounge parts and the interest to do this, and they take pleasure in doing it. More power to them!

❖ New "Impoverished Radio Experimenter"

Lindsay publications has released Volume Four of the *Impoverished Radio Experimenter* series. Lindsay is the premier reprinter of old-time technical books, including many volumes on radio – but this series is one he authors himself as, obviously, a labor of love.

The point of the "Impoverished" series is to show how a person can recreate and enjoy many of the classical old radio circuits using parts (often modern ones) easily found at radio swap meets. Much of this particular volume is devoted to detailed instructions for building a four-tube TRF/regenerative receiver that the author says will outperform the classic and revered National SW-3 of the 30s and 40s.

Since his receiver uses one of the famous National "PW" drives, Lindsay spends a little time describing the construction, operation and restoration of these units – things a lot of us appreciate the opportunity to learn more about. Other projects in the book include a crystal-controlled shortwave converter, an

experimenter's power supply (complete with instructions on how to recognize and scrounge likely components in flea markets), and a vernier slide-rule dial.

The 48-page, 5-1/2" X 8-1/2", soft-cover volume is written in Lindsay's usual entertaining, irreverent style and is profusely illustrated with very clear photographs. Cat. # 22920. Price $6.95 plus $1.50 s&h. Use secure on-line order form available at http://www.lindsaybks.com or call in your order at 815-935-5353 (have your charge card ready).

❖ Your Input Requested!

Since I have a little extra room this month, I'd like to ask interested readers to contact me with their input about this column. Those who have been following *Radio Restorations* for a while know that we started with simple restoration concepts and advice about acquiring and rehabbing test instruments for your repair bench. The restoration projects have been progressing to more complicated undertakings and we've been spending more time on vintage communication receiver "boat anchors."

Do you like what we've been doing so far? Any suggestions for other directions we might take? The best way to contact me is by e-mail at the address listed with this column, and I do try to answer all e-mails. I can also be reached by snail mail c/o Monitoring Times, 7540 Highway 64 West, Brasstown, NC 28902-0098.

The Tactics of Highly Successful Scannists

You can improve your skill in scanning for new signals by studying and adopting the tactics of highly successful scannists. I interviewed a few of the most skilled members of CARMA (Chicago Area Radio Monitoring Association) and combined their recommendations with my own observations. Thanks to Frank Lorenz (not his real name), Rich Carlson, Ron Smithberg, and Kevin O'Rourke for their insights.

❖ Hunt Actively for New Signals

Without exception, all the top scannists proactively search for new activity. Their scanners' keypads don't have a chance to collect dust. They aren't content with scanning the same old channels all the time.

As Frank says, "If you monitor only known local channels most of the time, you're not going to find anything new unless you dedicate another radio to searching for new frequencies."

When the experts travel away from familiar territory, they bring a scanner or two. Frank and Ron take handheld scanners with them everywhere. Frank points out, "You don't have to turn it on, but have it available if something is happening and you are able to listen."

A casual hobbyist confines his listening to the police and fire frequencies listed in *Police Call*, but the successful scannists are constantly sampling business, military air, and federal land mobile frequencies for undocumented activity regardless of their location.

❖ Know the Frequency Allocations

Another common trait shared by the experts is that they study the FCC and NTIS frequency allocations, as documented in *Police Call*, the **http://monitoringtimes.com** reference library, and other sources. They can, for instance, recognize that when a newcomer reports activity on 165.285 MHz, the true frequency is more likely 165.2875 MHz, the closest channel allocated for federal use and it's occupied by the BATF.

They know the frequency bands and where users are most likely to operate, based on the type of user and the relevent regulations.

❖ Keep Records

As Rich Carlson points out, detailed record keeping is essential, and all the top scannists maintain accurate records on paper, index cards, or in computer files.
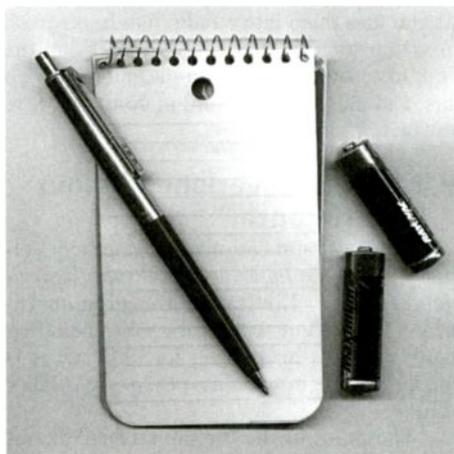
Learn from the records of other monitors. Novice scannists report incorrect frequency information sometimes because they are listening to an image instead of the actual carrier frequency, so you need to evaluate their information critically.

Search government records, but be aware of their errors, omissions, and other limitations.

Kevin O'Rourke concurs that "keeping good, logically-filed records is very important" and reminds us that "the FCC database is easily available on the Internet, but not all radio users have a valid or current license for the freqs that they're using."

Brandt, former *RCMA Journal* Business column editor and a top CARMA scannist, passed away last year. Before personal computers became affordable, Brandt kept meticulous, typewritten loggings in a set of giant looseleaf notebooks which he constantly updated.

Along with each entry, Brandt noted how he came by the information, confirmed it by listening, observed the FCC license, examined the transmitter, etc.

❖ Unattended Scanning

Successful scannists let their equipment work while they are busy doing something else.

Frank recommends you "use a radio or computer control to search while you can't (e.g., when at work), and then plug those hits into a scanner to listen when you can. Many hits are spurious, but a percentage will turn out to be someone."

One CARMA member hunts for hotel frequencies by parking his car at a hotel and leaving a mobile scanner running unattended in the Auto Store mode. While he is away from the car, the scanner searches between programmed frequency limits, storing active frequencies into a dedicated memory bank. He returns to the car a few hours later and writes down the frequencies stored during the search.

A voice actuated (VOX) recorder is useful for sleuthing. You can use computer software or a simple VOX cassette tape recorder. I use two modified Radio Shack CTR-75 tape recorders, an old, discontinued model.

VOX recorders allow one to compress a whole day's worth of monitoring onto a single tape. I often leave a recorder "armed" and connected to a scanner at home while I am away or doing something else. When call letters are mumbled, I can play and replay the tape until I hear and understand them.

❖ Limit Search, Memory Scan, Auto Store

Frank says his scanning setup is pretty basic at home. His main base radios are couple of Radio Shack PRO-2042s and an ICOM IC-7100A, all in search mode.

Frank recommends that you search through the bands at your normal listening post at least a couple of times a year. "Use the Search button as often as [practical] ... You'll be surprised at what you find." Frank

says that if you search often and find little, you can take comfort in knowing that you have been thorough and that the possibility of users "hiding" in the bands you've been checking is unlikely.

Frank reminds us that there is very little open spectrum any more. If you are located in a larger metropolitan area and there are government designated frequencies that appear to be unused, Frank recommends storing them in a separate bank and monitoring them every so often. Sooner or later, someone is bound to transmit on those frequencies.

Rich Carlson hunts for new activity by using memory channels instead of limit searches. "For scanners with large numbers of memory channels, I like to fill them with an entire band's worth of channels. This allows for finding new channels without searching, especially for disjointed sections of bands. For example, the VHF high band Public Safety channels take about 250 channels."

Rich programmed his handheld PRO-95 with all 96 AAR Railroad freqs in one bank, each in the correct channel number, and all the Marine Channels in another bank.

He likes to lock out busy and known channels and scan lesser used and unknown channels. This allows him to find new assignments, discrete channels and auxiliary channels.

Many users have started to employ lower power "itinerant" channels or FRS radios, according to Frank. Frank and I keep FRS and low power business and industrial frequencies in dedicated banks so we can scan or skip over them at will.

◆ Scanning Special Events

Frank keeps over 20 radios in boxes and suitcases, prepared for travel to various special events (e.g., air shows). All are preprogrammed with relevent frequencies.

Frank says, "I always try to arrive on the [day before] the actual air show, when a lot of channels are getting [tested] while preparing for the event." He takes about 8 scanners to motels near air shows, turns them on, waits for one of the channels to talk, then programs only the active channels into a handheld for use at the air show the following day.

Lately, Frank has been transitioning to PC programmable radios, but he hasn't been able to find time yet to wean his way out of the radios that have "only" 400 channels each! "As long as they work, don't create too much RF interference to other radios, and I don't [injure] my back carrying them," Frank will probably continue bringing several older scanners.

When using slow scanners, Frank says memory channel scanning is better than long time-elapse searches. His home station PRO-2042s and IC-7100 aren't very fast, and he gets too many false hits between 137 - 144 MHz. He doesn't use them to scan the entire 225 - 400 MHz UHF aircraft band, due to the large spread.

The main drawback to scanning memories instead of performing limit searches is

that one can miss signals on non-standard frequencies you haven't programmed.

◆ Identify by PL/CTCSS/DPL/DCS

Top scannists use equipment which can identify the CTCSS (PL) and DCS (DPL) subaudible codes transmitted along with the signals they monitor.
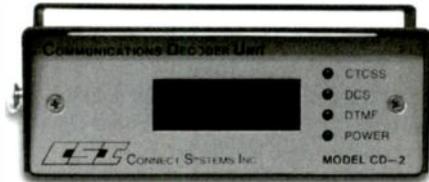
Ron Smithberg, a scanner enthusiast for over 20 years, says now that there are so many users on the same channel, the PLs are becoming as important as the frequency.

Rich Carlson agrees, "I use the PL feature on my BC780 and other scanners as well as a PL decoder to identify stations based on PL. Meticulous logging of PLs is essential to this method of identification. This really becomes important when [propagation] conditions are up, to help identify distant stations."

◆ Ask for Information

You might not have known it from Brandt's gruff exterior, but he was a trend setter.

He concentrated on monitoring business radio users at a time when most scannists were clueless about business frequencies. In his job as a taxi cab driver, Brandt came into contact with radio-equipped security guards, hotel staff, and parking attendants all over Cook County, Illinois, and surrounding suburbs.

Brandt had more nerve than most folks. If he couldn't find a business frequency by scanning, he would ask a radio-equipped employee, often a security guard, for frequency information. If the employee didn't know, Brandt would boldly ask to examine his transceiver. You would be amazed at how often Brandt got his way. He was able to examine the manufacturer's label on the transceiver to learn the frequency and PL/DPL code.

◆ Carry Spare Batteries, a Pen and Paper

Successful scannists carry spare batteries, a pen, and paper whenever they bring a portable scanner in the field. As Kevin O'Rourke warns, "nothing brings the fun to a grinding halt like dead batteries."

◆ Other Expert Tactics

Many of the top scannists I spoke with use Optoelectronics Scouts and other frequency counters both in their cars and on foot. They are acutely aware of a counter's limitations. Unless you add external bandpass or notch filters, frequency counters are disturbed by high power broadcast and paging

signals. They are not sensitive enough to reliably capture wireless microphone frequencies.

Frank, Ron, and I have learned to recognize the voices of regular dispatchers and system users. We know the unique sounds of their transmissions (e.g., "turkey caller" automatic number identification signals, the pitch of the Morse code identifier, etc.). Low tech "fingerprinting" enables us to identify the signals without having to look at the scanner display while driving and is especially helpful when monitoring several scanners simultaneously.

◆ Interdependence, Responsibility

Successful scannists participate in club activities. They are prolific producers of personally verified frequency and talk group lists and share their knowledge with others. They counsel beginners.

While top scannists are enthusiastic about their activity, they realize that radio monitoring is a hobby. They pursue scanning in harmony with their family and secondary to their family and community obligations.

COMPUTERS & RADIO

RADIO-RELATED SOFTWARE & HARDWARE SOLUTIONS

John Catalano, PhD
johncatalano@monitoringtimes.com

PROBEing the Spectrum with PCR1000

The ICOM PCR1000 computer-controlled "black brick" is a favorite with monitors looking for ultrawide frequency range capabilities (10 kHz to 1300 MHz) at a relatively low cost. It is also popular with software authors with over ten different third-party programs to control it.

Why third party software? When ICOM first released the PCR1000 the software that was included with the unit was basic, at best. It was as if ICOM gave birth to the first PC radio hardware but expected the world to "feed" it software in order to utilize all of its features.

The major radio software companies such as ScanStar and ScanCat happily accepted the challenge. They immediately accommodated the PCR1000 command codes into their existing multiple radio control software packages. Then other great programs such as Visual Radio, Bonita's RadioCom, and the easy-to-use RadioMax also began supporting the PCR1000.

As the number of commercial programs supporting the PCR1000 grew, a new contender rose to the challenge, TalkPCR. Pete Mahy offered his excellent PCR1000 program for *free*! Finally, *all* PCR 1000 users could ditch their original ICOM software for a step up in performance.

Recently, ICOM announced that RadioCom 4.0 software would be shipped with the PCR 1000 as standard operating software. This is quite a jump in performance and features from the original ICOM software. RadioCom not only includes radio control functions, but also decoding of digital shortwave modes such as RTTY, SITOR, FAX and SSTV. (Hey ICOM! How about giving early buyers of the PCR 1000 a break and making RadioCom available to them, too?!)

Of all the software that can control the PCR1000, only TalkPCR was written specifically for the PCR1000 … until now. Modeled after the popular PROBE program for Optoscan and Optocom hardware, DataFile has produced a program for PCR1000 users who use their PCR1000 as a VHF/UHF scanner.

Named Probe1K version 7.0 to indicate that it was written specifically for the PCR1000 (1K = 1000), it has the feel and look of dedicated scanner software. Of course, you can use Probe1K for shortwave monitoring as well.

◆ Computer Requirements

Since Probe1K runs under DOS 3.1 or higher, its computer requirements are *very* modest. All it requires is a PC running or emulating PC-DOS 3.1 or higher, 640K of RAM, a free serial port, 3.5 floppy drive and about 1.5 MEG of hard drive space for the program.

Just about any CPU will do the job, but DataFile suggests a 486 or higher to get reasonable program speeds. The DataFile website has a link with information for using Probe1K on a tiny Toshiba Libretto series palmtop. Although I have not tried it, I think my HP-100 DOS palmtop would also work. We used a Pentium II 366 MHz laptop running Windows 98 with 64 MEG of RAM.

◆ Installing Probe1K

Remember, the program works under DOS. So first we must put a Windows computer into the MS DOS mode via clicking the Start icon at the lower left and then finding MS-DOS Prompt under the Program menu.

The program comes on a 3.5-inch floppy and includes a 58-page manual which is indispensable. If the 3.5 inch drive letter is "A" and your hard drive is "C," then typing "A:" and then "Install C:" will quickly complete the installation into a subdirectory named Probe1K.

The program can be started while in the DOS mode by typing "C:\Probe1K" then press "Enter". Then type "Probe1K" and press "Enter".

You can make a short cut to the DOS file, making it convenient to start the program from Windows. Click on the "My Computer" icon on the Desktop. Find and open the Probe1K directory. Then right click on the *Probe1K.exe* file and choose "Create Shortcut". This will place a shortcut icon to Probe1K on your Windows Desktop. Now all you have to do is click this icon to start Probe1K.

◆ Learning the Lingo

Figure 1 is the deceptively simple-looking Main Menu of Probe1K, which offers only three choices: Scan, Configure and Utilities. What could be simpler, right? Well, not quite. Scan is the obvious operational function. But the real heart of Probe1K is in the use of the Configure commands.

In the language of the program, " Probe1K's capacity is 4000 Groups …each Group contains 99 Banks and as many as 1000 frequencies can be stored per Bank."

Now that we know Probe's structure we can start using it.

◆ Configure is the Key

Going back to the Main Menu's "Config-
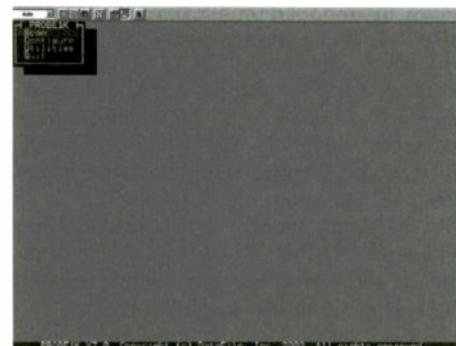
Figure 1- Probe1K's Deceptively Simple Main Menu

ure" command brings up another menu containing "Group" and "Bank", among other choices. Clicking on Group allows us to create and name a new Group. Once we create a Group, selecting Bank allows us to create and name a new Bank.

Let's "Add" a new Group that we will call

Figure 2 - Group Menu – Group "John" Created & Chosen (Check Mark)

"John". We can now create a Bank in the John Group using the Group "Edit" command. Since I enjoy monitoring civil aircraft I'll call the Bank "Civil Air". Again, these "creations" are done via the Configure menu. See Figure 2.

Remember, frequency and station data to be scanned are stored in Banks. The data can be entered in a number of ways. The simplest is manual data entry. But for our example we will download and then import an aircraft frequency file in the MCH format from the ICOM site **http://www.icomreceivers.com/**

Then, using the Utilities Menu and choosing "Import MCH Data", we can deposit it in the "Civil Air" Bank in the "John" Group that we created. The resulting bank of frequencies are displayed by choosing Frequencies in the Configure Menu. See Figure 3. All data fields can be edited, deleted or added to manually from
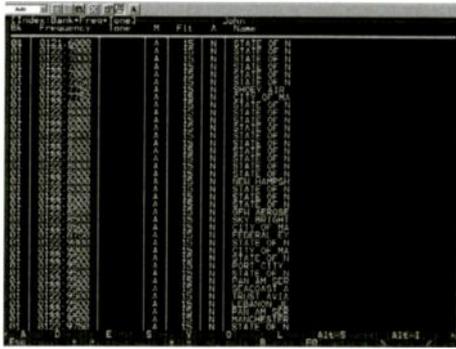
Figure 3 – Banks Menu – Bank "Civil Air" Created & Chosen

the Frequency screen.

Finally, returning to the Main Menu and choosing Configure, we select the Group to scan using the space bar to put a check mark next to our choice. Then we do the same for the Banks in the chosen Groups.

To use Probe1K you must keep the data structure and the Command conventions straight in your mind. A Group holds 99 Banks. Each Bank holds 1000 frequencies and station data.

◆ Now We Scan!

The moment that we have been waiting for is here. To start scanning we must choose a Bank and then a Group or number of Groups in the Bank. With a click on Scan from the Main Menu, we are scanning the Civil Air Bank in the John Group. Figure 4 displays a scanning screen. The upper left-hand section displays live station info and scanner settings. The upper right side of the screen displays the current or last active station information. Active scanning "Hits" are displayed at the bottom half of the screen.
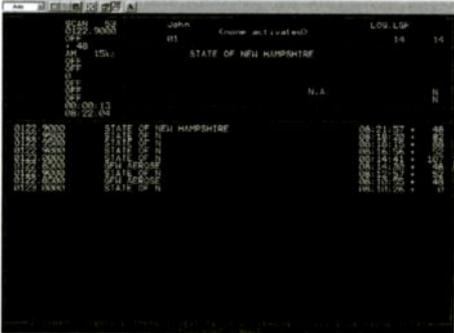
Figure 4 – Probe1K – Scanning! Notice Three Main Sections: Top Left Radio Info, Top Right Station Info and Bottom Displaying "Hits" List Info

The number at the top left of Figure 4 next to the scan status indicates the speed at which the scanner is running in channels per second. Four rows down, labeled Signal, is a number which is indicative of the signal level. This number can also be displayed as a bar graph.

Modifications to many of the functions can be accessed from the menu at the bottom of the screen. Hitting "S" will allow the user to set and save new scanning parameters. I found "S" and "M" (manual settings) the most useful. The remainder of the scan screen is pretty self-explanatory.

◆ Fancy Functions

What do Hyperbank, Smartscan and Tacscan mean? Well, they represent some very useful and unique scanning features.

How would you like to arrange your frequencies tailored to the type of scanning you need to do? For example, if you are trying to monitor an airline emergency, you would want to monitor local air traffic control, aircraft emergency channels, local police, ambulance and fire frequencies. However, in the next hour you might want to monitor the effects of worsening road conditions. Now you would want to monitor public works highway crews, highway patrol, local police and state police.

We can see that different types of scanning use different scanning schemes. Of course we could use different scanners (costly), or manually select and deselect banks of frequencies on our scanner (a real pain).

Probe1K's **Hyperbank** scan feature allows the user to store user defined collections of banks tailored to specific scanning. So with the press of one key we can be scanning banks of frequencies useful during an airline emergency. With the touch of another key we can instantly scan banks useful to monitoring road conditions. Hyperscan really is a very useful feature of Probe1K.

Another useful feature is **Smartscan**. For the computer programmers among you, you can think of this feature as a conditional branch "If-Then" statement. For example, if a Smartscan defined frequency becomes active, the program does not go to the next frequency in the Bank list. Instead it jumps to a new Bank of frequencies to scan.

This is useful for communications that do not use simplex – for example, a communications group that uses a central dispatcher on one frequency, but has the mobile units responding on different frequencies. Smartscan is also useful when monitoring trunked communications systems. Another application might be to jump over a whole range of little-used frequencies until the "key" frequency becomes active. In this way Smartscan will save valuable scanner time.

We have just covered the basic operation of these modes. More operational options for Hyperbank scan and Smartscan are covered in the manual.

TacScan is yet another scanning method that "assigns an active frequency to a priority position in the scanning list for a specific period of time."

Because of space we have to stop here. But let me just say that there are many more features that we have not covered, including CTCSS tone squelch.

◆ "If Only ..."

I encountered no problems with controlling the PCR using Probe1K. The serial port behaved predictably and I never encountered a program crash during use. However, due to its memory utilization, some programs, such as Paint Shop Pro which I use for screen capture, acted strangely when I loaded it after Probe1K. After all, we are mixing DOS and Windows programs. I suggest you experiment with Probe1K and running your favorite programs in the background before you launch into serious monitoring.

The 58-page manual contains all you would ever want to know about Probe1K. However, it is a bit difficult to follow. For example the "Quick Start" runs for over eight densely packed pages. Although there is a Table of Contents, an alphabetical index would be a very helpful addition.

I did have some unexpected results using the Import function. As you can see in the active list at the bottom of Figure 4, only the entry that I manually edited, State of New Hampshire, has the whole name of the licensee. The Import function only resulted in the licensee name of "State of N", as seen in the others listed in Figure 4. I tried several "MCH" imports with the same results.

◆ Probe1K Overall

This is a very ambitious and well-executed program. It is definitely for professional monitors using the PCR1000, who require complex scan requirements, but casual monitors will also find it very useful. Expect to initially spend a minimum of 30 minutes with the manual before you do any scanning. Keep the manual handy for the next few monitoring sessions, and your effort will be rewarded.

Probe1K version 7.0 is available from DataFile, Inc. (PO Box 20111, St. Louis, MO 63123) for $74.95 plus shipping and handling. Check their website at http://www.probe1k.com for more details and useful links.

Links to programs mentioned in this month:

http://www.probe1k.com
  Probe1K
http://www.icomreceivers.com/
  ICOM Database
http://www.datadeliverydevices.com
  RadioMax
http://www.mahy.demon.co.uk/
  TalkPCR
http://www.visualradio.de
  Visual Radio
http://www.shoc.ch/
  Radio Manager
http://www.bonito.net/infos/en_ham_rc40.htm
  RadioCom
http://www.scanstar.com
  ScanStar
http://www.scancat.com
  ScanCat

PAR End Fed Z EF-SWL Antenna

By Larry Van Horn, N5FPW

This is a moment of true confession for me. I have to admit that I love using wire antennas for my HF monitoring. And among the many types of wire antennas, I really like using the longwire style of antenna. These antennas are very economical, easy to install and provide a lot of bang for the buck. Those that know me best know that I value economy (i.e., I'm cheap), simplicity and performance. The random length longwire antennas meet all of these parameters.

But the simple longwire does have one major drawback. Due to the higher impedance at the feedpoint (random length longwire antennas are end fed), coax is not normally used. Most often you will see longwire antennas fed with single conductor insulated wire to the high impedance input of HF receivers. But this can be a problem in noisy RF environments.

If we can get that feed point impedance of a longwire down to 50 or 75 ohms, then we can use low loss coax in our installation. By doing so we can reduce, and in some instances even eliminate, man-made noise that is picked up by the feedline. If only someone would develop an inexpensive longwire antenna that can deliver 50 or 75 ohms impedance to the receiver so I can use low loss coax!

Well, we do not have to wait any more. Dale Parfitt, W4OP, has developed an end fed longwire that can use a 50 or 75 ohm coax feed – the PAR Z EF-SWL antenna.

The EF-SWL is optimally designed for 1-30 MHz reception. The heart of the EF-SWL is the UV resistant ABS matchbox that houses a wideband 9:1 transformer wound on a binocular core. This transformer has external stainless studs on the matchbox that allow the user to configure the primary and secondary grounds for best noise reduction at the receiving location. The antenna's output to the receiver is via a silver/Teflon SO-239 UHF connector that can accept a standard PL-259 coaxial connector. Lead-in coax cable is not provided by the manufacturer and will have to be purchased separately.

The basic configuration out of the box is a radiator that uses 45-feet of virtually-indestructible #14 black polyethylene coated Flex-Weave wire. The wire itself consists of 168 strands of #36 gauge woven copper. This material is very strong, yet it can be as easily coiled as a rope for portable work.

The radiator also attaches via a stainless stud (#3) on the matchbox that allows it to be removed or replaced. You can attach any length of wire you want to the matchbox. This allows you the opportunity to experiment with differ-

ent lengths for the radiator. If you need a shorter antenna for your particular installation or a longer run if you have the space, the EF-SWL matchbox can accommodate it.

The manual that comes with this unit shows typical radiation patterns for selected frequencies throughout the HF spectrum in the two primary mounting configurations – as a horizontal or sloper end fed longwire. Please note that this is a *receive-only* antenna.

◆ Antenna Construction-Installation

This antenna has a lot of the same characteristics as the monoband versions of the popular Cushcraft and HyGain half-wave or no-ground vertical antennas. The big difference between the no-ground verticals and this antenna is that the EF-SWL does not need any base radial wires.

My first impression after I opened the box was the quality of the antenna and its individual components – simply superb.

Since the radiator uses polyethylene coated Flex-Weave wire, environmental corrosion problems normally associated with using uninsulated copper wire will not be an issue. Another major failure location in most longwire installations is at the point were the user attaches the antenna's lead-in wire to the uninsulated radiator wire. If care is not taken to properly seal this connection, dissimilar metal corrosion will eventually cause a break where the two wires are connected. Fortunately that will not be an issue with the EF-SWL, thanks to the polyethylene coated wire used as a radiator. To further protect our outdoor test installation of this antenna we used rubber tape to seal the PL-259 connector to the SO-259 matchbox connection.

Bottom line – once you get this antenna up, mother nature will be hard pressed to take it back down through corrosion.
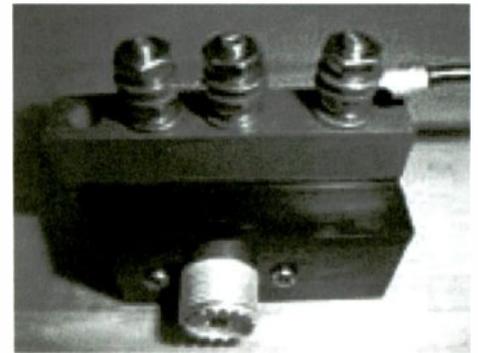
The antenna comes assembled right out of the box. The user does have two decisions to make, however. The instructions that come with the antenna fully discuss the pros and cons so that the user can make a logical decision which will best work at his location.

First, you have several options on how to hang the antenna. Choices range from horizontal, sloper, inverted-L, inverted vee, or even as a vertical.

Next, you have to decide how you are going to configure the ground, and this will vary from installation to installation. We were able to use the factory default configuration – connectors #1 (SO-259 shield) and #2 (ground lead of the antenna side of the 9:1 transformer) shorted. Basically, this leaves the connection to the antenna ungrounded and the user should ground the receiver in the shack.

Even though we did not observe it during our test, this installation may pick up man-made noise. If this is the case, you can also take the short between connections #1 and #2 out and ground one or both of these connections (#2 direct to ground and #1 grounded back to the receiver). This installation works very well in noisy environments from man-made sources.

Installation of the EF-SWL is very easy to
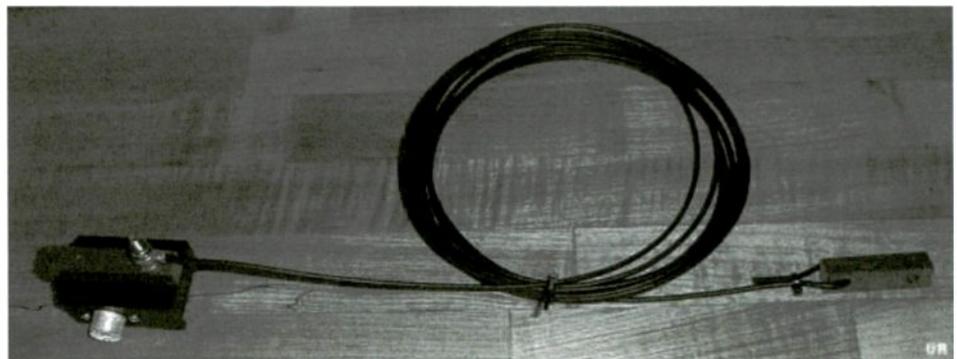
perform. My son Loyd Van Horn assisted in the installation and it actually took us longer to get the ladder set up so we could climb on the roof than it did to put the antenna up. We ran our test EF-SWL antenna configured horizontally at 35 feet above ground level, and we oriented the axis of the radiator north-south.

How Well Does it Perform?

In a word – fantastic!

We put the EF-SWL head-to-head with some of the antennas on the N5FPW two-acre antenna farm. We compared the PAR longwire with two 102-foot G5RV antennas, two end-fed (insulated wire lead-ins) longwire antennas that were 150 and 250 feet long, a full-size Grove Skywire sealed in the roof of my radio shack, and an MFJ amateur radio ten-band vertical antenna.

While some of these antennas outperformed the EF-SWL over the entire tuning range we tested (1-30 MHz), there were some nice surprises.

In the AM broadcast band, the G5RV antennas with their 102-foot capture areas had a distinct advantage over both the EF-SWL and the Grove Skywire. We did notice that the PAR antenna seemed to come alive in the upper portions of the AM band when compared to the Skywire as we tuned higher in frequency.

On shortwave frequencies below 10 MHz, the PAR antenna was equal to, or in some cases consistently better, than our Grove Skywire on signals from selected shortwave stations we used for measurement. One notable exception was around 40 and 15-meters. Since the Skywire is cut for 40-meters, there was a noticeable difference between the two antennas in these two frequency ranges. Above 10 MHz, EF-SWL really shone. Signal levels were comparable on selected shortwave bands to our longer G5RV antennas.

Our final test was a head-to-head comparison of the EF-SWL to our 150 foot north-south end fed longwire. Since both antennas were oriented in the same direction, we felt this test would give us a realistic idea of how good the PAR EF-SWL really was. I must point out that the height above ground for our 150-foot longwire antenna was not optimized, whereas the EF-SWL was.

Consistently across the entire 1-30 MHz
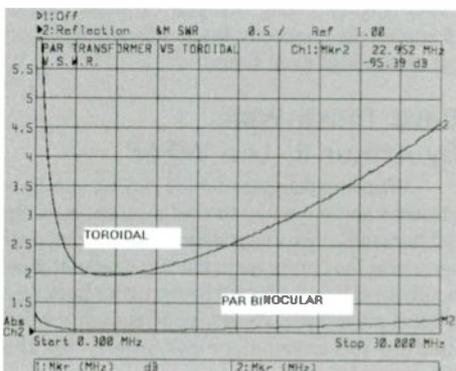
This graph compares noise reduction using the PAR binocular core transformer compared to the customary toroidal core.

tuning range the EF-SWL delivered a 5 db to 20 db signal over my 150-footer. But the real surprise was how quiet the EF-SWL was. In fact, at one point during the test, my wife Gayle Van Horn, who helped with this portion of the testing, questioned whether the PAR end fed was even connected to the receiver. It was that quiet!

In Conclusion

If you are looking for a good broadband, passive shortwave wire antenna for use in restricted space (i.e. attic, small city lot, etc.), then the PAR Z EF-SWL is your ticket. This antenna is especially ideal for portable operations, since it is compact, easy to install, and does not take up a lot of real estate.

You can purchase the PAR Z EF-SWL from Grove Enterprises (7540 Hwy 64 West, Brasstown, NC 28902; 800-438-8155; *order@grove-ent.com*). It sells for $59.95 plus shipping and handling. PAR also makes several versions of the EF-SWL for amateur radio operators. These are monoband end-fed antennas. You can get more information at http://www.parelectronics.com or contact Par Electronics, Inc., P.O. Box 645, Glenville, NC 28736; Voice: 828-743-1338, Fax: 828-743-1219.

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working protocol (the AX.25 part). As astute readers might guess, the protocol was a stripped-down version of the popular ITU X.25 system. The "A" denoted it was for amateur radio use.

AX.25 Packet ushered in the age of communication from computer to computer over standard radio channels. The underlying signal, 200Hz shifted FSK at 300bd (HF) or 1200bd (VHF/UHF), was originally generated from a number of cheap telecomm chips available at the time for basically landline modem-to-modem connections using the Bell-series of standards.

Data is sent in formatted packets. In the case of AX.25, a packet has a maximum of 256 bytes of data sandwiched between blocks of data that tell the receiver the start and end of the packet, the sender and recipient callsigns, and information that allows the receiver to check for errors to the data during transmission.

Unfortunately, while very successful on VHF and UHF channels, the system was not well suited to noisy HF environments and despite a strong start in the late '80s and early '90s, was quickly overtaken by superior modes like PacTOR.

Among organizations to use the system were/are US Forces MARS, Cuban diplomats, the Italian Air Force, and various terrorist organizations throughout Africa and South East Asia.

Resources

WoveCom	http://www.wovecom.ch
Hoko	http://www.hoko.net
Monterio	http://www.monteriollc.com
RodioRoft	http://perso.wonadoo.fr/rodioroft/
SkySweeper	http://www.skysweep.com

Tips from Our Readers

FM Band Preamplifier for FM-DXing
Designed and Developed by D.Prabakaran, Tamilnadu, India

This circuit is designed to work at VHF-FM band frequencies in the range 50-180 MHz. It has a gain of around 10dB and is suitable for boosting weak FM radio band signals. Transistor BF200 (widely used in TV boosters) is used here as the active element.

The tuned circuit connected at collector of "T1" comprising inductor "L1" and "22PF" trimmer capacitor resonate in the center of the FM band. The tuned circuit "L1" has four turns 18-20 SWG copper wire wound around 10mm drill bit, ensuring a low Q and therefore the possibility of a broad tuning range. The circuit should be enclosed in a metal case and a screen made between input and output, to avoid stray pick up.

Since the transistor is used in common base mode, its low input impedance is a good match for 50-75 ohm coaxial cable. The inductor L1 and 22pf capacitor form a tank circuit at the transistor's collector, providing maximum gain at resonance.

Signal picked by the aerial can be coupled to the emitter through a low loss co-axial cable. For efficient results or FM DXing, keep the antenna as high as possible (just as for TV reception).
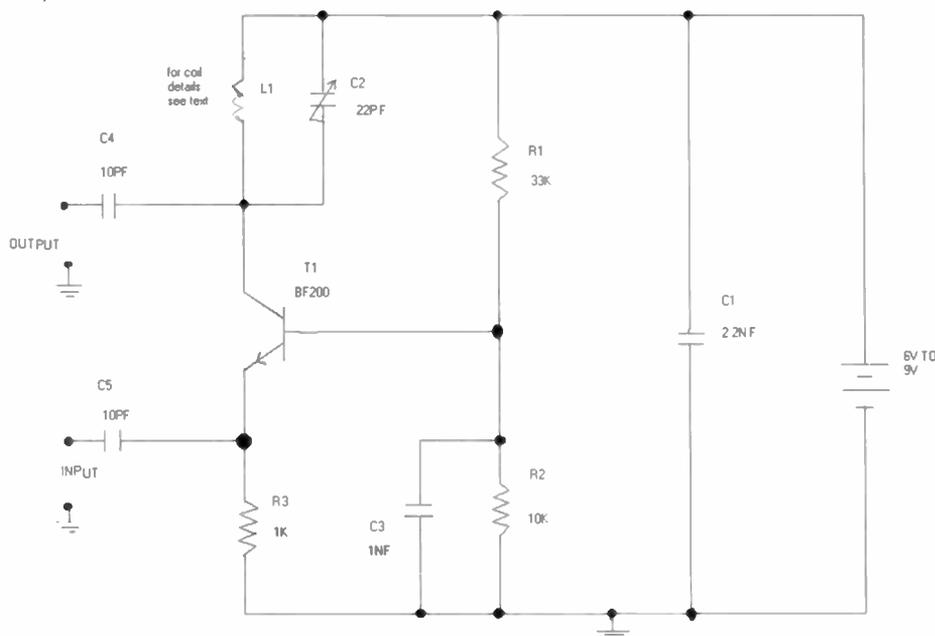
Roll Your Own 800 MHz Quarterwave
By Alan Bosch, KO4ALA, Arlington, VA

The conventional wisdom on multi-band OE rubber ducks is that they work equally poorly on all bands. That seems true in a paradoxical way if you live, as I do, in an urban area saturated with RF (from a forest of towers half a mile away featuring everything from broadcast AM, FM, and UHF TV, to business band, pagers, and longlines). Then a wide-band antenna is a sitting duck for myriad intermod products.

Aside from filtration, which must be outboard on a scanner, the best protection is an antenna tuned just for the band of special interest. The one pictured here cleaned up Arlington's trunked system transmissions noticeably for me.

The ingredients all came from my junk box: two wire-nuts (one large, one small), 3.5 inches of #18 plastic-coated wire, and an F female-to-BNC adaptor. Construction is elementary.

Trim 1/16-inch insulation off one end of the wire so it just fits into the center contact of the F-connector. Select one wire-nut with a skirt diameter the same as the F-connector's OD (out-side diameter), drill a wire-sized hole through its top, slide it down over the wire, and fasten it with a couple droplets of Krazy-Glue. Screw on the smallest wire-nut that will fit the insulated upper end of the radiator and you're ready for business.

Another benefit of this item is, of course, that its small size facilitates concealment where that is helpful.

Heatsink Those Soldering Jobs!
By Arthur R. Lee WF6P, Santa Cruz, CA

A couple of problems accompany every soldering job – that of not having enough heat, and that of having too much heat. By not having enough heat, solder will melt but not flow and make good contact. This is known in the trade as a cold solder joint.

The opposite is having too much heat and damaging the component to be soldered. Such is the case when soldering a terminal fitting to a piece of coaxial cable for radio use. Overheating a connector fitting can result in the melting of the coax inner insulating core, possibly leaving the center wire exposed to ground to the connector.
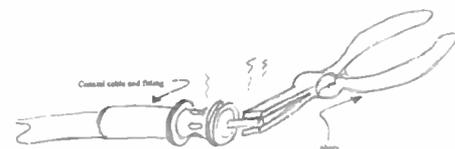
To help prevent this, after the solder has melted, immediately grab the end of the connector with a pair of heavy pliers, the bigger the better (Fig 1). Using two pair of pliers, one to clamp on the connector body, would help bleed off excess heat even faster.

Save Those Walls
By Arthur R. Lee WF6P

When our daughter moved into her new Sacramento home we had to find a place to set up her ham radio. We eventually settled on the ideal spot, near the computer in the spare second floor bedroom. Their L-shaped heavy office desk was a great place for both pieces of equipment, including the external power supply for the Kenwood HF rig.

A trapped vertical antenna was put up just outside the house and all was well. The coax feeding the vertical led in through the sliding glass

nylon cord

plastic bag

rubber bands

antenna feed line

pine window filler strip

height of window frame

hole for coax

slot

plug

← 3" →

window. To keep most of the weather out, we resorted to the primitive method of stuffing rags between the window and the window frame. It was inefficient, but most of the air conditioned cold air could be kept in the house during the summer and heat in during the winter.

It worked but didn't look all that fancy from the standpoint of my daughter, KN6RR. During the rainy season, the rags dripped water

and dust found a way in during the hot months. As an artist and home decorator, she wanted something more pleasing to the eye. Couldn't something be done to improve the appearance of the antenna feed line?

To appease her for a while we used the temporary expedient of simply disconnecting the antenna coax, tying the end to a cord, and lowering it out the window a few inches. The PL-259 was wrapped in a plastic bag to keep it moisture and dust free. At least the window would now close. However, this took all the convenience away from using the radio.

After much pleading from our daughter (two years worth, really), my son-in-law and I had to come up with a workable solution. Drilling a few holes through my daughter's new walls didn't seem to be an ideal approach as she wasn't sure the rig would remain in that bedroom forever. Also, the heavy desk blocked the wall we would use. This would require us to put the holes at waist high level instead of down lower, in a less obtrusive location near the floor.

Instead, we resorted to a rather old, but highly effective method. The modern double-paned window slid in a tight horizontal track. A quick trip to the local lumber yard produced a pine strip of wood 3-inches wide and the height of the window. After a bit of custom sanding, the strip was a snug fit for the inside of the window track A 3/8-inch hole was drilled in the center of the strip, but to avoid the chore of cutting off the PL-259 and replacing it, we cut a slot to the edge of the wood strip (figure 2). The coax was slipped inside the slot to the hole and a wooden plug inserted in the slot.

A 1/8-inch hole was drilled a short way below the coax entrance to allow the ground wire to pass through. A length of foam rubber weather stripping was glued to the metal sliding window frame. When closed, the weather stripping forms an air tight seal, keeping dust and rain out. The window has a built-in lock for variable opening positions so security is not compromised.

The wood strip was painted to match the window frame outside the house and to match the room on the inside.

This image, courtesy EUMETSAT, is the first of the new LRIT (Low Rate Information Transmission) format being transmitted currently by MSG-1 (Meteosat Second Generation) as part of the test program before the operational phase starts next year. It shows channel 13 (this is channel 1 visible-light) image from 1145UTC on July 7. LRIT will replace WEFAX on all WXSATs in due course. (see page 90)

Follow ups on Some Worthy Gear

Just over two years ago, I reviewed the Icom IC-706MkIIG. My conclusion then was: "For the casual ham operator who wants a whole lot of radio in a compact, reasonably priced package, the 706 delivers, and then some."

I stand by that conclusion. Every work day of the year at 6 am, I fire up the IC-706, and, for the next 2+ hours, run a commuter assistance network on two meters for the Capital District of New York State. Although I rarely operate on HF anymore, the IC-706 has performed admirably, never missing a beat, always delivering solid performance.

The IC-706 is the amateur radio mobile/base station equivalent of a Swiss Army knife. It's small, just 6.6" wide x 2.3" high x 7.9" deep; light, just 5.5 pounds, and it has great coverage: receive, 30 kHz-1999.999 kHz and 400-470 MHz; transmit, all ham bands from 1.8 MHz to 450 MHz, with modes including USB, LSB, CW, /RTTY (FSK), AM, FM and WFM (receive only). Power output on HF and six meters is 5-100 watts (SSB/CW/FM/RTTY) and 2-40 watts AM; on two meters 2.5-50 watts (SSB/CW/FM/RTTY), 2-20 watts (AM) and 2-20 watts (AM); and on 440 MHz 2-20 watts (SSB/CW/FM/RTTY) and 2-8 watts (AM).

The "706" includes tone encode, tone squelch, 102 alphanumeric memories (99 regular, 2 scan edges, 1 call), second VFO, crossband split capability, CW keyer, speech processor, and voice-operated transmit, plus some digital signal processing capabilities as well. A detachable front panel/display and optional remote separation cable make it possible to install the main "box" of the 706 in the trunk of an automobile and mount the front panel and microphone to the dash.

The performance simply sparkles, and I give the 706 my highest personal recommendation. For more info, check out **http://www.icomamerica.com**.

◆ Minelab Explorer II Finds Antique Lock

I reported on the Minelab Explorer II metal detector last month, but since then there have been additional developments. After filing my column for *MT*, I decided to see what the Explorer II could do with the help of an experienced detectorist.

Carl Bell, proprietor of Upstate Detectors in Schenectady, NY, agreed to meet me at a bend in a creek near the site of a now closed restaurant. This particular location had been used by people for at least 200 years and was probably the site of an old mill.

Bell adjusted my Explorer II in advanced mode for detecting in an area with a lot of iron in the soil. While the Explorer will work okay in these conditions as it comes out of the box, now it will perform even better. He plugs a splitter into the earphone jack of my Explorer so we can both listen to the audio signals the detector makes.

We try detecting in an area behind an old stone wall. In a short while, the Explorer begins emitting a high clear tone over one spot. It's a pull tab. Bell rescans it with the Explorer and instructs the detector to ignore similar tabs.

A moment later there is another signal, different in tone, but equally clear. Bell advises me to dig everything in an area this old. I cut a horseshoe-shaped plug in the turf and lever it up. Bell shows me how to use a handheld pinpoint detector to zero in on the target in the hole. It's a neat brass lock, shaped like a shield, with stars and bars on it. The keyhole is on the thin side of the lock at the point of the shield.

"Wow, an old lock," I say. Bell replies, "Not just a lock, a *nice* lock!"

The Minelab Explorer II continues to amaze me. I had already thought that two-way wireless communication amounted to a type of wizardry, but the Explorer eloquently demonstrates that radio waves can work another kind of magic: finding relics and other goodies underground. Further, if you are considering the purchase of an Explorer II (or any metal detector, for that matter), I suggest buying from a local dealer who is willing to help you learn the ropes.

For more information about the Explorer II, visit **http://www.minelabusa.com** or call 1-702-891-8809 and ask for an information packet. To reach Carl Bell, try **http://www.upstatedetectors.com** or phone 518-393-0624.

Domestic Broadcasting Survey 5

The DX season is gearing up and here's a publication every DXer should have close at hand! Edited by DXer Anker Petersen, (Chairman, Danish Shortwave Club International) the *DBS-5* continues to be the leading annual publication devoted to tropical and domestic shortwave broadcasting stations.

The DSWCI offers this fine publication only in PDF format by electronic mail, thus eliminating the increasing cost of printing. Data is composed from experienced DXers worldwide, and draws on their expertise for timeliness and accuracy. Information includes frequencies, programming details, hours of transmission, relay sites, identifications or station slogans, language services, parallel frequencies, networks, and transmitter locations.

One beneficial aid is the "Last Log" column. Station information is listed here as when the reporter last heard the station, just prior to the *DBS* deadline. Former frequencies not heard in the last year are eliminated and compiled at the end the survey.

The 2003 edition of *DBS-5* is, without question, very useful and accurate and an extremely valuable reference. The cost is affordable at $5 US, Euro 5, or seven IRCs. For additional information and a sample page of the survey, go to: **http://www.dswci.org**. Fees should be sent to: DSWCI, Bent Nielsen, Egekrogen 14, DK-3500 Vaerloese, Denmark.

I have relied on this excellent publication for many years, and continue to use it for each DX session. Every serious DXers should have a copy next to his receiver!

— Gayle Van Horn

The Shortwave Guide, Vol. 2

Looking for a simple and comprehensive guide to aid in your shortwave listening? Then look no further.

The second edition of *The Shortwave Guide*, from World Radio TV Publications, is receiving kudos from the listening community, and rightly so. This colorful frequency guide covers the summer schedules, which are those that are not included in the larger annual *WRTH*.

Each entry is listed by frequency, station, country, kW, hours, target areas, and color coded languages. Frequencies shown are for international and domestic broadcasters, including the tropical bands. This uncomplicated "at-a-glance" arrangement makes it perfect to determine which station is broadcasting as you bandscan.
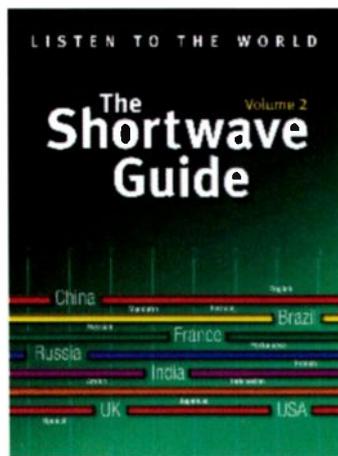
The 2nd edition is vastly improved from last year's premier edition. This edition includes an introduction to the hobby of shortwave listening, perfect for the newcomer. The reference section at the end of the book includes a "World Time Table" and a "Directory of International Broadcasters and Clandestines," with addresses, email, websites and phone numbers. This is handy for those DXers active in QSLing.

Interested in clubs for DXers and listeners? Then check out page 214; you'll find a complete list of non-commercial hobby clubs serving international radio enthusiasts. Find out how a Standard Time and Frequency station can aid in your DXing, and where to find Internet sources to compliment your hobby.

It is indeed a pleasure to find a publication that made visible efforts to improve the quality and accuracy of their guide. *The Shortwave Guide*, Vol. 2 is a comprehensive, yet a simple guide to shortwave listening. It is perfect for the beginner or the seasoned DXer.

The Shortwave Guide may be ordered from **http://www.wrth.com** or you can print out an order form from the site and fax to (+44) -0-1865-516717 or send to WRTH Publications Limited, PO Box 290, Oxford, OX2 7FT, United Kingdom. The *Shortwave Guide* is £12.99 including Airmail Post to any destination. (Visa, Mastercard, UK postal order, International Money Order drawn on UK bank, or International Postal Giro)

Bravo to Publisher Nicholas Hardyman and Editor Sean Gilbert, and their co-editors for a job well done.

— Gayle Van Horn

Technician Class License Study Manual
by Gordon West

The Amateur Radio Service now has reduced its license classes to three, the Technician, General and Extra. This has required a revamping of the question pool, with the latest element introduced in July 2003.

Gordon West, WB6NOA, well known for his license preparation materials, introduces this latest study manual, the *Technician Class*, a well-written, easy-to-use guide.

Well illustrated and accompanied by additional explanatory material, the test notes comprise more than 200 pages and contain all the possible questions the applicant could face at the exam.

This excellent study manual can be ordered from The W5YI Group, 7101 N. Ridgeway Ave., Lincolnwood, IL 60712, or from their website at **http://www.w5yi.com**. Cost is a very reasonable $9.50 plus shipping.

— Bob Grove

ARRL Books
Reviewed by Larry Van Horn

ARRL's License Question and Answer Study Guides

Recently the amateur radio Question Pool Committee issued new question pools for the Technician and Extra class license exams and the American Radio Relay League (ARRL) has followed suit by publishing two new corresponding question and answer license study guides.

In the July issue of *MT* we reviewed the new ARRL Tech study guide *Now You're Talking!* - 5th edition. But, if you are technically inclined and do not need an exhaustive study guide to help you prepare for your exam, then the new *Tech Q&A* - 3rd edition could be your ticket to the Tech license.

The Technician class license exam consists of a 35 question written exam drawn from a pool of 511 questions. The 245 page Tech study guide includes each of the 511 questions and answers for the Technician (Element 2) test, with answer key, for use on exams beginning July 1, 2003.

Likewise, if you are taking the test for the Amateur Extra class (Element 4), the League has a new 332 page Q&A guide for this license as well. The 50 questions in an Extra class examination are drawn from a 806 question pool. This newest *Extra Q&A* guide includes the latest question pool with answer key, for use until June 30, 2006.

In both Q&A guides, each question is printed with the correct answer letter shown in bold type. An accurate, but brief explanation is included after each question. The straightforward, uncluttered question-and-answer format means no hunting around for answers or ex-

planations. If you just need a review to prepare you to take your amateur exam, use these books to pass your test. (See below for contact information)

Tech Q&A - 3ʳᵈ edition (ISBN: 0-87259-882-9) #8829 - $12.95 plus shipping and handling

Extra Q&A - 1ˢᵗ edition (ISBN: 0-87259-888-8) #8888 - $17.95 plus shipping and handling

The ARRL DXCC List

Being an avid DXer in the ham bands, I use a lot of aids to keep track of my current DXCC (DX Century Club) stats. One of my favorite publications in this regard is the *ARRL DXCC List*.

The ARRL DXCC List is the official League source of DXCC information. You can record the DXCC entities you've worked and QSLed! This new May 2003 edition includes a complete listing of DX Century Club rules, including the latest changes and clarifications. It contains information about each entity on the DXCC List, deleted entities, and the latest DXCC entity additions. Also included are a prefix cross-reference, the list of international call sign series, and much more.

Descriptions of all DXCC awards are covered, and information about how to get numerous DXCC items, such as pins and plaques. This is a "must have" for every amateur DXer.

ARRL DXCC List – May 2003 edition (ISBN: 0-87259-894-2) #8942 - $4.00 plus shipping and handling (see below for contact information)

YASME—The Danny Weil and Colvin Radio Expeditions
by James D. Cain, K1TN

This new League publication chronicles the history of three travelers spanning the birth of
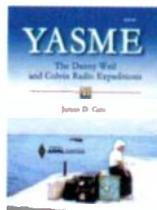
YASME—the boat that carried young sailor Danny Weil on his first voyages beginning in 1954—and the lives of famed ham radio amateur radio DXpeditioners Lloyd and Iris Colvin. *YASME* is a take on the Japanese yasume, meaning "freedom." The Colvins' worldwide adventures continue to be recounted in ham radio circles, epitomizing the spirit of international friendship through amateur radio and their 30-year association with the YASME Foundation. This 320 page League publication was commissioned by The YASME Foundation and published by ARRL.

YASME—The Danny Weil and Colvin Radio Expeditions (ISBN: 0-87259-893-4) #8934 – $24.95

You can order any of these League publications online at **http://www.arrl.org**, or through their toll free order line at 1-800-277-5289. The League snail mail address is ARRL, 225 Main Street, Newington, CT 06111-1494.

Getting Started In Electronics
by Forest Mims III

For decades, Forest Mims has entertained and educated electronics experimenters of all ages. His casual freestyle method of writing and illustrating invites the most inexperienced newcomer as well as seasoned veterans to the world of electronics. This recent edition is no exception.
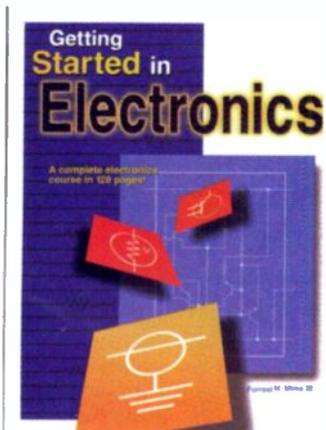
128 pages of simple electronic experiments utilizing readily-available components flash, beep, count, switch, calculate, detect, amplify, compute, time and regulate. Excellent introductory material explains components and how they work.

This is a terrific book for the electronically curious, a great way to figure out how to use all those parts you see hanging on the wall at Radio Shack, or inside that old radio or TV set you wondered whether you could salvage!

$12.50 plus shipping from The W5YI Group, 7101 No. Ridgeway Ave., Lincolnwood, IL 60712, or from their website at **http://www.w5yi.com**.

– Bob Grove

Voice of America, A History
by Alan Heil

Ask any shortwave listener the first station they heard, and chances are, they will respond "Voice of America."

Voice of America, A History, written by Alan L. Heil, Jr., is an in-depth history of the VOA's founding in 1942 until its sixtieth anniversary. Mr Heil worked for the VOA from 1962 until he retired in 1998, serving (among other positions) as a foreign correspondent, chief of News and Current Affairs, and deputy director of programs. Using transcripts of radio broadcasts and numerous personal anecdotes, Heil has given the reader a close-up look into the major events of the past sixty years.

The 540 pages provide a very interesting and enlightening story of the VOA through the wake of Pearl Harbor, the Cold War, the first steps on the moon, the Watergate scandal, civil war in Rwanda, and the intense drama of Tiananmen Square. Heil also relates the outbreak of HIV/AIDS in the 1980s, ethnic strife in the Balkans, the terrorist attacks on September 11, 2001, and the continuing struggles in the Middle East.
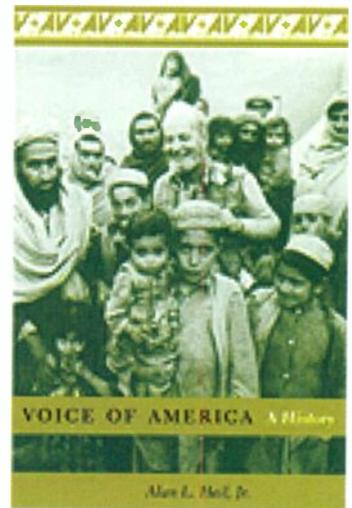
Alan Heil portrays the VOA as an organization continually underfunded and constantly struggling against congressional investigations, reorganization and leadership purges in an attempt to reshape VOA programming.

This is a human history of the Voice of America, told by someone who has been there. The VOA, known by millions of people around the world, has delivered the news with fairness and accuracy. This insider's story, now told to the world, should be on the shelf of anyone seeking a vivid look at events that shaped our history. Alan Heil reminds hobbyists how grand radio listening really is.

Voice of America retails for $37.50. For additional ordering information, go to the Columbia University Press **http://columbia.edu** or ask at your local book store for ISBN (0-231-12674-3)

– Gayle Van Horn

Getting started with Weather Satellites

Until about two years ago, someone who read an article, or heard from a friend about using a receiver to tune into weather satellites (WXSATs), faced a straightforward situation. They could set up a system to receive signals from polar orbiting spacecraft, and could also set up a dish system to receive signals from geostationary WXSATs. To some extent the choice is still there, but it is changing. This month I am updating the introduction.

◆ Polar WXSATs

There are some half dozen satellites in low polar orbits, carrying earth-image sensing equipment of which the amateur user can take advantage. These weather satellites (WXSATs) transmit continuous signals that – using suitable equipment – can be decoded and converted to lines of varying brightness that build up to an image showing the ground over which they pass. These satellites are transmitting real-time data. Depending on your depth of interest (and also on the depth of your pocketbook), you can build or buy equipment to receive and decode some of these signals. There are also many commercial imaging satellites, but these invariably require expensive decryption facilities, so are not covered in this review.

My own polar WXSAT receiver confirms that there are currently only NOAA (National Oceanographic and Atmospheric Administration) WXSATs in active service. At one time there was also a steady supply of Russian Meteor WXSATs, but, unfortunately, for what appear to be financial reasons, they are behind in their program of replacing no-longer functioning satellites. Each month I list the frequencies of currently transmitting WXSATs at the end of this column.

With suitable equipment – a good antenna, receiver, computer and software – you can easily receive APT (automatic picture transmission) images direct from the satellites. These have a resolution of about 4km per pixel, so you can obtain a picture from most satellite passes, and they will clearly show the local cloud situation.

There are currently three satellites regularly transmitting APT: NOAA-12, NOAA-15 and NOAA-17. If you use a satellite tracking program with updated data, you can determine when any of these WXSATs are passing over your location. They are all in sun-synchronous orbits (those that keep pace with the sun from day to day). NOAA-12 provides two or three passes during the mid to latter part of the afternoon, and again twelve hours later. NOAA-15 passes over during the early morning and early evening. NOAA-17 – the most recently launched – is a mid to late morning and evening satellite.

◆ Equipment Requirements

The APT-transmitting WXSATs require the simplest of the reception systems.* For the complete beginner who wants to test the cheapest options, you can use a simple dipole to receive the right-hand, circularly polarized signals from the NOAAs. Cut for 137 MHz, (although one cut for the amateur 2m band will do), such a dipole can provide a few minutes of signal during reasonably high passes.

A far better option is the crossed-dipole – a combination of two dipoles connected by a phasing harness that adds up the components of the WXSAT signal to produce a more consistent signal for longer periods. Such an antenna can be mounted permanently in a high position – perhaps on a roof-top – where it will hear any WXSATs as they come over the horizon. At these VHF frequencies, physical objects such as buildings or trees will obscure the signal.

Having sorted out an antenna, we need a good receiver. We occasionally see pictures posted on the Internet showing surprisingly good results obtained using general purpose receivers. These are not ideal for our purpose. The transmission characteristics of a 137 MHz band WXSAT signal require a bandwidth of about 45 kHz. Utility receivers are usually designed to offer a 15 kHz bandwidth, or one called NBFM (narrow-band frequency modulation). The 15kHz option is really much too narrow, and the other is far too wide!

The fact is that WXSATs are in a class of their own. Their telemetry format is specifically designed to allow the carrying of image data in a unique manner. Original image data (white clouds and dark land) is amplitude modulated onto a 2400 kHz subcarrier. The resulting signal (the modulated 2400 kHz carrier) is then itself modulated onto an r.f. carrier – the 137 MHz band carrier. Consequently, to faithfully decode this complex signal, you need to have not only a 45 kHz bandwidth receiver, but optimized decoding circuits as well. For the price of a proper receiver you can be assured of the best possible image quality.

◆ Dealers

My understanding is that

Timestep Weather Satellite Systems is probably the main US supplier of all types of WXSAT hardware. Their web site address: **http://www.time-step.com/**

Although based in Britain, they supply both directly (Timestep, PO Box 2001, Dartmouth Devon TQ6 9QN England) and through a dealer: Spectrum International Inc. (PO Box 1084 Concord Mass. 01742 Tel. (978-263-2145)

◆ Internet Site Update

The "allmetsat" site offers a comprehensive selection of images from virtually all operational satellites, both polar and geostationary. To my surprise, it also includes high resolution imagery from the polar orbiters, recently collected by local meteorological organizations, such as Meteo-France. Composite imagery from NOAA-16 (see figure 1) of the Antarctic and Arctic regions, is included.
http://www.allmetsat.com/en/index.html

Frequencies

NOAA-12 and -15 transmit APT on 137.50 MHz.
NOAA-17 transmits APT on 137.62 MHz.
GOES-10 (West) and GOES-12 (East) use 1691 MHz for WEFAX

* See p.85 for first glimpse of the next generation LRIT format
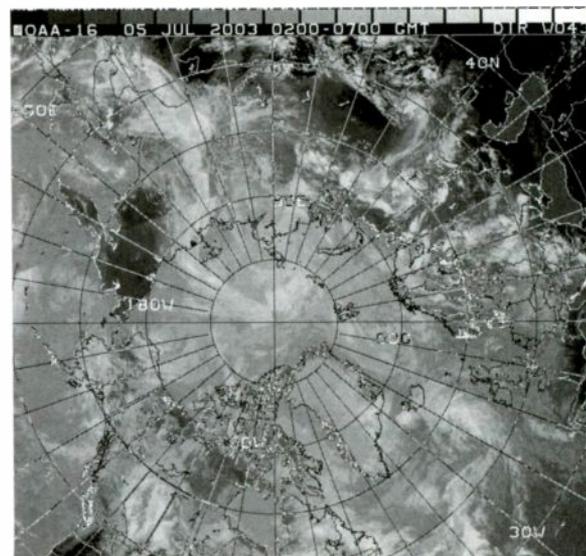
Fig 1: Arctic - composite NOAA-16 infra-red image July 5, 2003, courtesy NOAA's Office of Satellite Data Processing and Distribution

This page is open to thoughtful opinions on radio-related topics. Submissions should be about 800 words in length and may be mailed to Closing Comments, care of this magazine, or emailed to editor@monitoringtimes.com

Rumors of DX Death Greatly Exaggerated!

Editorial by Doug Smith W9WI

Tests of the new IBOC digital broadcasts have FM and mediumwave DXers nervous. Both AM and FM DXers are saying things like "I'm going to catch all the DX now while I still can!" I suppose some of you may wonder why there hasn't been more concern expressed about IBOC in the pages of this magazine.

Well, for one thing I don't like to expend too much energy trying to change things I know can't be changed... The LPFM (low power FM) proceedings made it obvious that when an industry with lobbyists wants something from government, they'll likely get it. (I suppose scanner monitors can cite the ECPA and its amendments; and computer users can cite the DMCA.) If the National Radio Club can hire a team of Washington lobbyists, I suppose we might be able to stop IBOC. Somehow I doubt the NRC's treasury could support such an effort.

Existing broadcasters, and their lobbyists in the National Association of Broadcasters (NAB), *want* IBOC. They seem to feel it'll stem the gradual decline in radio listening by bringing CD-quality sound to the FM band and FM-quality sound to AM stations.

Maybe more importantly, the IBOC system brings digital radio without changing the relative coverage areas of existing stations (unlike the Eureka system used in almost every other country that has digital radio). Radio hobbyists and media activists may try to stop IBOC, but without lobbyists bearing campaign contributions, I doubt they will have any effect.

Why such a hullabaloo about IBOC?

On the AM dial, the digital data is placed in the outer edges of the station's assigned channel *and in the adjacent channels.* An analog station on 710 kHz occupies the area from 705-715 kHz; an IBOC station on 710 occupies 695-725. A listener with a good receiver can DX 700 and 720 even if he lives near an analog station on 710. If that analog station switches to IBOC, this listener will no longer be able to DX 700 or 720 kHz.

On FM, IBOC stations do not spill into adjacent frequencies. However, they *do* occupy the outer portions of their existing channels. With analog, these areas are "guard bands" between stations. The effect is the same: it will prove impossible to DX frequencies adjacent to those used by IBOC stations.

So chances are we *will* have IBOC in the United States. DXers have two choices: Live with it, or give up and take up a different hobby.

DXers have learned to "live with it" before. Here are some of the developments that over the years have threatened to put an end to the DX hobby:

- Seven-night-a-week AM broadcasting
- The end of the typical midnight-6am silent period
- Power increases on Class C channels, from 100 watts to 250 to 1,000
- FM
- TV
- Breakup of the "clear" channels
- Radio Marti and the high-powered retaliatory broadcasts from Cuba
- Docket 80-90 (which made hundreds of new FM stations and FM power increases possible)
- Low-power TV
- Low-power FM
- The end of VHF TV in the U.K.
- Blanket nighttime operating authority for most AM daytime-only stations
- Internet "radio"
- Cable TV
- Satellite TV
- Digital TV

Yet the National Radio Club, International Radio Club of America, and Worldwide TV-FM DX Association are as strong as ever. People are still DXing.

Sure, there are some things you can't do anymore. You won't hear California from the East Coast every night. You won't log Hawaii with a table radio in St. Louis. Double-hop trans-continental TV skip is now a once-in-a-lifetime treat, not an annual event. Many (most) DXers don't care. They get a thrill out of whatever they hear that's new and unusual.

Just in the last year, many DXers logged the Virgin Islands for the first time, thanks to the expanded AM band. The widespread adoption of unattended computer recording techniques have filled logs with new DX. Record-breaking 850-mile digital TV reception has been accomplished, and then surpassed when a digital TV signal was received via sporadic-E at a distance of over 1,050 miles. We have the first ever reliable report of reception of U.S. FM stations in Europe. And Australian DXers are receiving American UHF TV signals via reflection off the moon. DXers adapt.

Wait and See

Nor is it a foregone conclusion that IBOC will work. AM IBOC is still experimental; recent tests have left many participants unhappy with the "codec" – the software that "tosses out" redundant parts of the audio to make the data stream fit in the necessary bandwidth.

Because of the adjacent-channel interference problems, the FCC is not allowing AM IBOC operation at night. For much of the year, commuters are driving home from work after sunset. These commuters are the most important radio audience. A digital radio system that doesn't work at night isn't going to work in the marketplace.

Finally, IBOC is expensive for the station. At the very least, an expensive digital "exciter" is necessary. At many stations, the entire transmitter will need to be replaced. At some, an entire separate digital transmitter and antenna may be necessary. At AM stations, complete redesign of the antenna system may be required.

Unlike AM and FM, IBOC is covered by patents. Those wishing to build IBOC receivers or transmitters must buy a patent license – and stations wishing to broadcast IBOC will *also* require this license. Many stations today (especially AM) can just barely afford to pay their existing bills. Extensive transmitter modifications and an IBOC patent license will be beyond their means. Many stations will remain analog.

So, to be concise... IBOC digital broadcasting *is* coming. We can't stop it. If it succeeds (and it may not), it will *change* domestic-band DXing. It will never *eliminate* it.