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MONITORING TIMES

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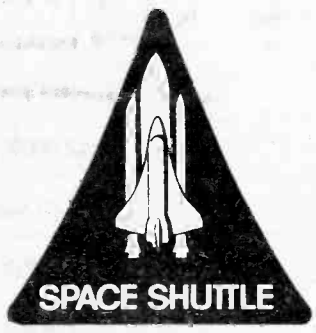
Special Report: Space Shuttle Panorama Prepared by Monitoring Times



Although the days of busy HF circuits for space support have faded since Gemini and Apollo, some point-to-point communications are still used as backup for the primary satellite and wire links.

The extensive shortwave listings shown here are still, for the most part, authorized, but seldom used. Frequencies like 10780 kHz (Cape Kennedy call-in for vessels and aircraft) and 20186 (Ascension Island tracking net administration) are still in use as of this writing.

Most HF communications are conducted on military channels authorized for use at the prime shuttle sites. Modes may be upper or lower sideband, RTTY or multiplex.

The following comprehensive list of NASA/USAF/USN Space Shuttle support frequencies is the largest ever to appear in print.

US Navy, Malabar (Cape Kennedy), Florida

Frequencies (kHz)

4705.5	6724.5	11206.5	15052.5	16420	22755
5719.5	7387	11252	15058.5	18010.5	23225.5
6694.5	8788	13173.5	15068.5	18990	23325
6709.5	8779.2	13228.5	16168.5	22683	
	9007.5	15022.5		22687.3	

US Air Force, Malabar (Cape Kennedy) Florida

Frequencies (kHz)

2357.5	4856.5	6754.5	7765	11183	13635	17668	19290
2622	4860	6897	7833	11407	13735	17975	19928
2638	4864	6937	7919	11414	13878	18009	20186
2717	4900	7355	7985	11548	14397	18020	20188.5
2764	4992	7387	9022	11622.5	14547	18022	20195
2800	5180	7412	9043	12107	14650	18196	20198
2821.5	5188.5	7461	9132	12277	14896	18310	20390
2837.5	5246	7512	10305	13204	14937	18355.5	22755
3120	5350	7525	10310	13210	15040	18769	23325
3187	5810	7676	10780	13237	15575	19304.5	23413
3365			11104	13600	15610		24240
4521.5					17490		24914
4765							
4825							

Cape Kennedy NASA Callsigns

Callsign	Identification
ARIA/AGAR	Advanced Range Instrumented Aircraft
Eyesite	US Navy P-3 Aircraft
Chase 1,2	T-38 Chast Aircraft
Fisher	Cape Radio to Ships
Cape Leader	Contingency Emergency Helicopter
Picopay	USS Vandenberg (Tracking Ship)
Dishpan	USS Redstone (Tracking Ship)
King	USAF/ARRS Rescue Helicopter
Liberty	Booster Recovery Vessel
Freedom	Booster Recovery Vessel

See SPECIAL REPORT on Page 6

An Exclusive Monitoring Times Report

The Kenwood R-2000 -v s- The Icom IC-R70

By Robert Lonn WA6PHN

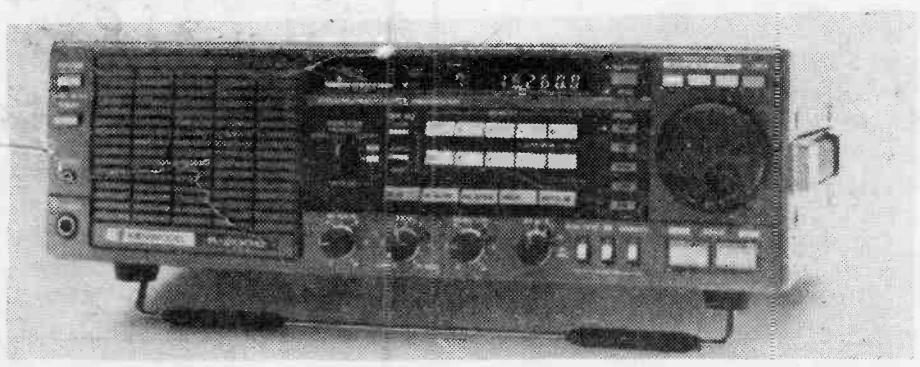
As the owner of an Icom 720A transceiver, I recently compared this unit against the new R-70 receiver. For years we have heard of general coverage ham transceivers that astound the public with all of their features and specifications.

The R-70 from Icom (see related article elsewhere) is not only a copy of the famous 720A but in many ways outperforms its big brother--an industry first.

This radio has a fantastic front end. Sensitivity and selectivity are outstanding. Passband tuning aids the listener in ultimate flexibility when separating closely-spaced stations, even 5 kHZ away.

A new noise blanker with a dual wide and narrow feature previously was found only in top level ham equipment. It works well on the woodpecker and other pulse noise.

The ultimate in tuning is accomplished with Icom's 10 HZ tuning increments with equal resolution on the tuning knob. One revolution of the tuning knob changes the frequency only 1 KHZ compared to 10 KHZ on the competitive NRD-515, 10 KHZ on the TS-930s, 3 KHZ on the FT-ONE, 100 KHZ on the FRG-7700, 80 KHZ of the R-1000 and 20 KHZ on the new R-2000.



The Icom is a dream for RTTY and CW. You can preset the digital readout to a frequency listed in a book or magazine and when the station signs on, no retuning is necessary even on a SSB signal! Try that with another radio!

THE KENWOOD R-2000

At a recent Cable TV Show I viewed the new R-2000 being used as part of a demonstration. Once again a radio one would think was a copy of the new TS-930S ham transceiver, but far from it! I feel Kenwood was trying to catch up and exceed the memory feature of the Yaesu FRG-7700. They have accomplished this with the ability to do many things with the memories. They have added two 24 HR clocks and PLL tuning. Yes, a move up from the R-1000, and it does exceed the performance of the FRG-7700, but falls short of the R-70.

The tuning is in 50 HZ steps, but Kenwood failed to provide a RIT control. In tuning in a RTTY or CW station you could easily tune right pass the passband of a RTTY or CW reader. The Icom R-70 does not suffer from this problem with its 10 HZ tuning and RIT control, even providing a RTTY position on the mode switch.

I did not try the R-2000 on an outside antenna but I *did* tune in CATV audio signals used at the demonstration booth. Unlike the Icom which has superb selectivity, the wide and narrow filters on the R-2000 seem to be broad like the R-1000 and FRG-7700 factory stock filters.

And in conclusion the R-70 is a first class receiver which would meet the most demanding shortwave or ham radio operator needs.

The R-2000 falls short. It will be interesting to see what other comments develop in the months to come once the radio hits the world market and more evaluations are done on both receivers.

MONITORING TIMES

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Judy Grove ..... Advertising Manager

Mitzi McCoy ..... Circulation Manager

Rachel Thomas ..... Subscriber Services

Listen To Your Neighbors' Christmas Presents!

This holiday season, more wireless home entertainment and appliances were sold than ever before.

While much of the electromagnetic pollution will consist of undecipherable noises, some voice signals will be heard as well.

Many intercoms (160—190 kHz), cordless telephones (1695, 1725, 1755 khz base/ 49.83, 49.845, 49.860, 49.875, 49.89 MHz) and walkie talkies (49 MHz ranges as above) will be heard in large metropolitan areas nationwide

MONITORING TIMES PREDICTS: A major thrust by cordless telephone manufacturers for more channels in the overcrowded personal communications bands. Where will the frequencies come from? A good bet will be the little—used federal low band (30—50 MHz) range.

As with all communications intended as private, what you hear must not be repeated (but there's nothing wrong with listening with a friend!).

RADIO CONTROLLED DEVICES share some additional assignments not generally tunable on most consumer radios. They are found in the citizen's band, amateur six—meter band, and the little—known 72 MHz portion of the spectrum:

26.995, 27.045, 27.095, 27.145, 27.195, 27.225 MHz 51.2, 52.04, 53.1, 53.2, 53.3, 53.4, 53.5 MHz
72.08, 72.16, 72.24, 72.32, 72.40, 72.96, 75.64 MHz

Most WIRELESS MICROPHONE allocations are in the low band portion of the FM mobile spectrum:
30.5, 33.14, 33.4, 35.02, 35.96, 36.7, 37.1, 37.9, 40.68, 42.5, 42.89, 42.98, 43.50, 44.87, 47.27, 49.89 MHz

MULTIPLE-POINT DISTRIBUTION SYSTEMS (MDS), relays of satellite TV programs, are broadcast in most major cities on three FCC assigned channels: 2150.25, 2154.75, 2158.75 MHz.

And, for a real thrill, tune in that new microwave oven on either 915 or 2450 MHz!

Editorial

Hopping On The Bandwagon ... Is It Too Late To Save The Vanishing Breed?

With the advent of personal computers, an explosive growth in computer-oriented publications has taken place. Many of these "new" publications are simply relabeled old—timers who have jumped on the bandwagon.

Perhaps the most outstanding (and certainly the most recent) example is the phasing out of Popular Electronics Magazine, now Computers and Electronics. In the U.S., this leaves Radio Electronics virtually the last non—amateur experimenter/hobbyist electronics magazine. Are they the next to follow suit?

Where does this leave those of us who enjoy the evening and weekend challenges of hobby electronics? Where will youngsters and oldsters alike discover the thrill of putting together their first superregenerative receiver and hearing aircraft in flight?

Are we witnessing the death of hobby electronics as we knew it...a smoking soldering iron, a drawer of used components religiously extricated from a defunct radio, a coveted collection of diagrams on pages torn from favorite magazines?

Where will budding basement experimenters learn how to build a crystal radio detector, put together a simple audio amplifier, assemble a wireless microphone?

Not from most ham radio clubs, now depersonalized into repeater societies with structured meetings on the air. Not from school classes whose rare electronics classes instruct in TV repair and make vague references to microcomputers and the microprocessor-controlled world to come.

Not from many library books, whose tattered pages must be regarded in historical perspective, since their home-construction volumes are ancient vacuum tube projects or obsolete germanium transistor experiments.

And certainly not from the present genre of slick magazines whose computer—crazed obsession no longer recognizes RF circuitry unless it interfaces a video display.

We at Monitoring Times would like to ask our readers the following serious question: How would you like an additional publication from Grove Enterprises, separate from Monitoring Times, which is dedicated to the home builder, the radio experimenter, the serious hobbyist who has an unabiding curiosity and takes pride in building his own accessory equipment?

Let us know; we are listening.

The Mujahedin Resistance....

FREEDOM WILL NOT DIE IN AFGHANISTAN

by John Santosuosso

They were young, in their early twenties. But they were seasoned veterans. One had personally witnessed an unsuccessful attack on Radio Kabul. Another spoke of a close friend who had accounted for the death of over one hundred Russian soldiers. It is better not to give names. Let it simply be said they were truly the Mujahedin, the freedom of Afghanistan.

They were pleased to learn that at least a few Americans listen to clandestine Radio Mujahedin, which also identifies as the Voice of the United Muslim Fighters of Afghanistan. When conditions are right, it can be heard on 15460 broadcasting in Dari and Pushtu from 0100 until shortly before 0200. Somehow it manages to overpower those Russian jammers determined to silence it. When asked if the transmitters were in Egypt, as has been suspected, they would only smile. However, they were quick to add that before his death President Sadat had promised "extensive" aid to the Mujahedin. One was left free to draw his own conclusions.

Had the Majahedin been successful in establishing any other clandestine stations? They replied that indeed this was the case. Deep within Afghanistan itself the Mujahedin had made broadcasts using a mobile transmitter. They themselves had heard these, and sometimes the signal would be quite strong only to grow weaker as the transmitter was moved in order to avoid detection. Since they had been out of the country for awhile, they could not say whether it was still in operation or not.

What about the hated Russian? Had he made any use of clandestine radio transmissions? Solemnly, the told the story of how the Soviet invasion of their country was first announced to the world over Radio Tashkent. That station had informed its listeners that at the very same time its broadcast was being made Radio Kabul was telling the people of Afghanistan that Soviet troops had crossed the border at the request of the Afghan government. This they knew was a lie. Friends had been listening to Radio Kabul, and they claimed it never departed from its regular programming.

Did they really think they had any chance to defeat the Russian occupiers? Again there was that quiet smile of those who may know more than they care to tell.

How could there be an "accident" in the Salang Tunnel, they remarked, when a wall separates the northbound from the southbound lanes? The tunnel has been there for thirty years, and there never has been a head-on collision causing a major "accident" before.

No Soviet soldiers from Central Asia are in Afghanistan any more. Their own government could no longer trust them and had to replace them. When they opened bags of sugar and felt bullets being smuggled to guerrillas it was amazing how they would discover nothing. They did not want to fight their brother Muslims.

What about Radio Kabul? Did they plan to attack it again? Yes, it was a definite and high priority target. All past attacks on the station had been unsuccessful because it is heavily fortified, literally surrounded by a ring of tanks.

But the Mujahedin are better organized now, and a successful attack is only a matter of time. It is a virtual certainty, they said.

If you want to hear Radio Kabul before the Mujahedin arrive, you might try for its English language broadcast on 15077 from 1900 to 1930 GMT. An easier catch may be the Home Service transmission on 4740 after 0125 GMT.

Although in the hands of the occupiers, and possibly even relayed via the USSR, this service still sometimes broadcasts beautiful, haunting native music which somehow captures the spirit of a people determined to be free.

"Perhaps our next meeting will be in Kabul," I said, as they prepared to leave. "In a free Kabul," they replied. And maybe they are correct, for after all, they are the Mujahedin.

The Pirates Of Paris

When Francois Mitterrand, now president of France, was arrested and fined for illegal broadcasting in 1979, he vowed that he would open up the airwaves.

And that he did. Under the Mitterrand administration some 1425 "free radio" broadcasters cram the airways in France, over 100 of which are in Paris alone.

There are no restrictions on the content of programming. A recent broadcast featured a couple making love in the studio, complete with a play-by-play commentary by the disc jockey!

The stations are not technically "pirates" since they are licensed; access to licensing is virtually automatic for the applicant.

Thanks to Monitoring Times reader Jim Puscher of Washington, DC for this interesting news item, and for his excellent list of frequencies which appeared in the November/December issue of MT.

The Pirates Of Long Island

Part III

by John Edwards

(In this final installment of our series about pirate radio operators on New York's Long Island, we look at underground radio formats and the method pirate operators use to talk with listeners.)

Programming on Long Island's underground stations is something of a mixed bag. While some do-it-yourself broadcasters are content to play one 45-rpm record after another (a la top-40 radio), such an operator is likely to be viewed by his underground peers as something of a detriment to the corps.

While no particular grudge is held against someone with a preference for broadcasting continuous music, an undergrounder, at the very least, is expected to offer some sort of an alternative to the legal stations. Offbeat album cuts, live performances by local groups and playing listener's requests are all considered to be noble endeavors.

Of course, one doesn't necessarily have to play music to be innovative. WJMP in Farmingdale, for example, is pioneering in the field of underground call-in radio. As with most underground stations, WJMP is apt to be erratic (broadcasting roughly once a month), but when it does appear, the morning's programming is filled with interesting talk ranging from the latest news about fellow undergrounders to a debate on the current condition of the nation's economy.

WJMP's owner, Bruce Camporelli, sets the guidelines for his station. "The caller is free to talk about anything-- politics, sports, weather--for any length of time," he says. "All we ask is that he refrain from using foul langauage and that he says something at least marginally interesting."

Conducting an underground call-in show can present some unusual problems. For instance, an undergrounder can't just use any telephone line--that would be too easy for the FCC to trace. Instead, most employ what are known as "loop lines"--special numbers used by phone company repairmen for testing purposes. Before an undergrounder goes on the air, he places a call to the loop and leaves his phone off the hook. Then, after the number is announced during the broadcast, listeners can call and immediately reach the station on a sort of closed-circuit arrangement. Should the FCC agents then initiate a trace, the trail would only lead back to the phone company.

Loop lines also provide a very important service to the operators of music-oriented stations, who use them as a medium for listeners song requests. A few years ago, before the existence of loops became common knowledge, music undergrounders were forced to rely on a number of even more unusual methods to keep in touch with their audiences. One technique was to have a friend accept the requests and relay them, via a second telephone call, to the station operator. But that plan had its problems, too. If an undergrounder kept announcing the same number night after night, there was the chance the FCC could eventually launch a trace. And friendship has its limits, especially when it comes to talking to a federal agent.

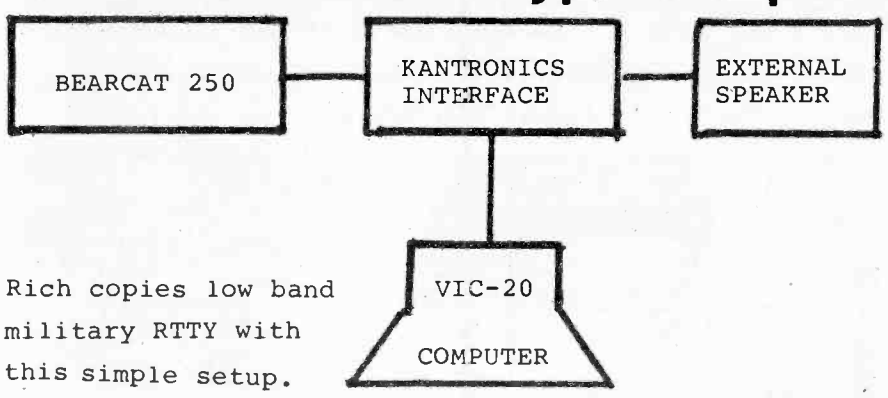
It took a now-defunct station, WSEA in Floral Park, to devise a singular way around the problem. Tommy Stevens, WSEA's owner, had his girl friend take calls for him while she was babysitting at neighbor's homes. Since WSEA's airtime (Saturday nights) coincided with his girl friend's babysitting hours, the arrangement worked perfectly. Each weekend, Stevens would announce the new number over the air and his girl friend would handle the requests, passing them along to Stevens. The only hitch in the system was his girl friend's clients, who would continue receiving mysterious phone calls for weeks after she had left!

It was such schemes that earned WSEA its almost legendary status among area undergrounders. That and the fact that Stevens succeeded in achieving the dream of nearly every undergrounder--becoming a DJ on a legal radio station. And not just any station, but one of New York's network-owned outlets.

The news that he has survived a recent massive shake-up at his station has only elevated his reputation among undergrounders. Stevens, incidentally, decided to close WSEA after realizing the threat the station might pose to his job if the FCC were to apprehend him. Even so, he is still in close contact with the underground community and remains an avid listener.

Which just goes to prove: you can take the pirate broadcaster out of pirate broadcasting, but you can't take pirate broadcasting out of an ex-pirate broadcaster.

Low Band Radioteletype Reception



Rich copies low band military RTTY with this simple setup.

by Rich Newbould

My favorite time of the year is here--winter! Not because of the cold, ice and snow, but because of "SKIP" reception.

As usual the low band VHF channels have come to life here in the keystone state; West Coast police and fire frequencies are active daily from 1100 EST-1800 EST.

Being one who constantly searches for new "skip" reception reports, I began searching with my Bearcat 250, in particular: 36-37, 38-39 and 40-42 MHz. These frequencies are quite active with military communications.

As my radio came to life I discovered some stations were not only clear voice, but RTTY!

Since I use a Kantronics "interface" and the appropriate software card in conjuction with a VIC—20 computer for RTTY/CW/ASCII on my Yaesu FRG-7700, I thought I might try as well on my Bearcat 250!

One simple connection was made ("ext. speaker" to "audio in" on the "Interface") on the Bearcat 250. To my astonishment the RTTY broadcasts were not encoded! All were sent at 67 or 100 WPM (425 Hz shift). Most messages pertained to weather, aircraft locations and even some M.A.R.S. communications (Do not forget section 605).

The frequencies I monitored were 41.25, 40.10 and 41.75; I'm sure there are many more.

Remember, all of my reception reports are "skip", so this type of monitoring is seasonal. For those of you who can monitor these transmissions from local military bases year round, results should be fantastic!

This experiment is still in the infant stage and reader input is encouraged.

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This experiment is still in the infant stage and reader input is encouraged.

"Hamsoft"

By Kantronics

"Hamsoft" provides the necessary package to complete the VIC-20 and "Interface" RTTY station.

"Hamsoft" for the VIC-20 consists of a circuit board that plugs directly into the rear of the computer.

It provides the user with a split screen display, selectable RTTY/CW/ASCII speeds, a real time clock at can be used for GMT or 24 l ar clock.

"Hamsoft" is also capable of providing hard copy if you have a printer. As of this writing "Hamsoft" is available for the following computers; VIC 20, TRS-80 color computer, Atari 400/800, and Apple II w/disk.

"The Interface"

by Kantronics

As its name implies "The Interface" permits interfacing between a communications receiver and a computer. The capabilities of this unit are CW (0-99 wpm), RTTY (60,67,75,100 wpm) and ASCII (110 and 300 BAUD).

This unit can be used by amateur's for sending and receiving, but it works just fine for us monitor hobbyists.

The unit operates on 12 VDC at 150 ma. Packaged in a tan plastic case, the unit will be a nice addition to the shack. Remember, this unit is for use with a computer, and as of this writing, the only computers it will work with are Atari 400/800, TRS-80 color computer, Apple II with disk drive, and VIC 20.

Commodore VIC 20 Computer

The VIC 20 is a color computer which is readily available at local discount stores. It comes with 5k of RAM, expandable to 32K, 8 programmable function keys, a typewriter style keyboard, upper/lower case characters, and superb graphic capabilities. Interfacing this computer is only limited by the users imagination and checkbook! Software can be purchased on plus-in ROM cartridges on cassette tape.

What Is That Hum?

Have you ever had the experience, when all is quiet, of hearing a low—pitched hum? While audiologists are quick to explain the phenomenon as "tinnitis", a variation of ringing in the ears, there are those who wonder if some more ominous cause might be responsible.

Are our bodies responding to electronic polution? The elevated level of RF and electromagnetic fields grows all the time. Project ELF, atmospheric ionization experiments, high voltage tramsmission lines, military experiments in earth—conducted signals, microwave long—distance beams, satellite interrogation and atmospheric sounding beams all co-exist

Could the headache and nausea—causing radio beams transmitted at the American Embassy in Russia a few years back be the tip of a personality—modifying iceberg? An interesting question which requires a knowledgeable answer.

Moscow Molly And The Neptunesw Of Argentia

Part II

By Havana Moon

Molly and the Soviets knew (as all electronic-propagandists know) that if they expected these reconnaissance crews to listen, they would have to give them something that they wanted to listen to.

In the manner in which the Nazis broadcast "swing" music to the GIs of World War II, Molly would broadcast "high-end-of-the-AM-dial" music to the Argentia crews.

Intelligence quickly determined -by RDF and other means- that 12,210 KHz was the relay output frequency for Molly from one of the trawler transmitters. Molly was --apparently-- snug and warm in Moscow or Minsk. That's --well, the story that George was told by his superiors. The feeder frequency was never revealed to George. The Soviet Naval Base at Murmansk, however, was one possibility.

How did Molly know when to transmit? That part was the least of the mystery. The trawlers would simply indicate by encrypted transmissions that the Neptunes were on-station. It was known that most Soviet traffic was directed to the Naval installations on the Barents Sea.

How did Molly obtain the other information? There was a more sinister answer to that question. That there was a spy --somewhere-- was obvious. Counter-Intelligence had nothing but vague answers for that one.

This spy obviously communicated by radio as broadcast information from Molly was, for the most part, current and accurate. There were instances when sudden Neptune crew changes would result in Molly greeting crew members that were elsewhere.

Her weather information was proving to be an embarassment to Naval Flight Operations. Molly would often predict dates on which flights would be "scrubbed." Her meteorological information was superior to that of operations.

As was the procedure of this Soviet flotilla, the vessels would disperse in all directions during the day. At night, they would "cluster" around an electronic-beacon buoy. The ident signal was in Morse and was alpha-numeric (the full ident and frequency was not remembered).

Transmissions to the Neptunes would begin at about fifteen to twenty minutes after the planes were on-station. Transmissions usually occurred three or four times week and were of about one hour's duration.

The music was interspersed with news, weather, and bits of personal information in regards selected Neptune and destroyer crew members. Molly would usually terminate with short tips on survival for downed fliers. She was also emphatic in regards an imminent recon disaster!

As the missions continued, much of the COMINT and ELINT activities were shifted to destroyer crews; the Neptunes would become heavily involved with ECM activities (Electronic Counter Measures). It was about this time that Molly became more mysterious and emphatic in her warnings of disaster.

She also commenced, on an irregular basis, to add the name of Ensign Brian Miller in her greetings. Strange! None of the crew members had heard this name before. None -- except George. Upon hearing this name, he sat in silence for a very long time.

Steve and Frank were the first to notice George's personality change. He continually wore the look of a man on guard; tensed, always waiting for the unexpected.

During the late afternoon on July 1, 1960, George was summoned to attend a most urgent briefing. He would sadly learn that the disaster that Molly had often mentioned had finally happened.

An RB-47 "shoot-down" had occured just hours before! This recon aircraft had been downed by a MiG fighter over the Barents Sea—four of the six crew members had perished.

"Molly was right!" exclaimed George as he briefed his crew just before take-off. Better that they hear it from him than Molly.

"Secure yourselves and all equipment on the double!" George screamed at the startled crew.

The Neptunes and Navy fighters then began their mock bombing and straffing runs at the trawlers for the next few hours.

George advanced in rank to Lieutenant Commander; his flying days were--well, temporarily over. His new duties would include --among others-- Argentia Direct Air Recon Support.

Frank was now Lieutenant J.G. Arlington and he was the OIC (officer-in-charge) of the Neptune crew. He wondered what surprises Molly would have for him in the months ahead.

Molly had one last surprise for George. It was his birthday and what-a-time he was going to have at the officers club that night.

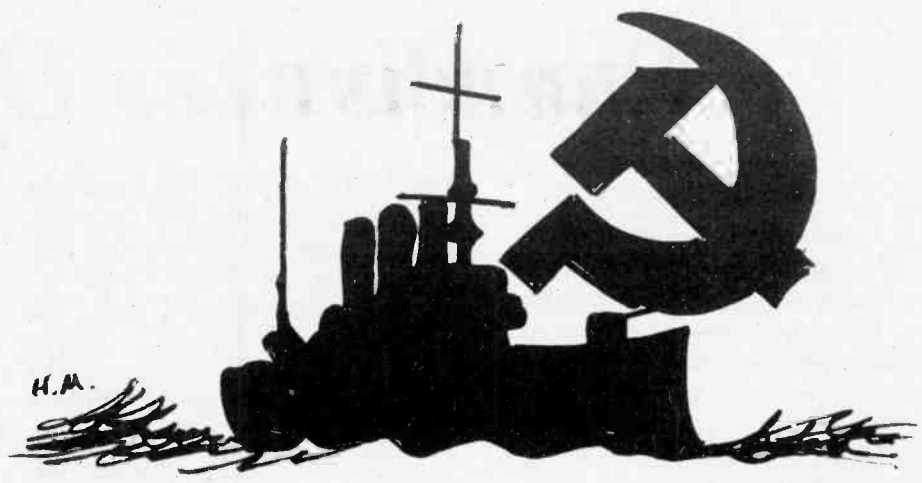
"He what?" George screamed.

"Cut his feet on scattered glass in the shower. He---"

"Forget it! Pick me up in thirty minutes," he snapped as the Marine hastily retreated through the BOQ door.

"Frank really owes me now," George remarked as Steve automatically tuned to 12,210 KHz.

"It's my birthday and ---"



There she was again! "Moscow Molly" with a birthday greeting for Lieutenant Commander George Carpenter. And then --Moon River, George's favorite song.

Molly terminated her transmission by telling George in less than one day he too would come face-to-face with MiG pilots. Then --silence.

Molly came back up on frequency just minutes before the Neptunes were to return to Argentia. She bid George and all of the crews farewell for the last time. She advised George that he would find a letter and a package from his fiancee upon his return to BOQ.

Later --the letter and package were opened.

★★★★★

"Okay George! Just who was Ensign Miller?" I asked as we drove to the airport the next morning.

I was pulling into the short-term parking area before he decided to answer.

"Miller was my best friend and room-mate at OCS. (Officers Candidate School) He's dead you know. Got it on a photo-recon flight near Inchon. The body was burned --"

George hurriedly cleared airport security without saying another word. I would never see George again.

Adios, Jorge
HAVANA MOON

Monitoring Times is pleased to answer questions from our readers. Only those which are accompanied by a self-addressed stamped envelope will receive a personal reply.

VIEWPOINT

Just finished the latest issue of Monitoring Times and I have a complaint...two, actually.

It is not nearly big enough, and it does not come out nearly often enough.

Having been in the newspaper business myself, I figure you could put this out on a weekly basis with the same number of pages each week for about three weeks before you had a nervous breakdown...but think how many of us you would have made happy in the meantime!

Seriously...IT IS ABOUT TIME that we had a serious, professional and responsible organ for the serious monitor enthusiast. Every issue has been better than the last and I really do look forward to the day that you will become a monthly publication. I am sure that day will come...I hope it will be soon.

Keep up the good work! (Art Lewis Kimball, Tuscola, IL)

I would like to know if you accept trading for receivers, scanners and accessories (Juan Jilly, Miami, Fl.)

As much as we would like to accomodate our customers Grove Enterprises has no walk-in trade so used equipment can not be accepted. Contact other advertisers in Monitoring Times, or place an ad in the Stock Exchange column....Bob)

Congratulations on an interesting publication. Although I enjoy the publication I must take you to task for the "tacky" way you insert the little self-serving comments about the Grove equipment. It seems unlikely to me that your contributors would all insert these little tid-bits so that they appear in the same issue.

As examination of the paper will show that we are paying for a very high content of advertising with the multiple pages and the addition of the "Marlin Perkins type; Mutual of Omaha" ads in the editorial content is a little much.

Gordan F. Fox, W1YNE, Conventry, RI

(Grove Enterprises is the only combination manufacturer of accessories and publisher of books designed for shortwave and scanner listening. As a result it is not surprising that many authors mention this source in their articles. Competitors are also mentioned when their products or publications apply.

So far as the "very high content of advertising", Monitoring Times has the smallest ad content of any commerical hobby electronics publication. The "break-even" point for magazines and newspapers run anywhere from 40-70%; MT ad space is limited to approximately 30 percent....Bob)

I have just received the November/December issue of MT. I must say that I am continually impressed by the large amount of frequency information contained by your publication, albeit American oriented. (It is also one of the few publications which I read, where, I find the advertisements as interesting as the articles themselves.) I certainly did not realize that the interest in specialized radio monitoring was to the degree it evidently is.

Are there any plans for more Canadian frequency information in future publications, and/or are there presently any books in the Canadian (or American) market with relative information? Congratulations on your very imformative publication. Good luck and keep up the good work. Bob Antonietti, Ottawa, Ontario

(Thanks, Bob. We encourage more Canadian contributions so that we may expand our coverage to our nothern neighbors. Unfortunately, I am not aware of any books on the market for your area...Ed)

I wonder if it might be possible for a business such as yours to make arrangements to get lists by city or area of all services, and how much demand there would be for them? I know I would be willing to pay as much as $25 or $30 once a year to be able to get a good list of everything rather than just the police, fire and similar services usually sold.

Paul C. Gunn, East Moline, IL

(How about it, readers? Do others of you want this kind of service or publication?....Bob)

Why not have short columns of say the media freqs., F.D. freqs, business freqs, mobile phone freqs., paper freqs., medic freqs (mobile), hospital freqs, military freqs, etc., also their location. Say just a few from each state, with a notice of what you will run in the next issue. Don't forget skip is in and the west coast is beginning to come in the midwest.

Oh yes how about these experimental stations? I would like to know just what they are trying to test. Living close to Motorola here in Chicago's N.W. suburbs they are heard on 451.65 MHz. Then a year or so ago one was heard on 159.425 MHz. The latter repeating odd meaning sentences.

Jim Cavanaugh, Palatine, IL.

Recently received a sample of your "MT" and find it very entertaining and informing. The only thing I'd say by way of comment, is I don't agree with the "liberal" views applied to the various state laws re: scanner use. "Street" or "portable" use of these devices is not a prerequisite for enjoyment of the monitoring hobby!! If one "sees" the enormous problems police agencies have in protecting your propery and safety, I'm sure cooperation, and respect for the need for these laws, would be the order of the day. Unfortunately, we all must be prepared to pay some small price for the "moral impoverishment" of a small, but nonetheless, still too large, criminal minority. By the way, we "Canucks" have lots of dirty linen, too! Hi!.

Richard Phillips, St. Catherines, ONT.

On page 9 of Vol. 1 No. 4, illustration No. 1 (of MT) is of the BBC Broadcasting House, not Bush House. Broadcasting House is the home of the BBC's administration dept. and several studios of their internal services.

Bush House is the home of their external services, i.e., "BBC World Service".

So I have written to the BBC and am pleased to enclose one of their official photos of Bush House. Geoff Halligey, Cottingham, England

(Thanks for your thoughtfulness, Geoff!...Bob)

Within the past several months the entire Honolulu Police Department converted over to microwave. Frequencies that came in loud and clear, were no longer.

I put the scanner on the Scanner Beam, aimed it toward Honolulu (there is a mountain range in between) and Bingo! I hear it all once again! (June Frabotta, Kaneohe, HI).

Thanks for the interesting information, June. Apparently the Honolulu PD abandoned their VHF repeater backbone and you are now hearing communications direct!

Can think of no publication on the market for monitoring, than MT that is more timely and informative. Keep up the great work.

Henry Ponder, Lawndale, NC

Special Report from page 1

Ascension Island

4500	7910	13468	15528	18700	20475	24512
5775	9170	13495	15564	18801	20690	24780
5822	10147	13742	16216	19126	21810	25130
7313	10159	14497	16246	19371	22990	25161
7332	10215	14585	17470	19966	23035	25198
7605	10230	14615	17552	20186	23479	25245
7697	10850	14937	17554	20192	23485	25597
7715	10880	14967	18051	20198	23661	26356
7742	11634	15471	18331	20266	23840	26389
7804	11988	15484	18434	20272	23940	26684

Antigua Island (incl. US Navy)

2576	5060	6919	9115	10475	15064	19143
2744	5436	7313	9138	11984	15087	23281
3039	5724	7860	9170	12160	15560	24530
3099	6701	8964	10270	12287	16246	26515
3219	6810	8972	10301	14432	17554	
4714	6880	8991	10327	15025		

Western Space and Missile Center (WSMC)

USAF Pacific Missile Range (Formerly SAMTEC)

Frequency (kHz)

3163.5	5700	7706.5	10273.5	10804	15763	17428
4486	5822	9029	10510	13218	13900	20261
4760	6889	9213.5	10660	13756	15021	

Additional NASA Frequency Allocations (kHz)

Nationwide Tracking Net	3380, 3385, 3395, 6982.5, 14455
Wallops Island, VA	14452, 20089, 22745
Houston, TX	2624, 25590, 27725
Hampton, VA	2017.5
Moffitt Field, CA	2541.5, 27725
Fairbanks, AK	4683.5, 5470.5
New Orleans, LA	2207.4, 2383.4
Mobile, AL	2431.4
Elginton, TX	27900
Satellite	4000
Search And Rescue	10003, 14993, 19993

NASA Frequency List Cape Kennedy, Florida

1610 (AM) VIP grandstand rebroadcast

SLF-Shuttle Landing Facility
ETR-Eastern Test Range
CT-Crawler Transporter

FREQUENCY (MHz)	ASSIGNMENT
117.800	Shuttle/Control Rebroadcast
171.0000	Utilities/Parking "Bravo Control"
156.1875	Telemetrics/EMI
173.6875	Security Primary/Astronaut Escort
162.6125	Launch Support "Alpha Control"
173.6625	Range Safety/Prime Emergency Egress
416.500	Range Safety
170.4000	GSA Supply/Maint.
170.1500	Base Comm./Press
170.3500	Public Affairs/Paging
148.4550	SRB RCVY/HGR AF CRANES
149.1750	SRB RCVY/HGR AF CRANES
173.5625	Fire/Emergency Egress/Rescue
173.4375	Med./Emergency Egress/Rescue
171.1500	General Maint./Fuels "NOVA"
173.1750	Security Tac.
170.1750	Rail/Trucking Ops.
158.940	Civil Defense (RCV 155.715)
173.7875	Fire/Backup Emergency Egress
155.3700	Intercity Police Dept.
162.0125	Marine Ops.
154.1600	Intercity Fire Dept.
148.4850	Timing/Photo/Status
163.5125	Cape SRO
163.4625/.4875	Cape Security
163.5625	Cape Fire
142.5000	O&C Crane Ops.
142.8600	O&C Crane Ops.
143.0400	O&C Crane Ops.
139.3000	Operational Loan Pool
139.900	Operational Loan Pool
164.000	Radiation Monitoring
407.325	LC 39 Convoy CMD.
407.475	LC 39 VAB Crane Ops.
408.150	LC 39 Convoy Purge
408.175	LC 39 VAB Crane Ops.
408.800	LC 39 Ops. Pool
409.050	LC 39 VAB Crane Ops.
409.125	LC 39 Ops. Pool
409.175	LC 39 Convoy Cooling
121.750	Chase Aircraft/Ground
126.300	Air/Ground Control
126.65	Weather Recon
259.700	Air/Ground (Orbiter)
296.800	Air/Ground (Orbiter)
284.000	Air/Ground Control
243.000	Emergency (MIL)
121.500	Emergency (Commercial)
916.000	Crawler Moves
929.000	Crawler Moves
939.000	Crawler Moves
165.1875	Visual Surveillance
165.6125	(Unknown)
165.8975	(Unknown)
171.2625	Camera/recording production
173.5375	(Unknown)
416.150	(Unknown)

295.075 Uplink/261.475 Downlink Satellite Data Link

Patrick AFB, FL (Aircraft)

Zone Control - 126.4
Barracks 7 - 141.3
Barracks 9 - 294.6
Twr USAF - 236.6
Gnd Ctl Pat - 335.8
Twr Pat - 348.4
Dep Ctl Pat - 340.9
Twr CK/SKID - 393.0
Thinker 1 - 264.8
Variety 1 - 294.6 (USCG at SRB impact area)
Space Shuttle CM - 296.8
ARRS/Tng/TAC - 252.8
USCG Air/Gnd - 381.8
USCG/SAR - 282.8
FSS VFR - 255.4
PFSV WX Pat - 344.6
PTD Base Ops - 372.2
Twr GBI - 284.1
App Ctl Pat - 358.3
GCA Discr Pat - 369.2
" " " - 297.2
" " " - 378.8
" " " - 372.8
PTD Pat Ops - 383.0
CK Reg/Mel - 257.8
Melbourne Twr - 384.4
Miami ATC (Mel) - 269.3
Freeport App Ctl - 269.4
UHF/DF - 255.4/305.4
USCG Sec Air/Gnd - 282.0
JAX ATC Daytona - 263.0
JAX ATC GNV - 385.6
ORL App Ctl - 307.0
Orl Dep Ctl - 284.7
Avon Park Ctl - 292.2

Command Voice and Ranging (Freq. MHz) Shuttle (downlink)

259.7 (EVA astronaut to orbiter)
259. 4 (backup and teleprinter)
296.8 (primary UHF voice; simulkey w/S band)
2205.0 TLM (FM)
2217.5 " "
2287.5 " "
2250.0 " "

GROUND (uplink)
296.8 (primary UHF voice; simulkey S-Band)
259.4 (backup and teleprinter)
2106.4063 (PM)
1831.0
2041.9479
RADAR Altimeter 4.36 GHz
TACAN 1092/1156 Mhz 1135/1198 MHz 1121/1184 MHz
MSBLS 15.460, 15.616 GHz

Edwards AFB Shuttle Support Frequencies

MHz	USE
121.8000	Lakebed Traffic Control
123.0500	Loma Linda Hospital
138.4500	A/G VHF Command Control
162.6250	Purge VHF Net
164.1000	Convoy Command VHF Net
168.0000	Cooling VHF Net
169.4000	PAO Release (JSC)
169.6000	TV Direction (JSC)
2287.5/2217.5	S-Band Fm
4680	Chase Plane
7245	TV 1 Long Range
13012.5	TV 3 Lakebed
1771.8310	TV-2 Convoy (JSC)
2250.2205	S Band FM

Hams To Broadcast Shuttle Comms....

FCC Reverses Ruling

In a reversal of the ruling reported in Monitoring Times, November/December issue, the Federal Communications Commission has decided to allow the amateur radio service to rebroadcast Space Shuttle Communications.

The new decision was handed down after the amateur community responded to the prohibition by the FCC to continue transmissions made on several amateur 2-meter repeaters during the previous shuttle missions.

As of this writing, it is legal for amateurs to retransmit the audio loops intended for public reception. Jet Propulsion Laboratories (JPL) in Pasadena provided wide-area coverage during the flight of STS-5 through the use of single sideband relays of the broadcasts on the amateur 20 meter band.

Monitoring Times reader Chester Brown of Lodi, California investigated a rumor he heard that the transmissions were taking place. A JPL spokesman confirmed the rumor, adding that Houston is also participating.

Shortwave frequencies ostensibly in use during the last mission included 14230, 14263 and 21360 kHz USB. MT readers are advised to look on or near these amateur 20-meter frequencies during the next shuttle mission for more astronaut voice relays direct from space.

Satellite To Aid Search And Rescue

Four nations recently agreed to explore the possibility of cooperating in a joint project to launch a satellite system designed to look for emergency and distress signals in the worldwide aircraft and maritime bands.

The United States, Canada, France and the Soviet Union have reached partial agreement on the vigilant satellite, capable of hearing calls for help on such frequencies as 121.5 and 243.0 MHz, used globally for calling and distress. Downlink transmissions can be heard in the 406.0-406.1 MHz range.

On June 30, 1982 the Soviet Union launched COSPAS I, the first satellite within the framework of the joint project. The US SARSAT, developed in common with Canada and France, is tentatively scheduled for a February launch.

The next year or so will be devoted to tests to evaluate the effectiveness of the system. Norway and the United Kingdom will combine their efforts to help the four other nations determine the eventual effectivenss of the pioneer search and rescue system. Saved lives are already being reported by participating agencies.

TIS A New Challenge For The DX'er!

by Terry L. Krueger

Probably every Monitoring Times reader has at some point DXed the medium wave band. The dial is filled with licensed broadcasters ranging from a few hundred watts to thousands of kilowatts. But did you know that a world of low-powered medium wave services are anxiously awaiting your ears?

In recent years, I have enjoyed listening to the little-known world of low-powered "carrier current" -- usually under 10 watts) medium wave stations. For the purpose of this article, we'll classify these low-powered services into three categories: TISs, carrier current broadcasters and mutants.

T.I.S.

What's a TIS? No, it's not a new Swedish anti-submarine device. A TIS is a Traveller's Information Station. TIS's are low-powered (10 watts) AM automated advisory stations. TISs are becoming increasingly popular at national parks, tourist attractions, airports and congested highways -- anywhere that the mobile masses may gather. Most TISs are found just below or above the US medium wave band (530 or 1610 kHz, respectively), however, some operate in-band, as we'll soon explore.

You might wonder just what is so special about TISs. These stations, though clearly intended for the general public's listening, have gone relatively unnoticed in the DX press. Many shortwave clubs have given the upper-frequency TISs an "exiled" status; that is, classified them as not operating within the shortwave spectrum. Indeed, the 1610 kHz TIS propagates closer to a medium wave signal's characteristics that to shortwave, and most auto radios can be stretched just past 1600 and below 540 kHz. Medium wave clubs, though more tolerant, have yet to focus on the extensive DX possibilities of TISs.

Normally the listener will have to be within a few miles of a TIS, at best, in order to hear the signal. A few TISs do seem to exceed their required wattage, however. Fortunately, road signs are erected at most TIS sites, advising the listener in advance. Some TISs to try for include: WXT-613, Greater Cincinnati International Airport, Boone County, Kentucky (1610); Gatlinburg Information Radio, Gatlinburg, Tenn. (530 and 1610); WYZ-235 Tampa International Airport, Tampa, Fla. (1610); KFB-759, Acadia National Park, Maine (1610); and WRD-948 south Atlanta, Georgia (530).

A sacred few locations operate TISs within the medium wave band. Walt Disney World (Lake Buena Vista, Fla.) has four in-band TISs: 1030 and 1200 at the Magic Kingdom, and 810 and 900 at EPCOT Center.

The TIS at the Kennedy Space Center (1610) uniquely carries the unedited live shuttle-to-ground control conversation during STS launches for the lucky-few grandstand dignitaries.

Summer vacations are ideal opportunities to hear TISs. Check 530 and 1610 kHz when near possible TIS locations on your car radio.

I would like to compile a comprehensive listing of TISs nationwide for publication in Monitoring Times. Please list the exact site, frequency, call letters or slogan and operator (government or private) when submitting the information. Send all TIS/low-powered information on a postcard to: 84 Winter Park Drive, South, Casselberry, Florida 32707, USA.

CARRIER CURRENT BROADCASTERS

Many college campuses in the US operate (legally or illegally) low-powered broadcasting stations. Some of these stations are legitimate entities of the college. The University of Central Florida in Orlando, for instance, operates WUCF-AM on 640 kHz (under two watts) for preliminary training before announcers are allowed on the eight-kW WUCF-FM. Occasionally, technically-inclined students have trasmitted their own experimental programming from dormitory residences. Thus, it is wise to check the medium wave dial when on any university campus.

Drive-in movie theaters are rapidly converting from the old wired-in box speakers (how many of you have intentionally driven off with the cord still in your car?) to AM/FM soundtrack audio. The AM transmitters are usually on 530 kHz, while FM is in the 88 to 90 MHz range.

Another unique carrier current broadcast service is the drive-in church. Several old drive-in theaters across the US have been purchased and renovated by church groups for Sunday services. One such example is the Drive-In Christian Church in South Daytona Beach, Fla., operating on 657 kHz from 7 a.m. to 11 a.m. Eastern Time Sundays.

MUTANTS

Several aeronautical or maritime beacons operate within or near the medium wave spectrum. "The Beacon Guide" by J. Clements and K. Stryker, PO Box 17088, Seattle, Wash. 98107 USA is highly recommended for reference in this area.

DXer David E. Crawford of Oak Hill, Fla. has, for several years, noted mutant beacons just above the medium wave band. Some of David's most recent findings from his coastal location include Morse A1 mode OZ45 (1818); YN14 (1825); ZQ43(1860); and K205 (1900). Any details on the origin/purpose of these beacons is welcomed.

Cordless telephones on 1695, 1725, and 1755 kHz, European maritime traffic and other utility operations are also found just above the upper end of the band.

The medium wave pirate topic has been covered in detail in past Monitoring Times issues, but should not be overlooked. Most medium wave pirates operate in the 1610 to 1630 kHz range (though some have appeared in-band, i.e. KDOR, 830 kHz, Los Angeles, Cal.)

New York City and New England have traditionally been the home of most medium wave pirates. If you live far from New England, don't give up hope on hearing some of these infamous operations--I frequently logged WCBX, New York (1615) in the spring of 1979 on a car radio in Florida!

Many low-powered stations can be verified by simply stopping in at the transmitter site. Prepared verification cards are a must, as is a convincing monologue explaining the purpose of QSLing!

I hope you have gained some insight into the low-powered medium wave world through this article, and wish you the best of 73 and happy carrier currents!

This card confirms your reception of Great Smoky Mts. Nat'l. Park, Smokemont, NC, KIE700 on 1610 kHz, 2 August, 1982 at 2145-2200 GMT hours. Transmitter power is rated at carrier current watts.

Marian Engle-Park Ranger

SUPERINTENDENT
Great Smoky Mountains National Park
Gatlinburg, Tennessee 37738

Terry:

This card confirms your reception of the 1982 World's Fair Radio stations on 530 kHz, 2 August, 1982 at 1:15 to 2:00 p.m. EDT. The transmitters are operating at carrier current power.

Official 1982 World's Fair Souvenir
the Continental card

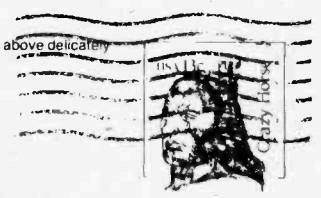
© 1981 Knoxville International Energy Exposition
Knoxville, Tennessee 37901

Mr. Terry L. Krueger
84 Winter Pk. Dr., S.
Casselberry, FL
32707

THE 1982 WORLD'S FAIR (May 1 - October 31, 1982) in Knoxville, Tennessee, gateway to the Great Smoky Mountains National Park. The energy-themed international event is the first World's Fair to be held in the United States since 1974 and the first fully sanctioned World's Fair ever held in the Southeastern United States.
B11034

Mike Roberts Color Productions
Oakland, CA 94623

JAPAN IN THE WORLD SHOWCASE The lower of an ancient fortress will rise above delicately sculpted gardens and colorful *koi* fish ponds in the Japan Pavilion



This verifies your reception of the EPCOT Travellers Information Radio on 810 and 900 kHz at 1604-1635 hours, EDT, on 17 October, 1982. Power is at carrier-current.

Walt Disney World
EPCOT CENTER

Sincerely,
Roger Nickel
AUDIO/ELECTRONICS WDW

ADDRESS
Mr. Terry L. Krueger
84 Winter Pk. Dr., S.
Casselberry, FL
32707

© 1981 WALT DISNEY PRODUCTIONS

WXT 613
Travelers Information Radio
Kenton County Airport Board

1610 kHz, 2 Watts, monopole antenna 47.5 feet above the ground 10 miles SW of Cincinnati, Ohio, in Boone County, Kentucky.

We confirm your reception of our radio transmission on the 1 day of August, 1982

Chief Engineer

GREATER CINCINNATI INTERNATIONAL AIRPORT
Box 75000
Cincinnati, Ohio 45275

TV DX From South America

by Jorge E. Cattaneo

An interesting branch of our hobby is DX'ing TV—VHF frequencies, and from Buenos Aires, very good catches take place between September—March of each year (Spring—Summer in southern South America).

I have enjoyed this kind of DX since 1975 when I discovered that with my old Philco TV set an ordinary antenna for local channel reception (on top of my building) I could see "something more" that another people.

In those days an article about TVDX appeared in a local newspaper and the author said that only in Europe was that kind of "signal captured" possible. Since that I tried to demonstrate that TVDX in Argentina was possible and I can pursue it.

At that moment the only signals of DX for me originated in Uruguay, so I waited for more distant captures. I scanned daily at different hours the low TV channels (2-3-4-5-6).

Before I continue, I have to explain that in Buenos Aires, we have 4 channels (7-9-11-13) and, as I live very near the transmission antennas, it is impossible to try the DX in the high channels when they are on the air. There is only one station on air near my city in the Low ch., but it does not present a problem (Ch 2 of La Plata at 57 KMs.)

Nothing extraordinary happened until 1977. One day in January, in the afternoon, signals from Brazil appeared at the same time in Ch. 2-3-4-5. That was only the beginning. One year later I saw Ch. 3 (TV Nacional de Chile) and since that year Channels from Peru, Venezuela, El Salvador, Nicaragua, Puerto Rico, Republica Dominicana and Mexico have appeared frequently probably because of the high solar activity.

Owners of the TV channels are not very interested in verifying the reception reports because they transmit only for a predeterminate influence area, so obtaining a QSL from the station is a challenge for the TV DX enthusiast.

Making a reception report for a TV station, I proceed as follows: when the DX signal appears, a cassette—recorder must record the program, especially the commercials and parts of the program. The commercials are very important when the station doesn't identify itself to recognize first the country and then, if possible, the city.

The kind of money mentioned in the prices can help, for example, Pesos (in Argentina, Uruguay, Chile, Mexico), Soles (in Peru), Bolivares (in Venezuela), etc. Brazil is easy to identify, not only for the money (cruzeiros) but for the language (Portuguese), a difference from the rest of Latin America who speak Spanish.

At the same time, I write the time of start and ending of each commercial block and the program. Then, after the DX, we must transcribe parts of the commercials, name of products and significant announcements. As the TV station keeps a log of commercials, this can prove that our report is correct. The report must contain: Date, time of the DX (in UTC or local time of that country), details of the program (as I indicated above), TV set and antenna, evaluation of the reception conditions (video-audio-fading), name, address and an SASE.

The addresses can be obtained in the WRTH (indispensable) and some times, when the identification isn't easy but we can identify the country, a little intuition can help.

The TVDX is not easy. Radio programmes around the world can be tuned in all the time, but when a TVDX station appears you must be there. The non-receipt request of our reports can dishearten, but when a QSL—letter arrives you know you must continue with this hobby!

Many important TV networks confirm correct reports with a QSL-letter and a sticker or other souvenirs:

-Rede Globe (TV Globe Ltda., Rua von Martius 22, Jardim Botanico-20000 Rio de Janeiro, Brasil.) Channels and repeaters throughout Brasil.

-Radio Caracas Television (Coraven, Corp. Radiofonica Venezolana, Apartado Postal No 2057, Caracas 101, Venezuela) Broadcast in 15 different cities of Venez. in Ch. 2-3-7-10. In Buenos Aires only Ch. 3 can be seen.

-SODRE (Servicio Official de Difusion Radioelectrica, Montevideo, Uruguay) Ch. 5CX-ATV

-WAPA TV (Puerto Rico Broadcasting Inc.-G.P.O. Box 2050, San Juan, Puerto Rico 00936) Ch. 4

-WKAQ TV (Telemundo Inc.—G.P.O. Box "W", San Juan, P.R. 00936) Ch. 2

-YSR TV2 (Ap. Postal 720, San Salvador, El Salvador)

-Canal 13 Television (Corp. Mexicana de Radio TV, Periferico Sur 4121, Mexico 20 D.F., Mexico) In Bs. AS. I have seen a repeater on Ch. 2.

As the color systems in South America are diverse (NTSC, PAL M (Brasil) and PAL N (as in Argentina and Uruguay) with a standard TV set it is not possible to receive the chromatic signal of another system. I have a SONY Trinitron PAL N set and with it and with my old NTSC W/B I can receive DX signals from different systems very well.

If the video carrier isn't useful we can clarify the audio with a SW or FM receiver near the TV set, tuning it until aural signal is heard.

If you think that radio DX is interesting, try TVDX!

BUENOS AIRES TV STATIONS

DIRECCION Y TELEFONOS DE LOS CANALES

- 2 LS86 Calle 36 entre 2 y 3 (La Plata) - 4-4510 y en Capital, Pueyrredon 1504 -826-4053/83-7371.
- 7 A.T.C. LS82 F. Alcorta 2977 - 802-6001/06
- 9 LS83 Pasaje Gelly 3378 - 801-3065/71/75.
- 11 LS84 Pavón 2444 - 941-9231 y 9351.
- 13 LS85 San Juan 1160 - 27-3661/66.

ARGENTINA TELEVISORA COLOR

Argentine TV stations are well represented among TVDX targets

Bookshelf ...For Your Reading

Several excellent publications of interest to listeners are highlighted in this month's column.

One unusual--and highly desirable to military listeners--publication is a large wall map produced by the Department of Defense. The large (58" x 42") wall map shows the locations of every major Air Force, Navy, Coast Guard and Army installation in the United States.

At only $2.25, the map is bargain. Send a check made out to the Treasurer of the United States and ask for Map #8205xmilinst; order from: Defense Mapping Agency, Office of Distribution Services, Washington, DC 20315.

Popular shortwave host Ian McFarland alerted us to several interesting publications available at no charge from the Canadian Department of Communications. They include "From Aloutette to Anik and Beyond", a colorful guide to the evolution of Canadian satellites; "For Better Television Reception", a bilingual brochure of TV antenna hints containing a list of all Department of Communications district offices; "The Spectrun", a full—color brochure illustrating man's gradual trend upward in frequency; and "How to Identify and Resolve Radio—TV Interference Problems", a reprint of an FCC booklet with superb step—by—step remedies to make listening more enjoyable.

Canadians may wish to order any of these publications through their nearest DOC office. U.S. listeners may contact the FCC for the excellent interference booklet.

★★★★★★★★

THE RADIO AMATEUR'S HANDBOOK (1983 Edition) (8—1/2" x 11", 640 pages, $12 from Grove Enterprises)

This masterful compendium from the American Radio Relay League has been the bible among radio habbyists for decades. The new edition follows the tradition of quality workmanship and meticulous craftsmanship which has become the hallmark of ARRL design.

Twenty—three chapters include such topics as electrical laws and circuits, test equipment and procedures, oscillator design, receivers and transmitters, antenna theory and construction, construction practice and data tables, frequency allocations, portable and emergency communications, solid state fundamentals, radio design techniques and language, wave propagation, vacuum tube and semiconductor theory and specifications, and much, much more.

Profusely illustrated, the ARRL handbook is the most valuable publication available for the serious radio hobbyist.

Continued on page 11

Continued from page 10

1001 THINGS TO DO WITH YOUR PERSONAL COMPUTER by Mark Sawusch (5" x 8", 333 pages, paperbound, TAB 1160)

With the potential proliferation of personal computers about as thick as CB's were just a few years back, Sawusch's book is a gold mine of games, business and technical programs, educational and control applications.

Written in an universal BASIC, softwave programs include: Chess, Personality Test, Robot War, Star Challenge, Music Composition, Lunar Landing Simulation, Antenna Design, Logic Circuit Analysis, Statistical Analysis, Mathematical Equations, Life Expectancy and many more.

Quite a collection of useful programs and application suggestions written in an easy—to—read style for the beginner. ($8.95 from TAB, Blue Ridge Summit, PA 17214)

BETTER SHORTWAVE RECEPTION by WILLIAM I. Orr and Stuart D. Cowan (5—1/2' x 8", 160 pages, paperbound, $5.95 from Radio Publications, Inc., box 149, Wilton, CT 06897).

Orr and Cowan are well known and respected authors of books and articles on communications; their recent printing (1982) is an updated edition of a popular book they first co—authored in 1957. Since radio waves have a habit of behaving the same now as they did then, the book is still eminently useful as an overview of the hobby of "listening in."

Topics include choosing a receiver, how receivers work (in laymen's terms), the radio spectrum and signal propagation, receiver alignment (peaking up that sensitivity), techniques for better interception, DX'ing the broadcasters (including FM and TV), even VHF/UHF receivers and services.

A chapter on shortwave antennas gives some good, solid advice on considerations like height, durability, grounding, shock hazards and more.

Good reading for those just getting into the hobby of listening to the spectrum, and for those of us who need a refresher as well!

INTERNATIONAL SATELLITE TELEVISION RECEPTION GUIDEBOOK by Stephen J. Birkill (8—1/2" x 11", 78 pages, paperback, $40 from Satellite Television Technology, Inc., PO box G. Arcadia, OK 73007).

While $.50 per page might seem a bit steep for any consumer book, Guidebook is an erudite reference. It is not loaded with fluff; rather, it is a cogent collection of data concerning all aspects of TVRO installations written by an expert.

This 1982 edition is profusely illustrated with transponder allocation charts, footprint diagrams, block diagrams of systems, orbital positioning data, classes of transponder occupancy, feeder and program schedules, worldwide satellite leases, international specifications standards and color systems, and even a complete diagram of a home built Russian Molniya decoder.

Direct Broadcasting Satellite systems (DBS) are also discussed, as exemplified by the Japanese Ku—band approach.

Guidebook is not limited to present—day satellite technology, but treats projected systems and future launches as well.

While the initial outlay is expensive, there is probably nowhere else where the serious satellite enthusiast can obtain such a wealth of information so thoroughly illustrated.

67 READY—TO—RUN PROGRAMS IN BASIC by William Scott Watson (TAB 1195, 5" x 8", 182 pages, paperback, $7.95 from TAB Books, Blue Ridge Summit, PA 17214)

With the personal computer explosion in our midst, it is not surprising that books on BASIC are pouring out of the publishing houses in record numbers.

This recent (1981) entry by Watson is conveniently classified into four catagories: games, graphics, home and business, and education.

The games, of which there are 29, consist of typical arcade—sounding names——"Hysperspace", "Robot War", "Knockout" and so on. The graphics programs are more demonstrative than practical, showing the endless visual variety accessible by keyboard.

With the home and business applications we get down to business. Simple inventory, depreciation, metric converter, loan payment, checkbook, break—even analysis and other programs have definite practical application.

The educational programs are typical textbook——algebra and word quizzes, dice throw calculation (probability), permutations and combinations, progressions and other examples of academic challenges.

As with all TAB books, printing is excellent, not the hard—to—read dot matrix printer reprints sometimes foisted on the unwary public.

Out Of Band Programming

TheGroveScanverter

Many readers have inquired about the possibility of using the popular Grove CVR—1 Scanverter outside of its intended 225—400 MHz disign range.

Recent laboratory tests have shown that the little converter does indeed perform on highly—sought bands, but with a slight reduction in sensitivity.

Nearby 216-220 MHz (inland water ways), 220—225 MHz (amateur) and 406—420 MHz (federal government) are receivable by connecting the CVR—1 to any programmable scanner capable of 36—45 and 154—168 MHz reception.

Searching, scanning and memory is possible on any portion of those previously—unavailable listening ranges.

The formulas used for frequency conversion are:

(Equation 1)

UHF = High Band — 252

or

High Band = UHF - 252

(Equation 2)

VHF = Low Band — 180

or

Low Band = 180 - VHF

Examples include: 411.325 MHz would be heard on 159.325 (Equation 1), 220.1 would be heard on 40.1 MHz (Equation Z).

The somewhat reduced sensitivity is a result of the passband filtering which is designed to prevent out—of—band interference from disrupting 225—400 MHz reception. Fortunately, the 406—420 and 216—225 MHz bands are close enough to the allowable passband that attenuation has barely begun.

UHF Military Frequencies Busy

A number of prospective listeners to the 225—400 MHz band have inquired as to whether they are likely to hear anything in their isolated areas. The answer is a resounding "Yes".

A good example is central Pennsylvania, the source of many inquiries. Reader John Hanson of Lewisburg uses his Grove CVR—1A Scanverter and a programmable scanner to hear a wide array of interesting military communications. He shares some of them with us:

283.8 MHz	State College
395.1	North Mountain
(Harrisburg)	FAA
261.7	FLEETSATCOM satellite

He reports several other signals intercepted with his Scanverter which he has not yet converted to the actual UHF frequencies: 118.6, 120.7, 121.2, 129.5, 135.7 and 136.0 MHz.

Due to the high altitude and wide flight paths of military aircraft, every part of the country is a potential listening position for this active part of the radio spectrum.

A list of commonly—reported UHF military aeronautical channels used nationwide follows:

236.6	Air Force control towers
241.0	Army/National Guard
243.0	Emergency, all agencies

Continued on page 20

Globescan

Unquestionably, one of the most innovative products yet released from Grove Enterprises has been the little CVR—2 Globescan frequency converter. Using the inexpensive device in conjunction with any programmable scanner with aircraft band coverage, a listener can tune in on worldwide broadcasting without the need of an expensive shortwave receiver...even while driving down the highway!

Better yet, those international broadcasting stations may be entered into the scanner's memory, allowing for instant fingertip recall! Search, scan and squelch functions may be used while seeking active transoceanic broadcasts.

BASE ANTENNAS

Although it is possible to use an outside scanner antenna with the Globescan, signal strengths will be limited by the small capture areas of such a small antenna. A wire antenna 20 or more feet in length, indoor or outdoor (preferred) should be used.

No ground is necessary unless interference from electric appliances or power lines is a problem, in which case an outside antenna fed with coaxial cable (any kind) is recommended.

FREQUENCY COVERAGE

The CVR-2 Globescan is designed to cover the entire 4-22 MHz shortwave band when combined with a 118-136 MHz scanner. Some scanners (Regency, Radio Shack, JIL) are capable of even greater aircraft band coverage, permitting the Globescan to go all the way down to the standard AM broadcast band--automatically!

Experimenters have found that with external filters it is possible to tailor the CVR—2 to a wide variety of frequency conversion schemes, limited only by the imagination of the curious!

Users with non-aircraft-band scanners can hear WWV and CHU time signals and even a few loud international broadcasters, although recovered AM audio is distorted on an FM—band scanner.

Typically, WWV 10, 15, and 20 MHz time signals may be heard on 162, 167 and 172 MHz. CHU transmissions may be monitored on 159.335 and 166.670 MHz, corresponding to 7.335 and 14.670 MHz.

LISTENING IN

Now that we have learned more about how to use the Globescan, what can we hear? With a suitable antenna, virtually any AM broadcaster that you can hear on an expensive shortwave receiver! Radio Moscow, Voice of America, the BBC....all at the press of a button on your scanner.

Even the elusive and mysterious spy numbers stations come in loud and clear! Try these frequencies on for size:

Spy Number Stations: 4044, 5135, 7404, 9074, 5812, 8418, 11532; English language broadcasts: 5975, 6175, 6195, 7115, 7165, 9410, 9700, 9915, 11750, 11925, 15205, 15260, 15325, 15345, 15365, 15380, 17820, 21460, and 21570 kHz.

For other worldwide broadcasts, consult a reference book like the World Radio TV Handbook, now available for only $17.50 from Grove Enterprise.

SCAN FREQ.	S/W FREQ.	NAME OR LOCATION	SCAN FREQ.	S/W FREQ.	NAME OR LOCATION	SCAN FREQ.	S/W FREQ.	NAME OR LOCATION
118(.)	4.200	VOA	123.(.)	9.710		129.(.)	15.355	KGEI-USA
75 METER	4.400	VOA	31 METER	715	WYFR-USA	19 MTR.	385	BBC
BAND	4.500		BAND	725		BAND	400	VOA
119.(.)	5.000	WWV		735			420	
60 METER	145			750	CANADA		425	
BAND	900	USSR		755			435	
	955	NICARAGUA		760	BBC		450	
	960	CANADA		765			455	USSR
	980	TAIWAN		775			575	VOA
	5.995			776	BBC		15.600	CHINA
120(.)	6.035	ARMED FOR. RAD		850		131.(.)	17.450	
49 METER	005	BBC		880			650	
BAND	006			9.965			700	
	025		124.(.)	10.000	WWV		720	USSR
	035			050			750	
	040	GERMANY		475			755	JAPAN
	050	BBC		825			800	
	055			10.975			825	JAPAN
	060		125(.)	11.575			850	
	065		25 METER	700	SWEDEN		17.870	ROMANIA
	085	GERMANY	BAND	725		132.(.)	18.075	
	110			740	VOA	134.(.)	20.000	WWV
	125	VOA		760	HAVANA		20.125	
	130			785			20.275	USSR
	135			825	A.F.R.T.S.	135.(.)	21.460	
	160			850	CANADA	13 MTR.	475	
	170			855		BAND	485	VOA
	175	HOLLAND		880	SPAIN		500	
	185			900			510	WYFR
	6.985			925			525	WYFR
121.(.)	7.150			930	HAVANA		550	
41 METER	155	USSR		940			555	USSR
BAND	200			11.950			560	
	300		126.(.)	12.005	USSR		600	
	360			030			610	
	7.400			050	USSR		750	
123.(.)	9.360			200			21.853	VOA
31 METER	505	JAPAN		475		140.(.)	26.000	VOA
BAND	510	BBC		13.800			26.170	
	535	CANADA	129.(.)	15.000	WWV		26.595	
	575	USSR	19 METER	100		141.(.)	27.555	
	585		BAND	125	SWEDEN	11 MTR.	27.645	ARGENTINA
	590	HOLLAND		135		BAND	27.650	USSR
	600			150	ECUADOR		27.725	VOA
	610			155		142.(.)	28.975	
	615	SOUTH AFRICA		175	BRAZIL	TOTAL	149	65
	625			200				
	635			225	JAPAN			
	660			235	V.O.A.			
	670			260	CANADA			
	675			280	KGEI-USA			
	9.700	A.F.R.T.S.		15325	A.F.R.T.S.			

Reader Rene Borde show how to construct a conversion chart for favorite listening targets

(Monitoring Times would to extend special thanks this month to reader Gordon G. Bousman, an instrument-rated pilot, whose contribution of aircraft frequencies centered on Chicago provide our other readers with an in-depth look of a complex air radio system.)

A I R S C A N

AERONAUTICAL RADIO FREQUENCY LISTING

CENTERED ON CHICAGO, ILLINOIS

CURRENTLY IN USE (UP-DATED 9-12-81)

(250 MILE RADIUS NOMINAL LISTENING DISTANCE)

-----) OUR TOP TEN LIST (-----

THE TEN MOST INTERESTING FREQUENCIES

IN THE GREATER CHICAGO AREA

118.10	O'HARE TOWER (NORTH)	125.70	O'HARE APPROACH
119.00	O'HARE APPROACH	131.30	UNITED AIRLINES RAMP
120.25	CHICAGO CENTER	131.65	CHICAGO AIRNIC
120.75	O'HARE TOWER (SOUTH)	134.40	CHICAGO TCA RADAR
125.00	O'HARE DEPARTURE	135.75	CHICAGO CENTER

THE ENCLOSED FREQUENCIES ARE INTERESTING AND INFORMATIVE IF YOU ARE A PILOT, A WOULD-BE PILOT, OR JUST INTERESTED IN WHAT IS HAPPENING IN AVIATION. THEN THIS LISTING IS FOR YOU. DEVELOPED BY A PILOT/ELECTRONICS TECH WITH AN INSTRUMENT RATING, YOU CAN NOW TRACK "FAILED LANDING GEAR PROBLEMS" FROM ONE AIRPORT TO ANOTHER. UP TO 500 MILES! WHERE TO TUNE NEXT! WE HAVE ALREADY DONE SO AND YOU CAN TOO. BE PATIENT AND KEEP LISTENING TO THE BEST PILOTS IN THE WORLD!

WE HOPE YOU ENJOY LISTENING TO AVIATION AT WORK. IT IS INTERESTING AND EXCITING - BUT REMEMBER, THERE PEOPLE ARE HUMAN BEINGS AND HAVE TEMPERS AND MAKE MISTAKES JUST LIKE YOU AND I. WE HOPE YOU CAN ENJOY THE ARMCHAIR FLIGHTS WITH SOME OF THE CREWS YOU HEAR.

THIS INFORMATION IS NOT FOR NAVIGATIONAL OR COMMUNICATIONS USE. MOST FREQUENCIES HAVE BEEN ACTUALLY MONITORED AND CONFIRMED (95%). OTHERS WERE OBTAINED FROM OFFICIAL SOURCES. HOWEVER, BEWARE! FREQUENCIES ARE CHANGED OFTEN!

NAVIGATIONAL FREQUENCIES

230 KHZ * "PINE" NDB ON THE 4 LEFT ILS COURSE AT O'HARE
248 KHZ * "KEDZI" LOCATOR/OUTER MARKER RUNWAY 31 LEFT AT MIDWAY
257 KHZ * "JOCKY" LOCATOR/OUTER MARKER RUNWAY 32 LEFT AT O'HARE
275 KHZ * "GILMY" LOCATOR/OUTER MARKER RUNWAY 36 AT ROCKFORD
368 KHZ * "LEAMA" LOCATOR/OUTER MARKER RUNWAY 14 LEFT AT O'HARE
350 KHZ * "DEANA" LOCATOR/OUTER MARKER RUNWAY 9 RIGHT AT O'HARE
-) NOTE: ALSO TRANSCRIBED WEATHER BROADCAST ON "DEANA"
385 KHZ * "INDDY" LOCATOR/OUTER MARKER RUNWAY 32 RIGHT @ O'HARE
394 KHZ * "ROAMY" LOCATOR/OUTER MARKER RUNWAY 14 RIGHT @ O'HARE
414 KHZ * "TAFFS" LOCATOR/OUTER MARKER RUNWAY 27 RIGHT @ O'HARE

108.20 * BLOOMINGTON, ILLINOIS VOR/DME/LOW ALTITUDE
108.40 * DUPAGE VOR/DME (LOW ALTITUDE WITH TRANSCIBED WEATHER BROADCAST)
108.40 * ROBINSON, ILLINOIS VOR/DME (TERMINAL TYPE)
108.60 * JACKSONVILLE, ILLINOIS VOR (TERMINAL) WITH TRANS-RIBE CRIBED WEATHER BROADCAST
109.00 * BIBLE GROVE, ILLINOIS VORTAC/LOW ALTITUDE
109.10 * ILS - RUNWAY 32 LEFT AT O'HARE AIRPORT
109.40 * MATTOON, ILLINOIS VOR (LOW ALTITUDE)
109.50 * ILS - RUNWAY 10 AT DUPAGE AIRPORT
109.60 * PONTIAC, ILLINOIS VORTAC (LOW ALTITUDE)
109.70 * ILS - RUNWAY 14 RIGHT AT O'HARE AIRPORT
109.80 * GALESBURG, ILLINOIS VOR (TERMINAL TYPE) WITH BROADCAST
109.90 * ILS - RUNWAY 13 RIGHT/LOCALIZER RUNWAY 31 LEFT-MIDWAY
110.00 * CHAMPAIGN, ILLINOIS VORTAC/LOW ALTITUDE
110.10 * ILS - RUNWAY 4 RIGHT & 22 LEFT AT O'HARE AIRPORT
110.40 * MARION, ILLINOIS VOR (LOW ALTITUDE) WITH SCHEDULED BROADCAST
110.50 * ILS - RUNWAY 9 LEFT AT O'HARE AIRPORT
110.70 * ILS - RUNWAY 32 RIGHT AT O'HARE AIRPORT
110.80 * ROCKFORD, ILLINOIS VORTAC (LOW ALTITUDE) W/WX BRDCST
110.90 * ILS - RUNWAY 14 LEFT AT O'HARE
111.00 * DANVILLE, ILLINOIS VORTAC (LOW ALTITUDE)
111.00 * MIDWAY AIRPORT VOT (VORTAC TEST SIGNAL)
111.10 * ILS - RUNWAY 27 LEFT & 9 RIGHT AT O'HARE AIRPORT
111.20 * POLO, ILLINOIS VOR (LOW ALTITUDE) WITH SCHED BRDCST
111.30 * ILS - RUNWAY 4 LEFT & 22 RIGHT AT O'HARE AIRPORT
111.50 * ILS - RUNWAY 4 RIGHT AT MIDWAY AIRPORT
111.60 * KANKAKEE, ILLINOIS VOR (TERMINAL TYPE)
111.90 * ILS - RUNWAY 16 AT PALWAUKEE AIRPORT
112.00 * O'HARE VOR TEST SIGNAL (VOT)
112.20 * SCOTT AFB TACAN (LOW ALTITUDE)
112.30 * JOLIET, ILLINOIS VORTAC (HIGH ALTITUDE)
112.40 * LAWRENCEVILLE, ILLINOIS VOR/DME (TERMINAL TYPE) WITH TRANSCRIBED WEATHER BROADCAST)
112.70 * CAPITOL (SPRINGFIELD, ILLINOIS) VORTAC/HIGH ALTITUDE
113.00 * NORTHBROOK VORTAC/DME
113.10 * QUINCY, ILLINOIS VORTAC (LOW ALTITUDE) (AUTO WEATHER)
113.20 * PEOTONE, ILLINOIS VORTAC (LOW ALTITUDE)
113.70 * MT. VERNON, ILLINOIS VOR (LOW ALTITUDE)
113.90 * O'HARE VOR/DME (LOW ALTITUDE)
114.20 * CHICAGO HEIGHTS, ILLNOIS VORTAC/LOW ALTITUDE
114.30 * VANDALIA, ILLINOIS VORTAC (LOW ALTITUDE)
114.40 * MOLINE, ILLINOIS VORTAC (LOW ALTITUDE) WITH SCHEDULED SCHEDULED BROADCAST
114.70 * BRADFORD, ILLINOIS VOR/DME
115.00 * CENTRALIA, ILLINOIS VORTAC/HIGH ALTITUDE
115.20 * PEORIA, ILLINOIS VORTAC (LOW ALTITUDE)
116.00 * NAVY GLENVIEW, ILLINOIS TACAN (TERMINAL TYPE)
116.00 * TROY, ILLINOIS VORTAC (LOW ALTITUDE)
116.60 * SAMSVILLE, ILLINOIS VORTAC (LOW ALTITUDE)
116.80 * ROBERTS, ILLINOIS VORTAC (LOW ALTITUDE)
117.20 * DECATUR, ILLINOIS VORTAC (HIGH ALTITUDE WITH TRANSCRIBED WEATHER BROADCAST)

118.00	*	MILWAUKEE APPROACH
118.05	*	CHICAGO CENTER (BLOOMINGTON, ILL.)
118.10	*	O'HARE TOWER (NORTH SIDE)
118.15	*	SOUTH BEND, INDIANA ATIS
118.20	*	MUSKEGON APPROACH
118.20	*	SOUTHERN ILLINOIS AIRPORT TOWER (CARBONDALE)
118.20	*	MOLINE, ILLINOIS DEPARTURE CONTROL
118.25	*	DECATUR, ILLINOIS APPROACH
118.30	*	ROCKFORD TOWER
118.30	*	KALAMAZOO, MICHIGAN TOWER
118.30	*	TERRE HAUTE, INDIANA (HULMAN FIELD) TOWER
118.35	*	TOLEDO, OHIO DEPARTURE RADAR
118.40	*	CHICAGO APPROACH/RADAR (MIDWAY & MIEGS)
118.40	*	DETROIT, MICHIGAN RADAR
118.45	*	SAGINAW, MICHIGAN RADAR
118.45	*	SPRINGFIELD, ILLINOIS RADAR
118.50	*	OSHKOSH, WISCONSIN TOWER
118.50	*	BATTLE CREEK, MICHIGAN TOWER
118.55	*	SOUTH BEND APPROACH
118.60	*	MILWAUKEE AREA RADAR (KENOSHA AREA)
118.60	*	SPRINGFIELD, ILLINOIS RADAR
118.65	*	LANSING, MICHIGAN RADAR
118.70	*	MIDWAY TOWER
118.70	*	EVANSVILLE, INDIANA TOWER
118.70	*	GREEN BAY, WISC. (AUSTIN-STRAUBEL FIELD) TOWER
118.75	*	CHICAGO CENTER (MOLINE)
118.80	*	JANESVILLE, WISCONSIN TOWER
118.85	*	MINNEAPOLIS CENTER (LA CROSSE, WISC)
118.90	*	SOUTH BEND, INDIANA TOWER
118.90	*	DECATUR, ILLINOIS TOWER
118.95	*	DETROIT APPROACH
119.00	*	O'HARE APPROACH (EAST & NORTH)
119.05	*	INDIANAPOLIS, INDIANA DEPARTURE CONTROL
119.10	*	MILWAUKEE MITCHELL TOWER
119.10	*	FT. WAYNE, INDIANA TOWER
119.10	*	PEORIA, ILLINOIS TOWER
119.20	*	TORONTO, ONTARIO APPROACH
119.20	*	KALAMAZOO, MICHIGAN RADAR
119.25	*	O'HARE CLEARANCE DELIVERY
119.25	*	TERRE HAUTE, INDIANA RADAR
119.25	*	GREEN BAY RADAR (STURGEON BAY, WISC.)
119.30	*	GRAND RAPIDS, MICHIGAN TOWER
119.30	*	TRUAX TOWER (MADISON, WISCONSIN)
119.35	*	MIDWAY & MIEGS RADAR
119.40	*	TORONTO CENTER (LONDON, ONTARIO)
119.40	*	MARION, ILLINOIS APPROACH CONTROL
119.40	*	MOLINE, ILLINOIS TOWER
119.40	*	GREEN BAY, WISCONSIN RADAR
119.50	*	GREEN BAY, WISCONSIN RADAR
119.50	*	ELKHART, INDIANA TOWER
119.50	*	DUBUQUE, IOWA TOWER
119.55	*	INDIANAPOLIS CENTER (MUNCIE)
119.60	*	SELFRIDGE, MICHIGAN RADAR ?? ?
119.60	*	OUTAGAMIE COUNTY TOWER (APPLETON, WISCONSIN)
119.60	*	PURDUE UNIVERSITY (LAFAYETTE, INDIANA) TOWER
119.60	*	APPLETON, WISCONSIN (OUTAGAMIE CO.) TOWER
119.65	*	MILWAUKEE DEPARTURE (EAST)
119.70	*	CEDAR RAPIDS, IOWA APPROACH CONTROL
119.70	*	ELKHARDT, INDIANA CLEARANCE DELIVERY (SOUTH BEND)
119.75	*	DUPAGE CLEARANCE DELIVERY
119.80	*	MUSKEGON, MICHIGON DEPARTURE CONTROL
119.85	*	CHICAGO CENTER (FT. WAYNE)
119.90	*	PALWAUKEE TOWER
119.95	*	CLEVELAND CENTER (CARLETON, MICHIGAN)
119.95	*	PEORIA, ILLINOIS RADAR
120.00	*	GRISSOM, INDIANA AIR FORCE BASE RADAR
120.00	*	MILWAUKEE, WISC. MITCHELL FIELD CLEARANCE DELIVERY
120.05	*	MIDWAY ATIS
120.10	*	MADISON, WISCONSIN APPROACH
120.10	*	MUNCIE, INDIANA TOWER
120.15	*	DETROIT AREA RADAR
120.15	*	MILWAUKEE AREA RADAR
120.20	*	FT. WAYNE APPROACH
120.20	*	GREEN BAY, WISCONSIN RADAR
120.25	*	CHICAGO CENTER (HAMPSHIRE, ILLINOIS)
120.35	*	CHICAGO CENTER (DES PLAINES, ILLINOIS)
120.40	*	CHAMPAIGN, ILLINOIS TOWER
120.45	*	CLEVELAND CENTER (LITCHFIELD, MICHIGAN)
120.50	*	TIMMERMAN FIELD (WISCONSON) TOWER
120.60	*	AURORA, ILLINOIS TOWER
120.65	*	MUNCIE, INDIANA APPROACH & DEPARTURE
120.70	*	GALESBURG, ILLINOIS TOWER
120.75	*	O'HARE TOWER (SOUTH SIDE)
120.80	*	CLEVELAND CENTER (FINDLEY, OHIO)
120.80	*	DAVENPORT, IOWA ADVISORY SERVICE
120.85	*	CHICAGO CENTER (WHITE CLOUD, MICHIGAN)
120.90	*	DUPAGE TOWER
120.90	*	EAST ST. LOUIS (BI-STATE PARKS) TOWER
120.90	*	INDIANAPOLIS, INDIANA TOWER
121.00	*	ROCKFORD APPROACH (RESERVE FREQUENCY)
121.10	*	INDIANAPOLIS, INDIANA APPROACH CONTROL
121.10	*	LA CROSSE, WISCONSIN APPROACH
121.15	*	CHICAGO APPROACH
121.20	*	KALAMAZOO, MICHIGAN APPROACH CONTROL
121.20	*	BLOOMINGTON, INDIANA TOWER
121.25	*	KANSAS CITY CENTER (ST. CHARLES, MO)
121.25	*	MINNEAPOLIS CENTER (IRON MOUNTAIN, MICHIGAN)
121.25	*	FT. WAYNE, INDIANA ATIS
121.30	*	MEIGS TOWER
121.30	*	SPRINGFIELD, ILLINOIS TOWER
121.35	*	CHAMPAIGN, ILLINOIS RADAR CONTROL (WILLARD AIRPORT)
121.60	*	O'HARE CLEARANCE DELIVERY
121.70	*	GROUND CONTROL (PALWAUKEE, AURORA, MIDWAY)
121.75	*	O'HARE GROUND CONTROL
121.80	*	GROUND CONTROL (DUPAGE & MIEGS)
121.80	*	MARION, ILLINOIS RADAR CONTROL
121.85	*	MIDWAY AIRPORT CLEARANCE DELIVERY
121.90	*	O'HARE GROUND CONTROL
121.90	*	GROUND CONTROL FREQUENCY USED AT MANY AIRPORTS
122.00	*	FLIGHT WATCH WEATHER (VARIOUS FSS STATIONS)
122.05	*	FLIGHT SERVICE STATIONS
122.10	*	FLIGHT SERVICE STATIONS
122.20	*	FLIGHT SERVICE STATIONS
122.25	*	FLIGHT SERVICE STATIONS
122.30	*	FLIGHT SERVICE STATIONS
122.35	*	FLIGHT SERVICE STATIONS
122.40	*	MILWAUKEE FLIGHT SERVICE STATION
122.50	*	FLIGHT SERVICE STATIONS
122.55	*	FLIGHT SERVICE STATIONS
122.65	*	FLIGHT SERVICE STATION (ROCKFORD)
122.70	*	FLIGHT SERVICE STATIONS & UNICOM
122.75	*	FLIGHT SERVICE STATIONS
122.80	*	UNICOM
122.90	*	UNICOM
122.975	*	HIGH ALTITUDE UNICOM
123.00	*	UNICOM
123.10	*	SELFRIDGE, MICHIGAN ANG RESCUE FREQUENCY
123.35	*	MILWAUKEE AREA RAD
123.60	*	FLIGHT SERVICE STA
123.65	*	FLIGHT SERVICE STA
123.70	*	WAUKESHA, WISCONSI
123.75	*	CHICAGO CENTER (AU
123.80	*	MILWAUKEE APPROACH
123.80	*	TERRE HAUTE (HULMA
123.85	*	LAFAYETTE, INDIANA
123.90	*	CLEVELAND CENTER (\
124.00	*	MADISON, WISCONSIN
124.00	*	DANVILLE, ILLINOIS
124.05	*	DETROIT RADAR
124.10	*	SOUTH BEND RADAR
124.20	*	PALWAUKEE ATIS
124.20	*	ST. LOUIS, MISSOUR
124.25	*	DETROIT APPROACH C
124.30	*	KANSAS CITY CENTER
124.30	*	LA CROSSE, WISCONS
124.35	*	O'HARE APPROACH (F
124.40	*	INDIANAPOLIS CENTE
124.40	*	CHICAGO CENTER (WIS
124.50	*	DUPAGE AIRPORT TOWI
124.60	*	GRAND RAPIDS, MICHI
124.60	*	BLOOMINGTON-NORMAL
124.70	*	TOLEDO, OHIO, APPRO
124.70	*	PALWAUKEE AIRPORT T
124.70	*	SCOTT AIR FORCE BAS
124.75	*	MILWAUKEE, WISCONSI
124.80	*	DUPAGE ATIS
124.85	*	MINNEAPOLIS CENTER
124.85	*	CHAMPAIGN, ILLINOIS
124.90	*	ROCKFORD RADAR CONT
124.90	*	DETROIT APPROACH
124.95	*	INDIANAPOLIS, INDIA
125.00	*	O'HARE DEPARTURE (
125.05	*	CHICAGO CENTER (MI
125.10	*	CHICAGO CENTER (MI
125.15	*	DETROIT, MICHIGAN
125.20	*	CHICAGO CENTER (GA
125.30	*	MINNEAPOLIS CENTER
125.30	*	KANSAS CITY CENTER
125.35	*	MILWAUKEE - MITCHEL
125.40	*	O'HARE DEPARTURE (2
125.45	*	TERRE HAUTE, INDIAN
125.50	*	BENTON HARBOR, MICH
125.55	*	CHICAGO CENTER (GR
125.60	*	CHICAGO CENTER (DE
125.65	*	GRAND RAPIDS DEPART
125.70	*	O'HARE APPROACH (WI
125.75	*	CAPE GIRARDEAU, MI
125.80	*	PEORIA, ILLINOIS A
125.80	*	OSHKOSH, WISCONSIN
125.90	*	MINNEAPOLIS CENTER
125.90	*	LANSING, MICHIGAN F
125.90	*	KANSAS CITY CENTER
125.95	*	MOLINE, ILLINOIS RA
126.00	*	ROCKFORD, ILLINOIS
126.00	*	ANDERSON, INDIANA T
126.05	*	O'HARE DEPARTURE (R
126.10	*	TOLEDO, OHIO RADAR
126.10	*	PEORIA, ILLINOIS AT
126.15	*	SPRINGFIELD, ILLINO
126.20	*	CHICAGO RADAR (RES
126.20	*	NAVY GLENVIEW TOWER
126.25	*	CHICAGO CENTER (GRA
126.30	*	GARY, INDIANA TOWER
126.30	*	GREEN BAY, WISCONSO
126.40	*	MILWAUKEE MITCHELL
126.40	*	EVANSVILLE, INDIANA
126.50	*	MILWAUKEE APPROACH
126.50	*	DAYTON, OHIO DEPART
126.55	*	GREEN BAY, WISCONSI
126.60	*	FT. WAYNE RADAR (AE
126.65	*	GRAND RAPIDS, MICHI
126.70	*	ST. LOUIS, MISSOURI
126.70	*	ROCKFORD, ILLINOIS
126.75	*	CLEVELAND CENTER (I
126.80	*	CHICAGO AREA RADAR
126.85	*	MADISON, WISCONSON
126.90	*	O'HARE TOWER (BACK-
126.90	*	MARION, ILLINOIS TO
126.95	*	KANSAS CITY CENTER
127.00	*	CHICAGO CENTER (DUE
127.10	*	CHICAGO CENTER (NOR
127.20	*	MINNEAPOLIS CENTER
127.30	*	MINNEAPOLIS CENTER
127.30	*	DETROIT AREA RADAR
127.40	*	O'HARE DEPARTURE (1
127.45	*	CHICAGO CENTER (DAN
127.50	*	CHICAGO CENTER (HI
127.55	*	CHICAGO CENTER (GO
127.60	*	CHICAGO CENTER (AU
127.65	*	MINNEAPOLIS CENTER
127.65	*	SPRINGFIELD, ILLIN
127.70	*	CLEVELAND CENTER (S
127.70	*	KANSAS CITY CENTER
127.75	*	CHICAGO CENTER (DES
127.80	*	CHICAGO CENTER (GAR
127.90	*	CLEVELAND CENTER
127.95	*	CHICAGO CENTER (JO
128.00	*	TOLEDO, OHIO RADAR
128.05	*	CHICAGO CENTER (
128.10	*	KANSAS CITY CENTER
128.15	*	CHICAGO CENTER (MI
128.15	*	ROCKFORD RADAR (RE
128.20	*	CHICAGO CENTER (JO
128.30	*	INDIANAPOLIS CENTE
128.35	*	CLEVELAND CENTER
128.40	*	GRAND RAPIDS APPR
128.45	*	O'HARE APPROACH
128.50	*	CHICAGO CENTER (GI
128.55	*	FLINT, MICHIGAN RA
128.55	*	MINNEAPOLIS CENTER
128.60	*	MINNEAPOLIS CENTER
128.70	*	MILWAUKEE, WISCONSI
128.80	*	INDIANAPOLIS CENTER
128.90	*	NORTHERN ARNIC - MI
128.90	*	RAMP CONTROL - UNIT
129.00	*	ARINC - CHICAGO
129.05	*	BRITISH AIRWAYS - (
129.10	*	TWA RAMP & MAINTEN
129.15	*	ARINC - INDIANAPOL
129.20	*	AMERICAN AIRLINES (
129.30	*	UNITED AIRLINES GA
129.35	*	NEW YORK ARNIC REMO
129.40	*	ARINC - CHICAGO TO
129.45	*	ARNIC - CHICAGO &
129.50	*	DELTA AIRLINES (RE

Air Force Space Command

With the successful deployment of several top—secret sensors in the July, 1982 Space Shuttle flight, the U.S. Air Force has taken several steps in militarizing space.

A recent article in the Colorado Springs Gazette—Telegraph sets the stage: "Throughout military history, a primary goal of strategy has been to seize the high ground. Space is now that "ground", and the United States and Soviet Union are moving to gain positions on its threshold."

"As the nation moves toward the 21st century, the Pikes Peak region will be in the vanguard of development. A hundred years ago this area was on the frontier of the West. Now we will be the leader on the last and greatest frontier that lies before man".

The Gazette-Telegraph article refers to the new Air Force Space Command, now expanding its operation at Peterson AFB, formerly a SAC installation.

The headquarters of the space command and control center is just east of Colorado Springs, home of the North American Aerospace Defense Command (NORAD) in the Cheyenne Mountain complex.

Here, intelligence gathering equipment will interface with existing and future satellites to detect missile launches on foreign soil.

While the Soviets are also rapidly developing tactical space satellites, it is felt that they are still at least two years away from launching a scaled—down version of a shuttle craft.

Secret U.S. satellite reconnaissance photos last summer did capture a test flight of a delta-winged Russian space fighter while in maneuvers over the Caspian Sea.

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RORA, ILLINOIS)
(EAST & NORTH)
N FIELD), INDIANA APPROACH
APPROACH CONTROL
WATERVILLE, OHIO)
RADAR
TOWER

(RADAR
ONTROL (WEST SIDE)
(DECATUR, ILLINOIS)
IN TOWER
(RESERVE FREQUENCY)
((INDIANAPOLIS, INDIANA)
CONSIN RAPIDS, WISC.)
R (RESERVE FREQUENCY)
GAN APPROACH
ILLINOIS TOWER
)ACH
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E RADAR
N RADAR

(TRAVERSE CITY, MICHIGAN)
ATIS
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340 DEGREES TO 159 DEGREES)
FORD)
WAUKEE)
PPROACH CONTROL (EAST SIDE)
Y, INDIANA)
(EAU CLAIRE, WISC)
(MARION, ILLINOIS)
L FIELD RADAR (WEST)
20 DEGREES TO 339 DEGREES)
A RADAR CONTROL
IGAN TOWER
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SOURI RADAR
PROACH CONTROL
ATIS
(FARMINGTON, MINNESOTA)
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(ST. CHARLES, MISSOURI)
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RADAR (ALSO JANESVILLE, WISC.)
OWER
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APPROACH CONTROL
(WEST & SOUTH)
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PROACH & DEPARTURE)
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(HOUGHTON, MICHIGAN)
(MASON CITY, IOWA)

60 DEGREES TO 219 DEGREES)
VILLE, ILLINOIS)
ORICON, WISCONSIN)
OSHEN, INDIANA)
URORA, ILLINOIS)
(ESCANABA, MICHIGAN)
OIS ATIS
AGINAW, MICHIGAN)
(MT. VERNON, ILLINOIS)
PLAINES, ILLINOIS)
Y, INDIANA)

OLIET & BRADFORD, ILLINOIS)
CONTROL
URORA & HAMPSHIRE, ILLINOIS)
(ST. LOUIS, MO.)
OISON, WISC)
SERVE FREQUENCY)
NES, MICHIGAN)
(EVANSVILLE, INDIANA)

ACH CONTROL
BACK RESERVE FREQUENCY)
AND RAPIDS, MICHIGAN)
DAR

(LA CROSSE, WISC)
RADAR

NNEAPOLIS
TED AIRLINES - O'HARE

O'HARE OPERATIONS
ANCE (O'HARE)
IS TO ST. LOUIS AREA
GATE CONTROL (O'HARE)
TE CONTROL (O'HARE)
OTED TO CHICAGO
SAGINAW MICHIGAN AREA
CIRKSVILLE, MISSOURI
MOTED FROM ATLANTA)

129.55	*	NORTHWEST AIRLINES - MILWAUKEE GATE CONTROL
129.60	*	DELTA AIRLINES RAMP CONTROL (O'HARE)
130.10	*	U.S. AIR - CHICAGO OPERATTIONS
130.25	*	AMERICAN AIRLINES - CHICAGO DISPATCH & MAINTENANCE
130.40	*	CHICAGO ARINC
130.45	*	ARINC - MINNEAPOLIS TO DES MOINES AREA
130.50	*	BRITT AIR AIRLINES (O'HARE OPERATIONS
130.55	*	BRANIFF AIRLINES - CHICAGO OPERATIONS
130.60	*	CHICAGO ARINC
130.70	*	EASTERN AIRLINES OPERATIONS (MILWAUKEE)
130.75	*	ARNIC - REMOTED TO CHICAGO FROM ATLANTA
130.85	*	PIEDMONT AIRLINES (O'HARE)
130.90	*	REPUBLIC AIRLINES - MILWAUKEE & O'HARE
130.95	*	FTI BUSINESS AIRCENTER UNICOM - (GARY, INDIANA)
131.05	*	PAM AM AIRLINES OPERATIONS (O'HARE)
131.10	*	AIR CANADA (O'HARE)
131.12	*	AMERICAN AIRLINES - CHICAGO OPERATIONS
131.25	*	REPUBLIC AIRLINES - KALAMAZOO, MICHIGAN
131.30	*	UNITED AIRLINES (O'HARE) - PLANNING CENTER
131.32	*	MIDWAY AIRLINES FLIGHT CONTROL
131.40	*	ARINC - SOUTH BEND TO FLINT MICHIGAN AREA
131.45	*	NORTHWEST AIRLINES - MILWAUKEE
131.50	*	MIDSTATE AIRLINES
131.65	*	CHICAGO AIRINC
131.80	*	ARNIC - CHICAGO TO MILWAUKEE TO MINNEAPOLIS AREA
131.82	*	FLYING TIGERS OPERATIONS
131.90	*	NORTHWEST AIRLINES (DISPATCH REMOTED FROM MINNEAPOLIS
131.95	*	AIR WISCONSIN DISPATCH (O'HARE)
132.00	*	AIR ILLINOIS COMMUTER - MIEGS FIELD
132.05	*	SOUTH BEND, INDIANA RADAR
132.10	*	KANSAS CITY CENTER (DECATUR, ILLINOIS)
132.15	*	CHICAGO CENTER
132.20	*	INDIANAPOLIS CENTER (TERRE HAUTE)
132.30	*	CHICAGO CENTER (MILWAUKEE)
132.35	*	MINNEAPLIS CENTER (ROCHESTER, MINNESOTA)
132.35	*	DETROIT AREA RADAR
132.45	*	GREEN BAY, WISC RADAR (PULASKI, WISC)
132.50	*	CHICAGO CENTER (MILFORD)
132.55	*	CHICAGO CENTER
132.70	*	INDIANAPOLIS CENTER
132.75	*	CHICAGO CENTER
132.77	*	INDIANAPOLIS CENTER
132.80	*	CHICAGO CENTER (CEDAR RAPIDS, IOWA)
132.85	*	CHICAGO CENTER (GRAND RAPIDS, MICHIGAN)
132.85	*	CHAMPAIGN, ILLINOIS DEPARTURE CONTROL
132.90	*	TORONTO CENTER (WIARTON, ONTARIO)
132.95	*	CHICAGO CENTER (CHICAGO HEIGHTS, ILLINOIS)
133.00	*	CHICAGO CENTER (ROCKFORD, ILLINOIS)
133.10	*	CHICAGO CENTER (GARY, INDIANA)
133.15	*	KANSAS CITY CENTER (QUINCY,ILLINOIS)
133.20	*	CHICAGO CENTER (DES PLAINES & NORTHBROOK, ILLINOIS)
133.25	*	CLEVELAND CENTER
133.35	*	CHICAGO CENTER
133.40	*	KANSAS CITY CENTER (ST. CHARLES, MO)
133.45	*	MINNEAPOLIS CENTER (IRONWOOD, MICHIGAN)
133.50	*	CHICAGO CENTER
133.57	*	INDIANAPOLIS CENTER
133.60	*	CHICAGO CENTER
133.65	*	MINNEAPOLIS CENTER (RHINELANDER, WISCONSINN)
133.70	*	CHICAGO CENTER (GARY, INDIANA)
133.75	*	CHICAGO CENTER
133.80	*	CLEVELAND CENTER (FINDLEY, OHIO)
133.82	*	CHICAGO CENTER
133.90	*	CHICAGO CENTER (GOSHEN, INDIANA)
133.95	*	CHICAGO CENTER
134.00	*	INDIANAPOLIS CENTER (LONDON, IND?)
134.05	*	FT. WAYNE, INDIANA RADAR (RESERVE FREQUENCY)
134.05	*	CEDAR RAPIDS, IOWA RADAR
134.10	*	SELFRIDGE, MICHIGAN AIR NATL GUARD BASE RADAR
134.15	*	CHICAGO CENTER (JONES, MICHIGAN)
134.20	*	CHICAGO CENTER (HAPSHIRE, ILLINOIS)
134.25	*	MINNEAPOLIS CENTER
134.30	*	CLEVELAND CENTER (ALGONAC, ONTARIO)
134.32	*	CHICAGO CENTER
134.35	*	MINNEAPOLIS CENTER
134.40	*	CHICAGO RADAR (NORTH TCA TRAFFIC)
134.45	*	MINNEAPOLIS CENTER (MINNEAPOLIS, MINNESOTA)
134.45	*	DAYTON, OHIO APPROACH CONTROL
134.60	*	INDIANAPOLIS CENTER (LAFAYETTE, INDIANA)
134.60	*	MINNEAPOLIS CENTER (PELLSTON, MICHIGAN)
134.65	*	CLEVELAND CENTER (LITCHFIELD, MICHIGAN)
134.70	*	INDIANAPOLIS CENTER (BROOKVILLE)
134.75	*	CHICAGO CENTER (MILWAUKEE)
134.85	*	MINNEAPOLIS CENTER
134.85	*	INDIANAPOLIS DEPARTURE CONTROL
135.00	*	KANSAS CITY CENTER
135.05	*	INDIANAPOLIS CENTER
135.10	*	CLEVELAND AND MINNEAPOLIS CENTER
135.15	*	O'HARE ATIS
135.20	*	SOUTH BEND CLEARANCE DELIVERY
135.25	*	INDIANAPOLIS CENTER
135.35	*	CLEVELAND CENTER
135.45	*	INDIANAPOLIS CENTER (WEST POINT, IND)
135.45	*	CHICAGO CENTER - LOCATION UNKNOWN
135.60	*	CHICAGO CENTER (BURLINGTON, IOWA)
135.65	*	CHICAGO CENTER
135.75	*	CHICAGO CENTER AT DOWNERS GROVE
135.80	*	INDIANAPOLIS CENTER (BROOKVILLE, IND.)
135.90	*	CHICAGO CENTER (GOSHEN, IND.)

ARINC: AERONAUTICAL RADIO, INC. - A CORPORATION JOINTLY OWNED BY U.S. AIRLINES. STATIONS ARE LOCATED IN CHICAGO, NEW YORK, SAN JAUN, SAN FRANCISCO, AND HONOLULU. THE FUNCTION IS TO PROVIDE ENROUTE COMMUNICATIONS FOR AIR-LINERS WITH WEATHER FORECASTS, SCHEDULE CHANGES, ETC.

LOCATIONS SHOWN IN PARENTHESES ARE THE REMOTE TRANSMITTER SITES FOR AIR ROUTE TRAFFIC CONTROL CENTERS. AUDIO IS REMOTED BY LEASED PHONE LINES. RADAR IS REMOTED VIA MICRO-WAVE.

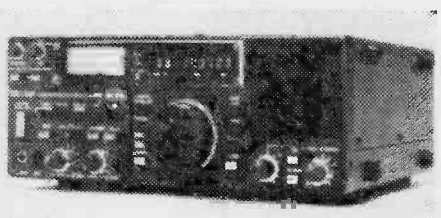
ATIS: "AUTOMATIC TERMINAL INFORMATION SYSTEM"

TCA: "TERMINAL CONTROL AREA"

ILS: "INSTRUMENT LANDING SYSTEM"

Product Review

ICOM ICR-70
COMMUNICATIONS RECEIVER



By Larry Brookwell
Product review

The ICR—70 is a compact and business—like piece of gear; its professionalism is immediately apparent. Its compactness presents one problem, miniature controls that require dainty touches with the tips of your fingers. No clod—hopper with a horny paw is going to be happy with this rig. It has a front mounted speaker which is quite small and has a "small" voice; connected to a good outboard speaker it delivers fine audio.

The speaker and a handy side mounted handle plus DC operaton and its small size makes it ideal for portable use. It is sufficiently sensitive to operate on any old hunka wire.

One annoying feature: stations such as WWV appearing at either end of a band must be approached in an oblique manner. In the AM mode 15,000 Khz is dead and WWV will be heard on 15,002, or correctly on SSB.

The same condition exists on all frequencies ending in 000. Caution: sensitivity is so extreme on this rig that one must depend upon the attenuator to avoid "choking up" or overload, especially on MW. Obversely, a weak signal can be boosted with the automatic preselector (about 20 dB).

The specs in bulletin number 53 describes the receiver as double conversion in the SSB, CW, RTTY and AM modes, and triple conversion in the optional FM mode.

In the specifications that come with the rig, the receiving system is described as quadruple conversion and the four IFs are listed as 70.4515 MHz, 9.0115 MHz, 455 KHz & 9.0115 MHz; this last figure is not applicable to the optional FM mode. So we have three specs, double, triple and quadruple conversion.

Coverage is 100 KHz to 30 MHz in two systems. For amateur coverage there are nine bands from 10 to 160 meters, and for the SWL 30 bands of 1,000 KHz each. Tuning is with an analog dial with 10, 100 Hz and 1 KHz markings, depending upon the operator's speed choice. For more rapid tuning up/down buttons can be used, (they also have three speeds).

A novel feature is the twin VFOs which permits the operator to store one frequency while searching another. Both frequencies will remain in memory until erased or covered up with a new signal.

Now we get to the nitty-gritty: Selectivity is listed at 6KHz on AM with a note, "adjustable to 2.7 KHz". This is done with the pass—band control which is designed to narrow the bandwidth down to 2.7 KHz if desired. It is not the same as passband controls of the Drake R—7 nor the NRD—515 which have a different function.

Additional selectivity is available with the Notch which can do a whammy on interference. In my testing I was able to tune four stations five KHz apart on 15385, 15390, 15395 and 15340 without interference even though 15340 was a biggie! In all fairness I must admit I could also do it with my NRD—515, at more than twice the retail cost.

My favorite test for real selectivity is Tahiti on 15170 without slop from VOA on 15175. R-70 passed that test while the Nerd still had some slop. The only other receiver to do the job was a Radio West Modified Sony CRF-1.

The ICR—70 seems to be excellent on MWAM but must be attenuated if connected to your SW antenna. There is a separate terminal for a MW antenna and a good MW loop would be ideal for this because of its directivity.

Extra fine features noted: Superior shielding; my overhead flourescent fixtures don't affect the ICOM. AGC quite effective. Noise blanker in two widths clobbers woodpecker. SSB mode (USB or LSB) automatically selected. The RIT or vernier control fine tunes the signal without changing the digital readout. It it is automatically shut off when the frequency is changed with the main dial. Tuning dial can be locked on frequency to avoid careless touch.

The tiny box (11-1/4 x 4-3/8 x 10-7/8 inches WHD) contains 77 transistors, 14 FETs, 43 ICs and 180 diodes. Weight is 10.3 lbs. Frequency control: CPU based 10 Hz step digital PLL synthesizer with digital readout (6 digits to 100 Hz). Stability: less than 250 Hz in first hour, less than 50 Hz after. Power: 117/235 VAC plus 10 percent, 50/60 Hz. Antenna impedance 50 ohms unbalanced. Single wire for MWAM.

Sensitivity with preselector engaged: SSB, CW, RTTY less than 0.15 mV, AM less than 0.5 mV; FM less than 0.3 mV.

Selectivity: SSB, CW, RTTY 2.3 KHz, adjustable down to 500 Hz. Greater selectivity requires optional filters. AM: 6 KHz adjustable to 2.7 KHz, added assistance from notch feature. FM: 15KHz.

Spur rejection better than 60 dB. Audio output better than 2 watts at 8 ohms. Dial light dimmer, true "S" meter, preamp and attenuator switch. Indicators for RIT, Mute, FM and Signal. Digital display includes mode as well as frequencies.

The bottom line: Damn fine receiver just a hair less capable than the Drake R—7 or the NRD—515 which sell for much more. Only other receiver approaches its abilities and features is the modified Sony CRF—1, also at a much higher price. Kenwood-Trio hopes to compete with its new R-2000 but we will cross that bridge when we come to it (see "new receiver" announcement).

Coax Seal

Receiving antennas have been the subject of many books. Most of these books give a good deal of attention to the lead—in and connection to the receiver. There is a good reason for this. Just one poor connection can render the system useless. Theoretically, every time you add a connector or a connection to the lead—in, some degree of signal loss will result. In reality this lose is negligible providing the following conditions are met:

1. Quality RF connectors are used.

2. No "cold" solder joints are present.

3. The connections and/or connectors can be properly sealed from the weather.

Items one and two are easy to deal with. The third item has stumped radio enthusiasts for years! How do you properly seal that coax connector to the antenna? How do you make the connector water—tight? Yes, that is correct; most coax connectors are NOT water—tight! Solutions have ranged from Vaseline to electrical tape to bathroom tub sealers. None of these procedures works well.

Tape cracks and is not "air tight". Vaseline is just a mess and does not work. Tub sealer is usually irreversible; the connector will be difficult to access or use again.

A bigger problem is that bathroom sealers often use acid as a curing agent which can corrode the connector! A long overdue solution to the problem has finally been developed. It is called COAX—SEAL.

COAX—SEAL is a black, tacky, putty—like material that is non—conductive, non—contaminating and 100 percent waterproof. It is despensed on a 60" roll. The putty is formed on a ½" wide strip that has a peel away paper backing.

Installation is simple.

COAX—SEAL can also be used to seal conventional solder connections. This product can be applied at any temperature between 50 degrees and 90 degrees F. It stays flexible from -30 degrees to 180 degrees F. Despite its amazing sealing properties it can manually be removed and even reused!

After spending time and money installing an antenna system, you will want to insure the most vulnerable part is protected--the connection or connector.

For the modest price of $2.49 a roll, every listener can afford to protect their exposed antenna connectors with this product.

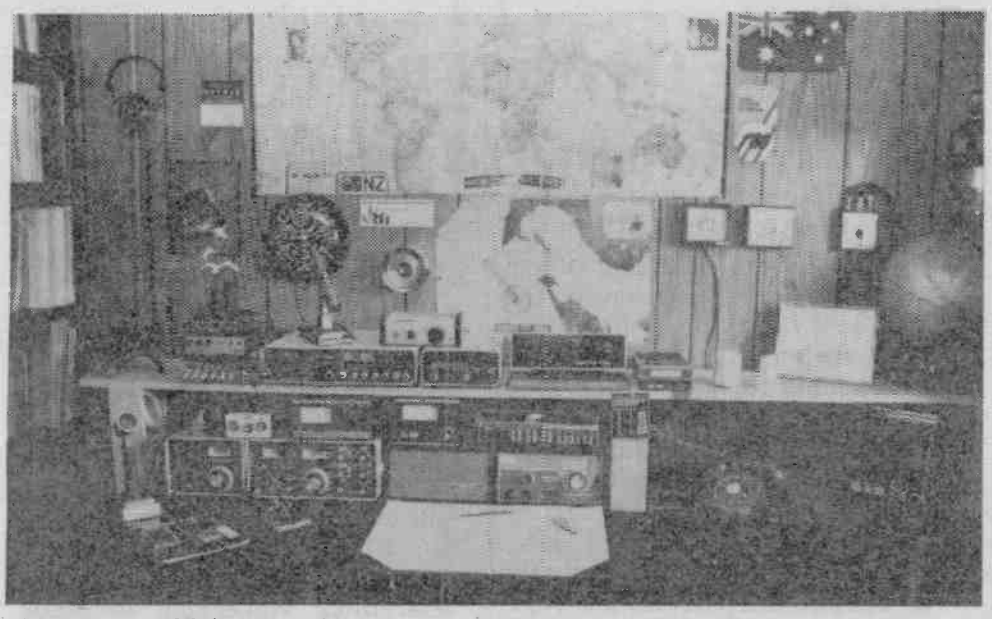
Check your local electroncis supplier or order from the COAX—SEAL manufacturer:

Universal Electronics Inc.
1280 Aida Drive Dept. F4
Reynoldsburg, OH 43068
$2.49 plus .50 shipping.

Monitoring Posts On Parade!

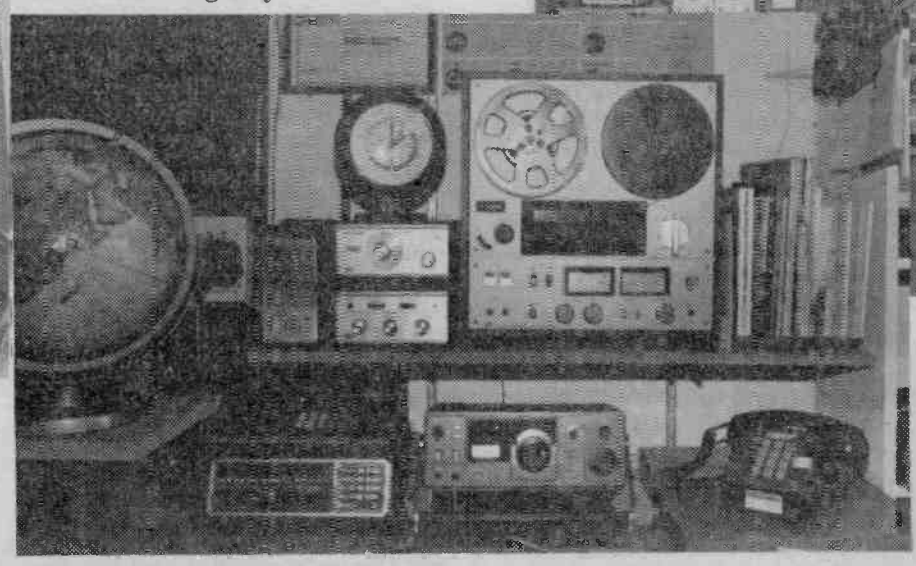
From time to time, some of our subscribers share with us photos of their listening positions. Many of these photos reveal ingenuity in design as well as economy of space.

Congratulations to those of you who have succeeded in maximizing the rewards of your hobby!



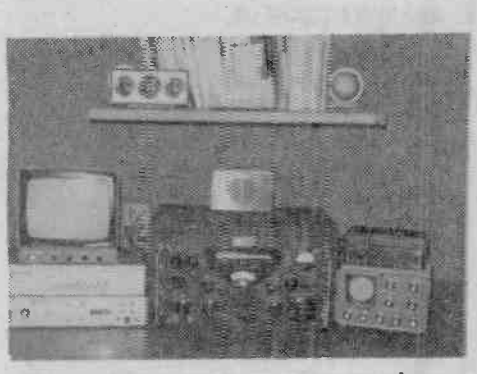
Anyone would be proud to show this sharp listening post of I.H. Pepper in Long Beach, Washington, who vigilantly monitors emergency calls

Jim Roberts KA6DUR of Huntington Beach, California has his shack conveniently located in a closet.



The popular Kenwood R-1000 accompanies Bearcat and Radio Shack scanners at the QTH of reader M. Elmitt Eastcott of Cerritos, California.

A display shelf in a radio store? Nope! This is just a portion of a collection of monitoring equipment which belongs to a Chicago listener. (Photo courtesy RCMA)



Even older equipment has a place in serious monitoring as demonstrated by this listening position in Davie, Florida

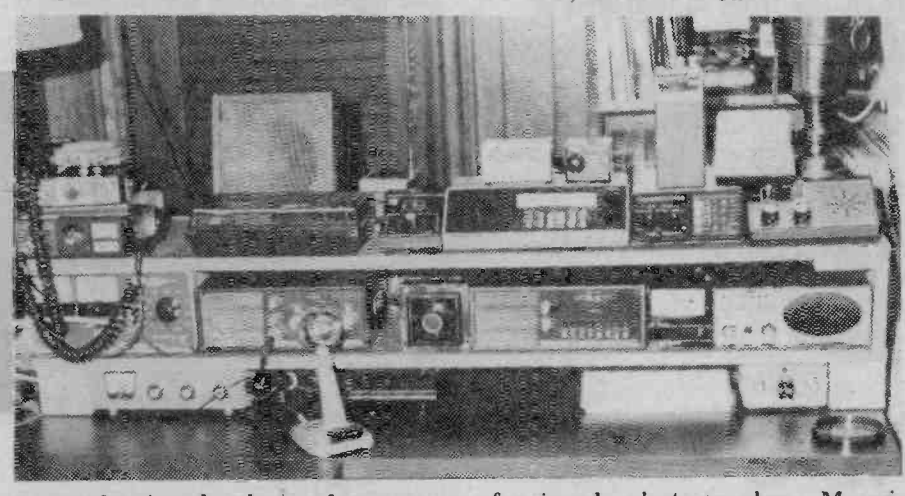
Brightly lightened, Jack Osborne has a window on the world at Kingston, Ontario

A custom shelf doubles the listening pleasure of Brian Jones of Durban, South Africa

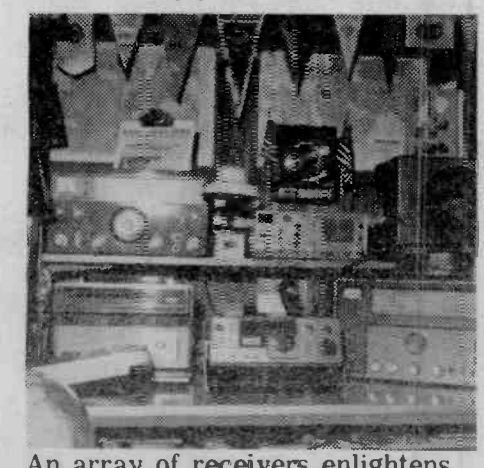
John Brush of Cecil, Ohio has found a handy nook for his compact monitoring post.

Volunteer fireman Robert Carson listens worldwide while off duty in Gauley Bridge, West Virginia

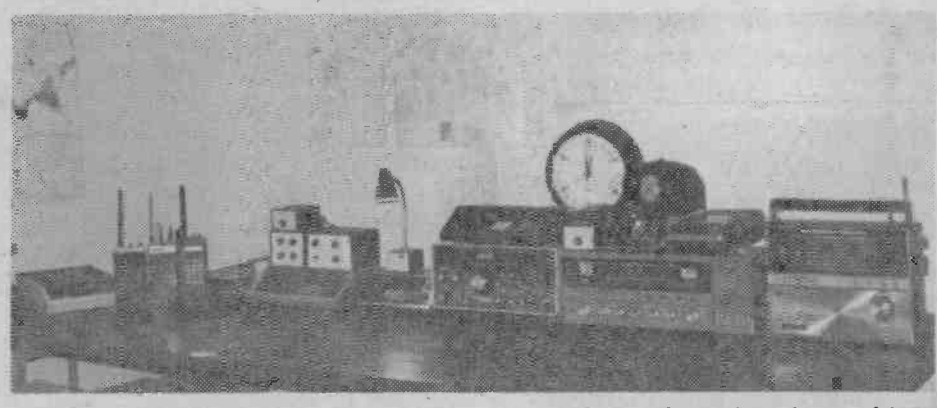
Peter Pompe of Kraainem, Belgium enjoys his NRD-515.



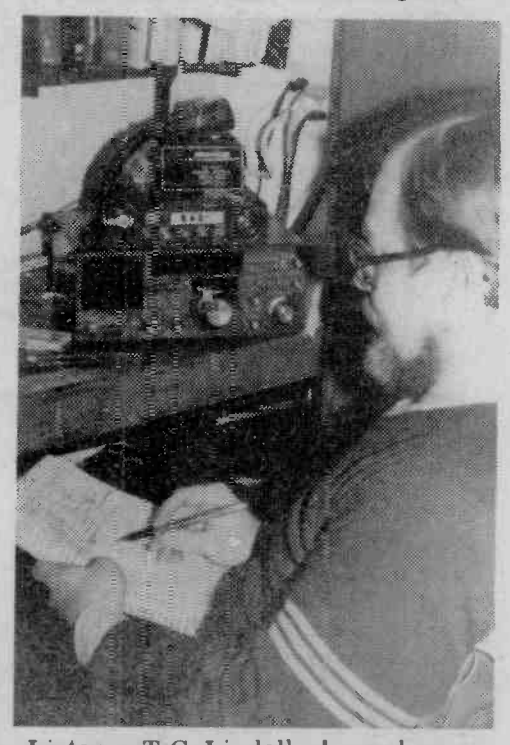
A professional photo from a professional photographer Maurice Dandeneau of Warwick, Rhode Island.



An array of receivers enlightens Elmer Cronkright of Wyoming, Michigan



MT columnist Bob McGovern does a lot of listening from this corner of his Las Vegas home.



Listener T.C. Lindell, shown here with his Yaesu FRG-7700 receiver, shares with us impressions of shortwave listening.

Technical Topics

A. Hi—fi AM radios are plenty sensitive, and assuming that there is enough tuning overrange above the nominal 1600 KHz limit, there is no reason why they could not provide good slope—detection reception of local FM cordless telephone base units. The corresponding 49 MHz handsets are also FM, so CB (or Hi—fi) AM converters would also be used in a slope—detection mode. But with so many excellent scanners around with 49 MHz coverage the effort isn't really worth it.

Q. I would like to offer some help for J.R.'s question in the September/October issue of MT. A source of info on TV satellite decoding is chapter 10: "The Secret Signals of the Birds", found in Home Satellite TV Book by Anthony Easton (Wideview Books, 1982, $10.95 paperback, ISBN 0—87223—730—3). (Paul Johnson, Santa Cruz, CA).

A. Paul continues with the suggestion to connect a general coverage receiver antenna input to the video output of the satellite TV receiver which is tuned to a transponder. Other readers have said that the majority of the action is between 6.2-6.8 MHz, USB. Any more readers with information?

Q. Do VHF high band signals occasionally pop up on a UHF scanner band? (Reed Darsey, Mobile, AL)

A. They sure do! A letter from reader S.C. Shallon of Los Angeles recently provide some excellent insight. According to Shel, the popular Bearcat 220 serves as an example.

Although the VHF RF section is turned off while UHF is being monitored, the 10.8 MHz mixer stage is not and may pick up strong signal feed—through. Since the high band oscillator also continues to run during UHF reception (it also functions for UHF), conditions are ripe for apparent UHF reception of high band signals. For example:

Your scanner is tuned to 465.6 Mhz; the VCO (oscillator) is working at 454.8 Mhz (triple the high band 151.6 fundamental). It is this lower frequency which mixes with, say, the 162.4 MHz weather signal, producing a 10.8 MHz product which is fed to the scanner's IF.

The equations are: UHF equals (3 x VHF) - 21.6, and VHF equals (UHF plus 21.6) divided by 3.

Yet another possibility exists——when the VCO is above the interfering VHF frequency. For example, if you are listening to 506.8125 MHz and your corresponding VCO is on 496.0125 (triple the 165.3375 fundamental). A signal on or near 154.5375 will mix to produce the 10.8 MHz IF.

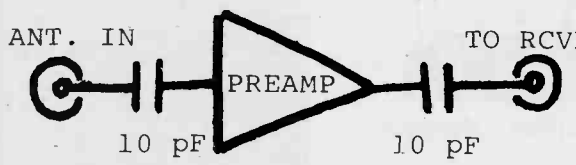
Continued on page 20

For The Stalwart Experimenters

Those readers with some technical expertise may wish to modify their wideband preamplifiers to limit the gain at lower frequencies. Shortwave intermod may be heard on scanners as Morse code or international broadcast signals. On TV, shortwave intermod may be seen as a fluctuating crosshatch pattern which is often more prominent at night.

An example of the modification technique may be used with the popular Grove ANT-4 Power Ant and PRE-1 Signal Amp preamplifiers. Originally designed for broadband 1-1000 MHz coverage, use from 30-1000 MHz is far more common.

To suppress shortwave preamplification, replace the input and output disc capacitors (100 pF) with 10 pF units. These are the two capacitors attached to the coax connectors on the printed circuit board. Remember, size counts. Use the smallest capacitors you can find or you may sacrifice UHF performance.



Input and output capacitors are reduced to limit low frequency response.

On a test model ANT-4, gain figures with the new capacitors were:

-4 dB @ 10 MHz
0 dB @ 15 MHz
plus 9 dB @ 30 MHz
plus 13 dB @ 40 MHz
plus 17 dB @ 50 MHz
plus 23 dB @ 160 MHz
plus 13 dB @ 450 MHz
plus 8 dB @ 900 MHz

The noise figure remained at a low 1.8 dB.

More important, in actual use, no more shortwave interference was noted on the scanner using a Scanner Beam antenna, and no more crosshatching was visible on a previously-obliterated TV screen!

The modification will be included on all future Grove PRE-1 and ANT-4 units.

More On The FRG-7700 Memory Expansion

By Art Kimball

Bob Lonn's excellent article about memory expansion for the Yaesu FRG7700 (September MT) is certainly a great help to those of us who like to keep track of a large number of frequencies. There are a couple of things that those who build it might find a help.

YAESU INCONSISTENCIES: For reason best known only to Yaesu, all FRG7700s are NOT created equal. Without going into great detail about logic circuits, suffice it to say that since the memory chip uses eight bits of logic, four of the twelve switch positions on switch M-CH utilize TWO addresses in storing memory; the other eight positions use one address each. On my particular unit, position 1-2-3-4 each use two addresses. This means that you CANNOT use the memory expansion with the M-CH switch in any of those four positions...you CAN use it in any other position. This will vary from unit to unit. The simplest way to discover how your particular unit is set up is as follows: (WARNING: DO NOT depend on Yaesu's schematic ... the one in my Owner's manual and my Service Manual are COMPLETELY different...and neither one is accurate with my radio!)

1. Turn ALL NINE switches on expansion to OFF position and turn M-R (Memory Recall) ON. Place M-CH in position #1.

2. With a Voltmeter on the 5VDC range and connected to Ground on your FRG7700...check each switch on the expansion in turn for 5VDC. Make a note of which switch(es) show voltage.

3. Place M-CH in position #2 and repeat. Follow this procedure for each of the twelve memory positions.

You can use your memory expansion with the M-CH in any position which showed 5VDC on only ONE switch on your expansion module.

If you attempt to use the expansion in any position that uses TWO addresses, you will find that you will find several settings on the expansion that seem to be functioning improperly. What is actually happening is that you are sending frequencies to the same address you used before and wiping out the first set of frequencies.

STATIC WARNING: It seems to me, that since MOS chips are extremely vulnerable to static electricity, a problem could arise. For my own peace of mind I ran a ground wire from Pin #1 of P-34 (this is the first pin on the end closest to the 5VDC pin.) to the metal plate on which my expansion switches are mounted. If you used a plastic box, you can put a spade lug under each switch mounting nut attached to ground. You can utilize one of the extra wires in the ribbon cable for this purpose.

If may be that my fears are ungrounded (no pun intended) but it seems to me that without the ground, there is a possibility that a static charge could zap the memory chip and wipe out the whole thing...and those suckers are EXPENSIVE!

One other note of interest. In Yaesu's Service Manual, they note two modifications. I have been unable to get them to tell me what serial numbers have these changes made and which do not. One modification entails the replacement of a bad IC which allowed an excessive power surge during turn on and the other corrects a problem in the memory unit. If your memory consistently shows 1 kHz errr when you recall the memory, and/or you hear an oscillating or warbling tone when using your memory, you might consider sending the unit back to Yaesu for the modification. It should be done free of charge since it is THEIR error. The only thing they would say was that it existed in "early" units.

(Thanks Art, for some excellent help...ed).

Scanner Antennas And Preamplifier Overload

One problem eternally facing scanner listeners is how to expand listening area without suffering strong-signal overload. Efforts to increase the strength of weak signals usually increase the strong ones as well, often resulting in front-end overload, characterized by overall reduction in formerly-readable signals (desensitization or dynamic compression) and phantom signals being heard all over the bands where they should not be found (intermodulation).

The problem is especially severe in metropolitan areas where huge complexes of radio and television broadcast transmitters, mobile telephone repeaters, airport towers and other irritating sources of radio frequency interference congregate.

The situation is usually aggravated by the addition of a preamplifier in an effort to make weak signals stronger. The preamp amplifies all signals--including the strongest ones--much to the dismay of the listener (and his scanner!).

A few words of advice are in order. First, if you are located out in the country or distant suburbs--a fringe area of reception--then a

Continued on page 19

Scanner Antennas

Continued

preamp might be in order. But your primary effort should be in the selection of an appropriate antenna and coaxial cable.

If you desire all-direction coverage simultaneously and don't need maximum distance, then a multiband omnidirectional antenna may be for you. On the other hand, if you desire maximum range and directivity, nothing can beat a good beam antenna.

Coaxial cable must be low-loss, foam-dielectric. Use RG-6/U, RG-8/U or RG-59/U. Do not use RG-58/U or RG-174/U for scanners. Do not be concerned with impedance matching. No scanner maintains a uniform 50 ohm impedance over its tuning range nor does any antenna. Be concerned with signal losses only.

If you do decide on a preamplifer, a masthead mount unit will provide better signal delivery to your receiver than an indoor amplifier. This is because the masthead preamplifier can build the signal up to a point where it may overcome the losses in the coax. An indoor preamp can not amplify a signal that isn't there! If a weak signal is present after its trip down the coax, the indoor preamp can boost it.

A preamplifier in the city is an invitation to disaster; all local signals will be amplified, even those strong ones you don't want to hear. Fortunately, there may be one way out: a tunable notch filter adjusted to the frequency of the offending transmitter.

....And The Winner Is....

Last month Monitoring Times tossed out an esoteric question just to see who was reading. The question was, "How do you resolve the bidirectional ambiguity of a Bellini-Tossi fixed-loop goniometer?"

The newspaper hardly hit the streets before answers began pouring in!

For those of you who are puzzled by the question, we are talking about a radio direction finding antenna with two crossed loops. Such a system show two possible signal directions off the back and front.

The earliest postmark on the correct answer came from Peter Golomb of Coventry, Rhode Island. Congratulations, Peter! Your prize, a technical book from the Grove library, is on its way.

Honorable mentions must also be given to the following correspondents who guessed correctly, but whose entries arrived after Peter's:

Peter Sinkowski (Surfside, FL)
Dr. Fred J. Friel (Annapolis, MD...see below) *
Lambert C. Huneault (Windsor, Ont.)
Vincent J. Pinto (Suffern, NY)
Larry Ledlow (Skyesville, MD)
Wayne M. Thompson (Decatur, Ga.)
Ronald Johnston (Champaign, Il)
Don Ferris (Hazel Park, Mi)
Charles Sabelberg (Sacramento, Ca.)
Paul Williams (Santa Cuiz, Ca.)
G.S. Cole (Somona, Ca.)

Nov. 1st, 1982

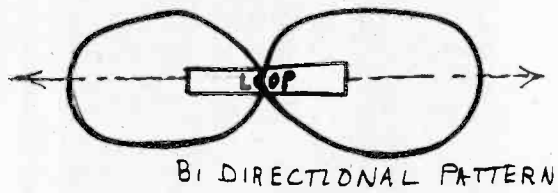
Ross E. Hicks, Jr. (Arlington, TX)

* Pursuant to MT Nov./Dec. 1982 Page 13:

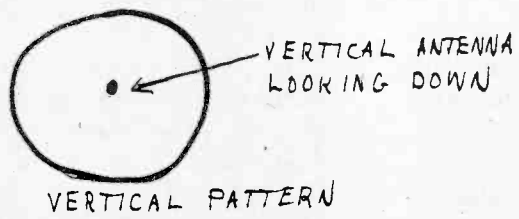
How do you resolve the Bidirectional Ambiguity of a Bellini-Tossi fixed loop Goniometer?

The obvious answer since no details are required is:

Simply introduce a sense voltage. Now, if you require - how is this done? The ambiguity is resolved by introducing a vertical antenna coupled as indicated

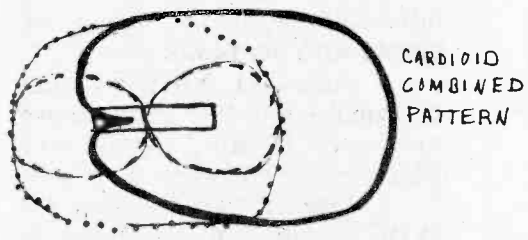


BI DIRECTIONAL PATTERN



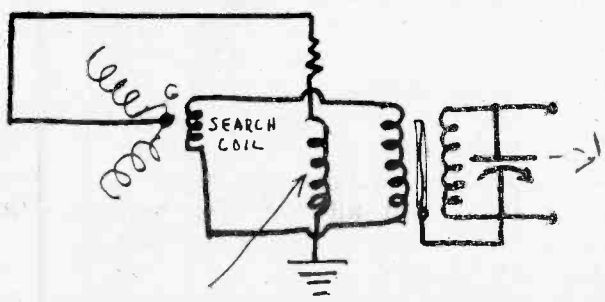
VERTICAL PATTERN

If these are combined, the pattern is:



The maximum of the signal is dependent solely on the intensity of the incoming wave and does not vary with the angle of incidence. The voltage introduced or induced in the search coil is proportional to the magnetic field linkage. Consequently as the search coil is rotated 360 degrees the receiver output indicator shows maximum and minimum signals 90 degrees apart. This is, of course, the same thing as a rotable loop. The same applies to the electrostatic Bellini-Tossi Radiogoniometer. Some of the early (1914) Marconi B.T.'s with aperiodic frames and open antennas employed a shielded receiver input transformer with a tertiary winding for sense indication obtained from the vertical effect voltage from the large aperiodic frames:

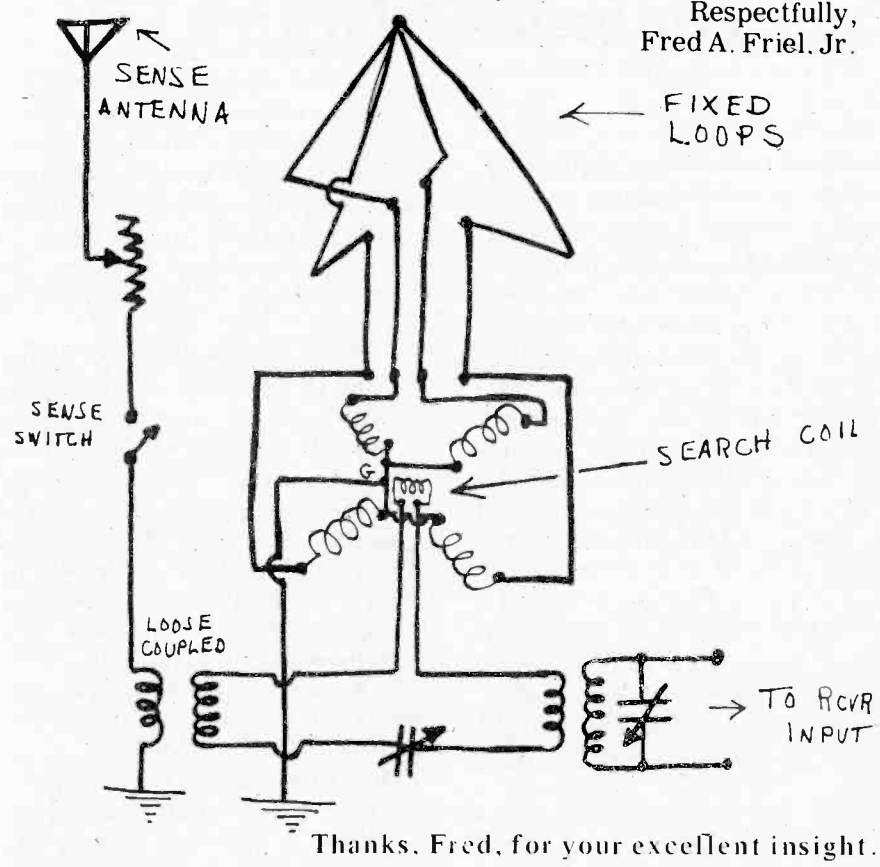
It is interesting as the connection for sense voltage was made at point G of Page 2 like this:



TERTIARY FOR SENSE INDICATION.

The purpose of the sense antenna is to determine definitively the sense of the antenna. This is, perhaps, best explained by simple loop antenna analysis:

Respectfully,
Fred A. Friel, Jr.



Thanks, Fred, for your excellent insight. Ed.

THIS MONTH'S TEASER: Coaxial cable is typically available in two nominal impedances -- 50 and 75 ohms. How were these values originally selected?

Send your entry to: Monitoring Times, 140 Dog Branch Rd., Brasstown, NC 28902.

Technical Topics

Continued from page 18

The equations are: UHF = (3 x VHF) plus 43.2, and VHF = (UHF-43.2) divided by 3.

Monitoring Times is grateful to Shel Shallon for sharing this interesting technical insight.

Q. I tried that formula for receiving 311MHz SAC transmissions on 461.15 MHz which was in the November/December issue of Mt, but came up with an entirely different answer. How come? (JP, Baltimore, MD)

A. The formula originally submitted by DW of Kent, OH was correct, but our typesetter had a problem with my writing! the correct equation is:

$$\frac{2\times(461.15-10.7)}{3}+10.7=311$$

The equation ostensibly works with Regency and Radio Shack programmables with a 10.7 MHz IF. For Bearcat (10.8 MHz IF) try

$$\frac{2\times(461.10-10.8)}{3}+10.8=311$$

While the technique does work on strong signals, sensitivity is only about 20 microvolts--some 30 dB or more worse than you would get using a Scanverter! And you will be using FM limiting on an AM signal, producing additional rejection of the voice modulation.

But it is a very interesting observation, and we thank DW for contributing it to MT readers.

Q. I note that my Bearcat 210 has a MOSTEK microprocessor chip; is it possible to expand its frequency coverage? (Ron Garon, Woodland Park, CO)

A. So far as I know, there is no way for a user to expand the coverage of the venerable BC—210. Anyone out there who can prove me wrong?

Q. Is the AM section of a hi—fi radio sensitive enough for reception of the 1695—1755 KHz cordless telephone bases? Can a converter be used with a CB radio to hear the corresponding 49 MHz remote units? (Pete Haas, Kent, OH)

Q. Why do some lists show shortwave assignments as "channels" rather than frequency? (Gary Memory, American Fork, UT)

A. For years, CW and Am dominated all shortwave communications. Then, SSB came along and doubled the possible frequency assignment with either upper or lower sideband. Since air and sea safety depended upon immediate access to common frequencies, a standard table of shared frequencies, or channels was established worldwide.

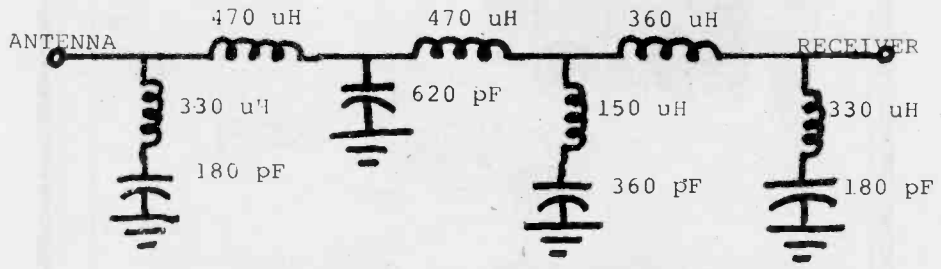
It is much easier for a coastal station to say "Switch to channel 401" than "I will talk to you on 4357.4 kHz upper sideband and listen for you on 4063.0 upper sideband"!

A complete list of ship to shore frequencies and channels worldwide is included in the Shortwave Frequcny Director (Grove BOK-13).

Q. Where can I find a digial readout attachment for my early-model radio?

A. Two manufacturers presently advertise them, although we have no first-hand experience with either: Grand Systems, General Delivery, Blaine, WA 98230; and Torrestronics, 4850 Hollywreath Court, Dayton, OH 45424.

There are other manufacturers as well; kits or factory-built units may vary in price in the $100-150 range.



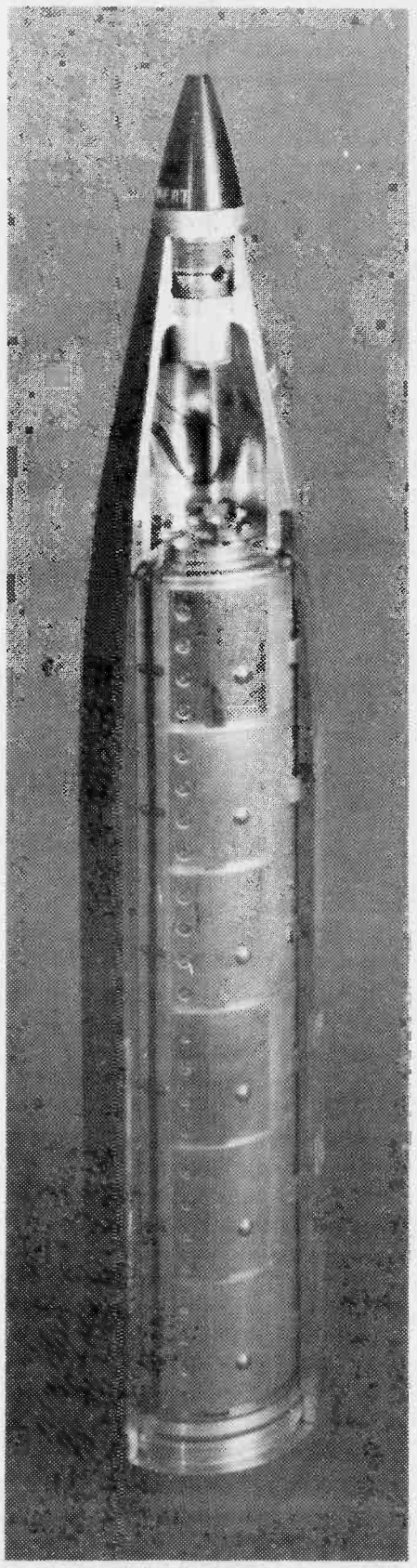
Q. Would any of your VLF enthusiasts like a diagram for a sure-fire AM broadcast band filter to put ahead of their 5-500 kHz receivers? (Jeff Silvester, Springvale, Victoria, Australia).

A. They sure would, and so would I, Jeff! Thanks!

UHF

Continued from page 12

255.4	Flight Service Stations
257.8	Military aircraft to FAA
264.8	Space Shuttle chase aircraft
272.7	Flight Service Stations
282.8	Coast Guard/Navy
296.8	Space Shuttle primary
304.8	Hurricane Hunters
311.0	Strategic Air Command primary
314.6	Military contractors
321.0	Strategic Air Command
340.2	Navy towers
342.5	Weather information
344.6	Air Force weather
345.4	Military contractors
348.6	Military aircraft to FAA
349.4	Air Force control tower
360.2	Navy control towers
372.2	Strategic Air Command
375.7	Strategic Air Command refueling
381.3	Tactical Air Command
381.8	Coast Guard air primary
383.9	Coast Guard air



Equipment for monitoring the military UHF aero band is scarce, mostly military surplus. Venerable (but old and heavy tube type) receivers like the URR—13 and URR—35 shipboard receivers, R—278 Army ground receiver and some more recent (but expensive) synthesized radios are occasionally found in surplus outlets like Slep Electronics (Otto, NC) and Fair Radio Sales (Lima, OH).

Army Hawks New Artillery Delivered Jammer

Successful engineering tests were conducted recently on the artillery delivered expendable communications (barrage) jammer (EXJAM), developed by the Army Electronics Research and Development Command's (ERADCOM) Signals Warfare Laboratory, Adelphi, MD.

For the tests, held at Yuma Proving Ground, AZ, jammers were loaded into 155-millimeter cargo rounds and fired from howitzers at various ranges.

The jammers are less susceptible to detection than those now in the field and are much less expensive to produce.

During flight, the base plate of the round is blown off, and the jammers are ejected from the round one at a time, according to preset timers.

The antenna/ground plane is then deployed and within seconds the transmitter is automatically turned on and the jamming begins.

Air To Ground Telephone

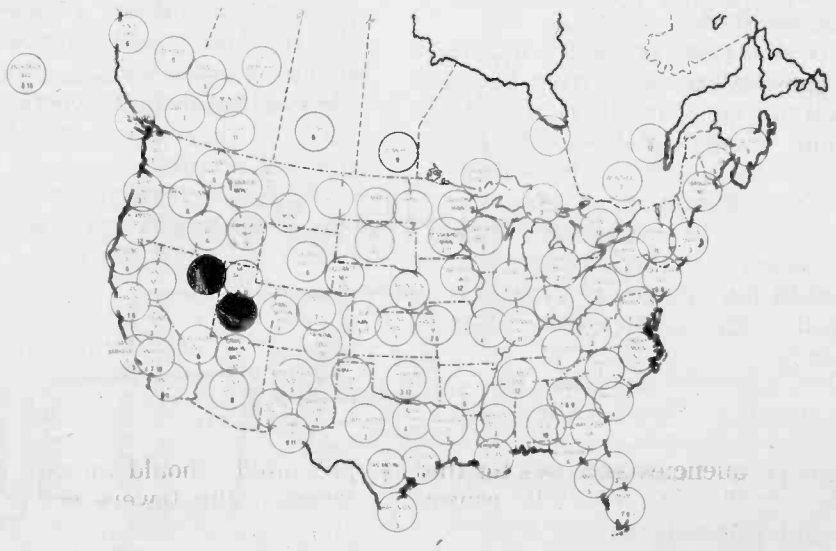
While any scanner buff knows the wide distribution of mobile telephone channels in the 152.51-152.81 MHz high band, few listen to the air to ground channels on UHF.

A calling channel is reserved for 454.675 MHz (ground) paired with 459.675 MHz (aircraft). Channels are spaced every 25 kHz between 454.700 and 454.975 MHz.

Following the standard base/mobile channelization plan, 5 MHz separates each ground and air channel.

While ground signals are limited to a radius of a few miles from the transmitter site, aircraft signals are often receivable for hundreds of miles!

For maximum distance reception, a good directional beam antenna is recommended along with low loss coaxial cable.



This densely-clustered map illustrates the wide distribution of air to ground telephone terminals in the United States.

Firefighters Richard Keyworth (left) and Philip Cappitelli pose with the "Public Service Awards" they recently received from the Scanner Association of North America. They received the awards for their actions in halting the string of Tylenol cyanide deaths in the Chicago area.

The Tylenol Killings...

It Could Have Been Worse

Congratulations to Firefighters Richard Keyworth and Philip Cappitelli of Chicago whose quick thinking triggered the Tylenol alarm.

Capitelli, an ardent scanner buff, became suspicious of the possible similarities among several victims struck down on the same day. After phoning Richard Keyworth, a fellow firefighter in an adjoining district, his suspicions were confirmed.

Within minutes, notified medical authorities had begun the arduous task of alerting the city...and then the nation.

Monitoring Times joins the scanner Association of North America (SCAN) in saluting these two citizens for their excellent detective work and humanitarian effort in halting the Tylenol tragedy.

Kilocycles? Megacycles?

The modern terms "kilohertz" and "megahertz" have actually been in use for many decades outside the US. World War II German radio equipment all bore that frequency reference.

In the US, the term "kilocycle" was retained because of its descriptive nature, referring to the repetitive electromagnetic wave. It was more accurately known as "kilocycles per second". Since the term "hertz" automatically conveyed "cycles per second", its shorter expression, combined with its more universal distribution, pursuaded the United States to get in step and kilohertz (and megahertz) will now be found on all recent electronic equipment.

For those of our readers who are newcomers to radio, kilohertz (abbreviated kHz) and megahertz (MHz) are related by 1000, or three decimal places. 1 MHz = 1000 kHz.

Conventionally, frequencies below 30 MHz (30,000 kHz) are given in kilohertz, while those above are shown in megahertz.

Information Please

Monitoring Times will print at no charge (as space permits) announcements of a non-commercial service nature.

I have limited knowledge of area frequencies and uses for the Peoria, Illinois area. Will answer all inquires. (John R. Otto, 81 Oak Lane, Henry, IL 61537)

Would like to correspond with owners of Hallicrafters Model SX-96. Also I am seeking a publication of Russian alphabet, punctuation, etc. converting it to international Morse code. Any assistance will be greatly appreciated. Should anyone be interested the towers depicted in photo below are being beautifully restored and certainly worthy of a visit for Marconi fans. Charles J. McCue, P.O. Box 275, Sea Bright, NJ 07760.

TVA Marine Radio Net

The Tennessee Valley Authority has been recently authorized to utilize five discrete HF single sideband channels in the marine radio service: 2094.4, 4195.0, 6223.0, 8295.6 and 12433.7 kHz.

The five channels will be utilized by the Construction Division and installed in crytal-controlled mobile radios.

Out Of Band Programming Trick For The BC-220

by Jeorge E. Cattaneo
Buenos Aires, Argentina

I have discovered some interesting programming tricks with my 1980 model Bearcat 220 which I would like to share with my fellow readers of Monitoring Times. While the frequency expansion is limited, it is interesting.

I have also included notes on a similar exercise for later models of the popular BC—220. Whether or not these techniques work on the new 20/20 only further experiments by our readers can verify.

OLD MODEL BC—220
PRESS: 49.99, MANUAL, LIMIT (50.065 will appear)
PRESS: 135.99, MANUAL, LIMIT (136.065 will appear)
PRESS: 173.99, MANUAL, LIMIT (174.570 will appear)
PRESS: 511.99, MANUAL, LIMIT (512.575 will appear)

NEW MODEL BC—220
PRESS: 49.995, MANUAL, LIMIT
PRESS: 135.995, MANUAL, LIMIT
PRESS: 173.99, MANUAL, LIMIT (as with old model)
PRESS: 511.99, MANUAL, LIMIT (as with old model)

This program can be used for the second limit entry to slightly expand the upper cutoff frequency during SEARCH.

To enter one of the four out—of—band frequencies into memory, simply:
PRESS: 49.99, MANUAL, ENTER (etc. for the other three frequencies)

CW For Shortwave Listeners

Part I

by Sam W. Lambert

In this high technology era of electronic computers, radioteletype and radiotelephone communications, many people are under the impression that Morse code is a thing of the past.

Most SWLs know better than that as they hear all kinds of c.w. signals while tuning across the HF spectrum. But I wonder how many readers of Monitoring Times who can copy Morse code fully realize how wide a variety of intriguing, fascinating communications can readily be picked up. Any listener with a little Morse code savvy need only switch on the BFO, and his general coverage receiver will open up a whole new, exciting world of dots and dashes!

Precisely what is out there awaiting the Morse code enthusiast? Well, the c.w. "utility" bands are richly filled with a wealth of signals running the gamut from ship-to-shore communications, law-enforcement bulletins, weather reports of all kinds, press news, notices to shipping, navigational beacons, daily updates on the location of the Gulf Stream, traffic lists for ships at sea, transmissions from embassies around the world, ubiquitous marker beacons, military communications, Morse code drills at various speeds by fleet radio stations, and more.

Code speed varies from about 6 words per minute to over 40.

To get maximum enjoyment from this hobby, a c.w. listener should also be familiar with or have access to a copy of the International Q and Z codes used by operators around the world. Commercial and ham radio operators use the Q-code, but the military use the Z-code.

Also, he/she should have access to a comprehensive frequency list to facilitate searching for and identifying the countless c.w. stations. THE SHORTWAVE FREQUENCY DIRECTORY by Bob Grove serves the purpose quite well because of its detailed coverage of frequency assignments in the various "utilities" services and because it also contains both the Q-code and the Z-code as well as a full listing of international callsign prefixes.

Another excellent publication to which I refer constantly is the CONFIDENTIAL FREQUENCY LIST by Oliver Ferrell. The fifth edition is especially valuable because it includes a callsign list (in alphabetical order) as well as frequencies listed in numerical order from 4 to 28 MHz.

What is so rewarding about c.w. listening is not only the multitude of DX signals that can easily be logged and identified, but mostly the fascinating contents of some of these Morse code communications.

Ship-To-Shore C.W.

Particularly interesting and ever present on the air waves are ship-to-shore c.w. transmissions between merchant ships on the high seas and coast stations around the world. These transmissions -- generally in English, although many other languages are also used -- typically feature messages between shipowners or agents and the masters of vessels at sea. The contents of these messages are extremely varied, and range from ETAs at specific ports, description and tonnage of cargo taken on or unloaded, details of mechanical breakdowns, fuel data, orders for repair parts; to personal greetings, medical emergencies, custom weather forecasts and reroutings due to storms, ports of call, ships' speeds, labor union problems concerning crew members, food orders, reports of oil spills, requests for nautical charts, and so forth. You never know what to expect!

For c.w. enthusiasts uninitiated in ship-to-shore c.w., a word about procedure. The method generally followed for establishing communications depends on whether a coast station has a message to transmit to a specific ship, or a ship's radio operator wishes to send a message to a particular coast station.

How do operators aboard vessels at sea know whether coast stations have messages on hand for them?....Of course, they can always call a coast station and ask "QRU?", which means "Have you anything for me?". If the coast station replies "QRU", it means "I have nothing for you". But if the answer is "QTC 1" it means "I have 1 telegram for you". After the ship switches from its calling frequency to a working frequency, the coast station operator is likely to transmit "QRV?" which means "Are you ready?". Whenthe shipboard operator replies "QRV" (I am ready), the coast station proceeds with the transmission of the message(s). The ship operator usually acknowledges receipt of each message with the signal "QSL".

Generally speaking, however, radio operators at sea find out whether coast stations are holding any messages for them by listening to the traffic lists broadcast several times a day by the various coast stations. These traffic lists consist of the call letters (listed alphabetically and generally repeated twice) of all the ships for which the coast station has messages. When a radio operator hears his ship's callsign in the traffic list, he then calls up the coast station and requests the message(s).

Where, in the HF spectrum, are these ship-to-shore c.w. communications heard?....Well, there are several chunks of spectrum set aside by the International Telecommunication Union (ITU) specifically for this worldwide maritime mobile service, in the 4, 6, 8, 12, 16 and 22 MHz bands. Frequency details are contained in the two books referred to above, as well as published from time to time in the pages of Monitoring Times.

To give unfamiliar readers a better idea of the procedure generally used in establishing contact and exchanging traffic, let's follow a fictitious buy typical situation: a radio operator aboard a Liberian freighter somewhere out in the Atlantic has a message from his captain, addressed to the ship's agent in New York City. The operator decides to send the radiogram via coast station WCC (Chatham Radio, in Massachusetts). Incidentally, coast stations normally have a three-letter callsign, while ships' callsigns generally feature four letters.

The ship's position and time of day dictate which frequency band the operator will use. Let's say he chooses the 8 MHz band. The official "LIST OF COAST STATIONS, Volume 1" published by the ITU shows that in the 8 MHz band WCC transmits in the A1 mode (c.w.) on a frequency of 8,586 kHz and listens to common-channel calling frequencies in the band between 8,363.2 and 8,364.8 kHz. So, the ship operator sets his transmitter's VFO to, say 8,364 kHz, and calls WCC something like this on his Morse key:

"WCC WCC WCC DE ELAA ELAA ELAA QSS 417 K"

Loosely translated this message says: 'WCC (Chatham, MA) this is ELAA (Liberian registry ship); I will transmit on 8417 kHz. Over". Incidentally, instead of QSS 417, the operator might transmit "UP 417", which means he will move up the band to a frequency of 8,417 kHz.

Now, if you happen to have two shortwave receivers, you can monitor both ends of the communication, i.e. the coast station's frequency (8,586) and the ship's frequency (8,417) simultaneously. Or, if you happen to be the fortunate owner of a receiver featuring a programmable, multiple-channel memory, you can switch from one frequency to the other at the push of a button and not miss a thing!

If the coast station is not busy communicating with a ship at the time, it is likely to be broadcasting a continuous, taped "marking transmission" such as:

VVV VVV (or CQ CQ) DE WCC WCC = OBS? QSX 8 12 16 MHZ K" repeated over and over again. Translated: All ships, this is WCC; any weather observations? We are listening on the 8, 12, and 16 MHz bands. Over".

This constantly repeated marking transmission will be interrupted when the coast station operator hears the ship's call. The reply will typically be something like this:

"ELAA DE WCC UP K"

UP means "move up to your designated working frequency" (8,417 kHz in this example).

At this point, you will likely hear the ship operator respond by keying dah dit dit dit dah (break) followed by one or two dits. This is

your cue to dial up the working frequency on your receiver, because the ship operator is now going to do the same thing to his transmitter's VFO. Within a few seconds you'll hear him retuning his transmitter on 8,417 kHz (long dash of several seconds duration), followed by a call to the coast station, something like this:

"WCC DE ELAA GE QTC 1 HW"

GE means "good evening."

HW means "how about it?" (or "did you get that OK?"

Once given the OK by the coast station, the ship operator then proceeds with the transmission of his message, usually beginning with dah dit dah dit dah (start of message). The message then features a preamble which usually includes the ship's name and callsign, message number, number of words in the radiogram (e.g., CK21 means 21 words), date/time of filing, and the name and address of TELEX number of the addressee. This is followed by the text of the message signal (dit dah dit dah dit), the ship operator is likely to key "NIL K", meaning "I have no further traffic; over".

After the coast station acknowledges receipt of the radiogram (QSL), the ship operator usually ends the communication with something like:

"R TU SU" ("Roger, thank you. See you.")

The coast station then forwards the radiogram to its New York City destination via landline (TELEX). Now that this QSO is over, you can dial your receiver back to the international calling frequencies and pick out some other ship's call and have fun all over again!

By the way, if you've never had occasion to tune your receiver to one of those maritime mobile calling frequencies, you might be in for a surprise the first time you try it. Be prepared to hear a real jumble of signals at times, because it can be a real mess of QRM (interference) when a dozen ships are calling different coast stations (worldwide) simultaneously on the same channel!

For example, you might hear one coast station (say, WCC) being called simultaneously by several ships, while other stations such as WNU (Louisiana), NMR (Puerto Rico), GKB (Portishead, England), PPJ (Brazil), TIM (Coasta Rica), WSL (New York), SVB (Athens, Greece) and others are also being called by as many ships, all transmitting on the same or very slightly different frequencies within that calling band. This results in a multitude of dots and dashes emanating from your loudspeaker or earphones, each signal having the same or a slightly different pitch!

But don't give up....Fine-tune your receiver carefully or adjust the BFO pitch control until you can comfortably pick out one of the ship's calls from the apparent confused mess, and as soon as you hear the QSS signal, retune your receiver to the indicated working frequency and enjoy a satisfying relief from the QRM headache. (I spell relief "QSS"!)

some operators (especially in coast stations) use computer controlled electronic keyers that send absolutely perfect c.w. It's a real pleasure listening to such transmissions -- just like listening to music! On the other hand, some operators have terrible fists, so bad in some cases that they're next to impossible to read.

I recall encountering such a fist on the weather circuit one day, many years ago when I was a commercial wireless operator working for an airline in the Canadian subarctic. The guy was so bad that after asking him for countless repeats I finally lost my cool, made up an uncharitable Q-code signal of my own and signalled it to him: QRF. That stopped him cold, as he had obviously never heard of QRF! When he managed to tap the predictable question "What does QRF mean?", I replied: "It means that if you must send with your foot, you should at least use your Right Foot!". It was surprising to see how much less sloppily he tapped his Morse code characters afterwards! Ah....the joys of c.w....it sure is a colorful sport!

Anyway, if you have never listened to the maritime mobile c.w. service, and you'd like to be truly entertained by some fascinating QSO's, I recommend that you tune-in one of the following calling frequencies and go from there; I can guarantee you lots of fun: 4182, 6273, 8364, 12545 and 16727 kHz. Naturally, the lower frequencies are more widely used during evening and nighttime hours.

Next month we will conclude our look at shortwave CW action with naval communications and INTERPOL!

Getting More From Your Scanner Beam

Is it possible to improve reception with the Scanner Beam? Yes. Even though the unique product is the best scanner antenna available, the way it is mounted can make a difference.

Most of us erect a metal mast and mount the Scanner Beam to the top of the metal pipe. Even with the 12" offset pipe included with the beam, there is still some interaction between the antenna elements and the metallic mastpipe.

A better mounting procedure is provided by rigid 1½" O.D. PVC pipe. It may be firmly attached as an extension to the top of the metal mast, or become the mounting pipe on the top of the rotor (preferred).

The length of the pipe should be enough to clear the longest (rearmost) element of the Scanner Beam so that it isn't in the "line of fire"; 36" should do the job nicely.

THE BALUN TRANSFORMER

The actual feed-point impedance of the Scanner Beam is approximately 250 ohms, balanced; even this nominal value changes with frequency. To match it properly, a 4:1 balun (balanced-to-unbalanced) transformer is provided.

Rarely, the small balun transformer may be defective. Of all the Scanner Beams that have been sold--federal agencies, military, hams, surveillance professionals and scanner listeners, only one unit has ever been returned to the factory...and it had a defective balun transformer.

If your Scanner Beam doesn't outperform other multiband scanner antennas, that could be the problem. You may wish to acquire a replacement locally from Radio Shack or a TV repair shop, or call Grove Enterprises for a free replacement. It is a standard VHF/UHF outdoor TV type, available everywhere.

DON'T FORGET...IT'S A VERTICAL!

Even though the Scanner Beam may resemble a TV antenna, it must be mounted in vertical polarization; that is, the elements must be up and down. Mounted horizontally like a TV antenna, the beam will perform poorly on everything but FM and TV broadcast stations!

CHOOSE THE RIGHT COAX!

One of the most common failings among scanner enthusiasts is the inappropriate choice of coaxial transmission line. DO NOT use RG-58/U (CB mobile coax) or RG-174/U (extra thin coax).

Among the best choices is certainly RG-6/U as used by cable TV installers; it is extremely low loss and may be often obtained at little or no cost as a spool end from the installer. Check around. Connectors may be harder to find for this size, but it is worth the effort.

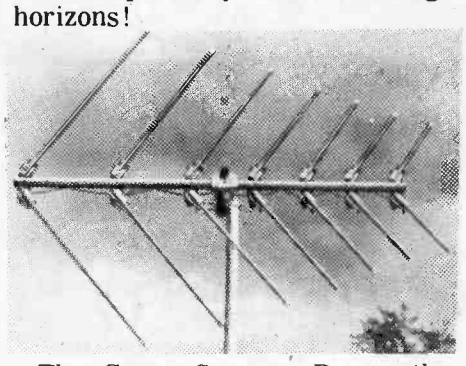
RG-8/U and RG-8/M are also good choices, provided they are low-loss foam-dielectric construction.

RG-59/U, commonly available for indoor TV service, is another good choice, provided it is of the low-loss variety.

Above all, never splice coax. The discontinuity caused by the break can lead to signal degradation even though every attempt is made to make a uniform joint. Replace the entire length.

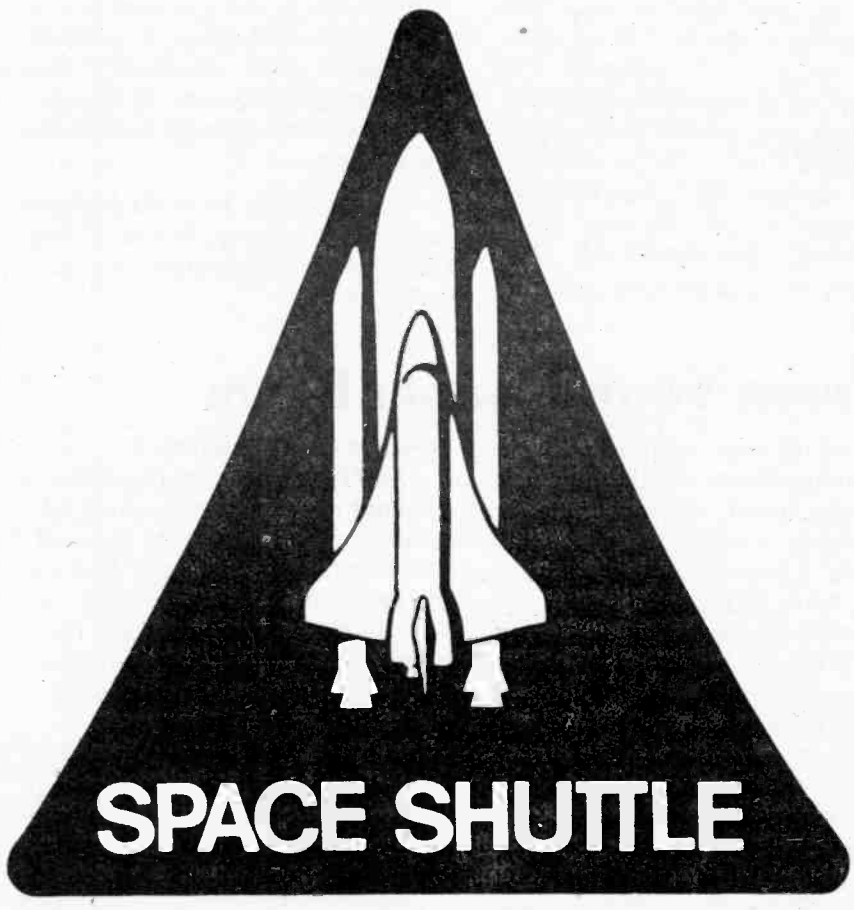
And finally, don't be concerned about impedance matching for receiving equipment. As pointed out elsewhere, no scanner and no antenna maintain a perfect 50 ohm match throughout their tuning range. Low loss characteristic (dB per 100 feet) is the prime criterion.

With these listening hints in hand, erect your antenna system and expand your listening horizons!



The Grove Scanner Beam, the highest performance VHF/UHF antenna available.

Ransom Of The Challenger



A special feature-length original story by Bob Grove, Editor of Monitoring Times.

She sat like a beautiful bird, sleek and gleaming in the powerful floodlights illuminating her hull. The Challenger, America's newest shuttlecraft, was being prepared for the liftoff. Her crew sat nervously, yet somehow placid, around the control console.

Damon Edwards, a veteran of two prior Apollo flights, studied his launch sequence orders. As commander of this historic orbital mission, he knew the awesome responsibility resting upon his shoulders. With a wife and two children, he felt uneasy about this new challenge. Sure, the Columbia had flown several robot missions before; but somehow, this mission seemed quite a bit different. Not only were there other crew members but the future of the man-in-space program was at stake.

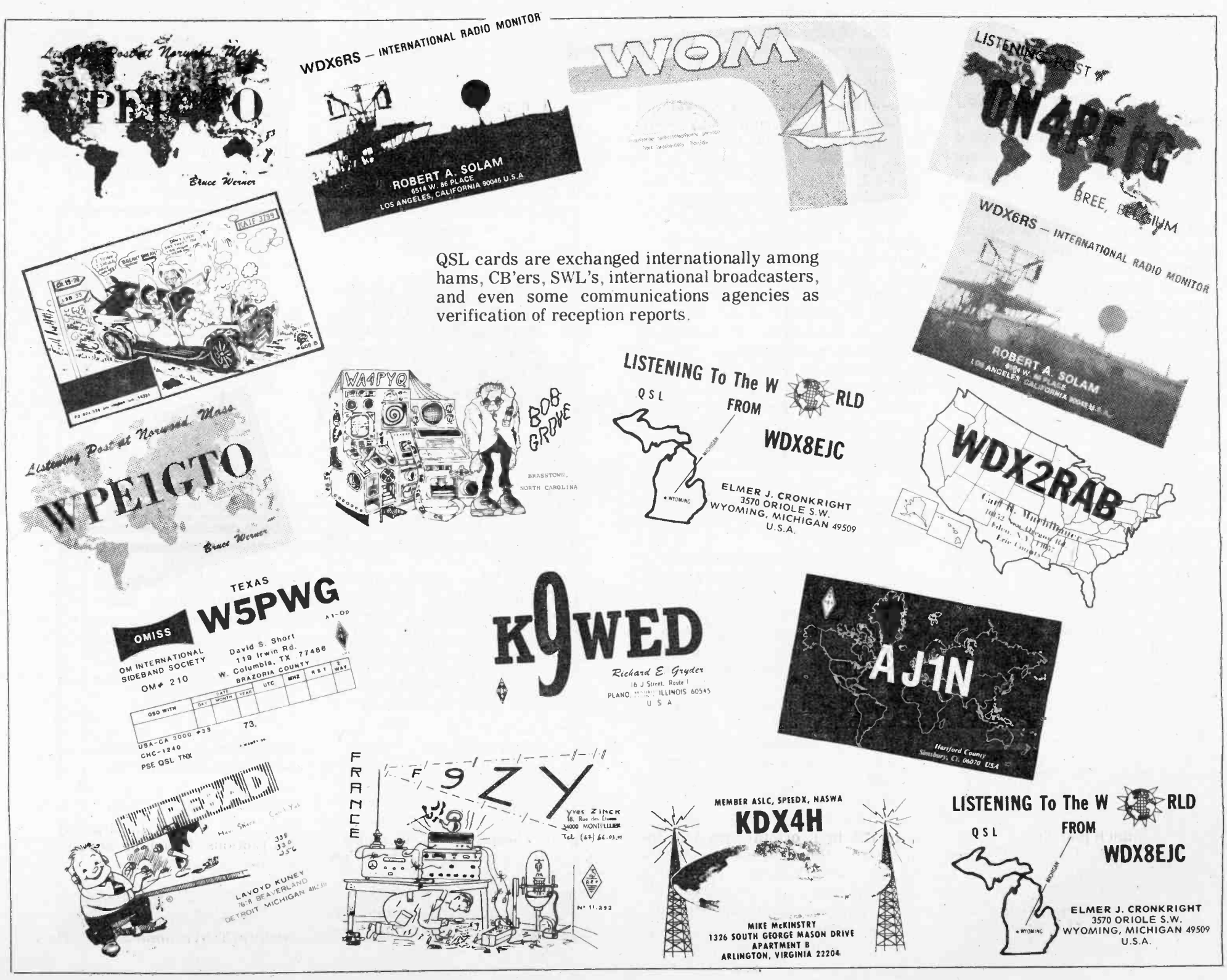
Congressional budget cuts had hurt the space program, and unless everything went according to plan, chances were good that more chunks would be chopped from the NASA budget.

When something goes wrong during ground tests, it is unfortunate; when something goes wrong in space, it is catastrophic.

Paula Krieger was the first woman to be part of the American "man"-in-space program. Her doctorate in astrophysics provided strong support for her choice among a competitive group of applicants to nagivate the "bird". She worked well with the prime crew during training, and looked forward to her responsible part in this imminent mission.

Kenneth Lamar knew a little about everything; as an interdisciplinary scientist, he well-complemented the crew. Formerly an instructor of the elite astronaut corps, he would now put his academic expertise to practical use. Repair and maintenance, scientific experiments, and environmental control aboard the Challenger were all his responsibilities.

Additionally, he was to supervise four on-board scientists. He would be busy, and he knew it.



QSL cards are exchanged internationally among hams, CB'ers, SWL's, international broadcasters, and even some communications agencies as verification of reception reports.

On the ground, mission control was in final countdown; "T minus 11 minutes, and counting." echoed the loudspeakers surrounding launch complex 39.

Work crews busily disconnected an octopus of wiring from the big bird, and hastily drove from the gantry area to the safety of the concrete blockhouse nearly a mile away.

The astronauts were now isolated; their only contact with other humans was via their radio communications link. Status lights flashed all around the cockpit area...all green. Everything was going normally; soon the bird would lift into space.

The radio speaker in the shuttle announced to the crew, "All systems go...T minus 3 minutes and counting".

Damon Edwards was still anxious, but he knew that the launch support crew on the ground was capable, consisting of dozens of the most highly-skilled technicians and scientists in the country.

"Roger", he replied into his helmet microphone, acknowledging the status report from Cape Communications.

"Challenger, this is Cape Com. We have 'Hold'. Stand by."

The commander turned anxiously to his navigator, then to his scientist-crewmate. "Anything wrong?" he asked automatically. Lamar rapidly scanned his status lights. "Looks good from here", he replied.

"How about the avionics console?"

"All systems still 'go' here", Krieger replied. The commander pressed his transmit switch.

"Something wrong down there?" he anxiously inquired of ground control.

"We're not sure, Challenger. Please stand by."

It seemed like time had suddenly stood still. An eternity passed before the loudspeaker again came on. "Challenger, this is Cape Comm. The hold was administrative, not a malfunction. We resume count at T minus 60 seconds. Prepare for lift-off."

Administrative? An administrative hold? This was unthinkable. But he would find out about that later; right now, there were more important things to consider.

However, if Damon Edwards had known the reason for the hold, he would have scrubbed the mission.

The launch-sequence clock beeped off the seconds; "Ten; nine; eight..." announced the communications system. In spite of years of training, no astronaut becomes blase at this moment; hearts are pounding...adrenaline was rushing.

"Three...two...one...ignition...lift-off." A deafening rumble like a hundred thunderclaps rolled across launch pad 39.

Inside Challenger, the crew felt the vibration of the booster rockets as an ominous pressure pressed them back into their seat cushions. The shinning bird was air-borne, gently lifting through the misty clouds of a Florida sky, looming higher and higher into the blue canopy of space.

Shortly, another vibration signaled the crew that the spent boosters had been successfully jetisoned away from the shuttle. "We have separation", the onboard loudspeaker confirmed from the Cape.

Challenger was on her own now obediently taking command from its expert crew. Status lights blinked like a Christmas display; audible signals annunciated system functions. Everything was working perfectly...an engineer's dream.

"Cape Com, this is Challenger."

"Roger, Challenger, go ahead."

"What was that 'administrative hold' business about?"

"I don't know, Damon. We're checking on it now." The voice was that of Bob Adams, familiar to many astronauts as they maintained their tenuous link with earth via two-way radio. His informal style had helped soothe the curse of many anxious moments during previous space flights.

"Let me know as soon as you find out, Bob" the commander requested.

"Roger...will do" the friendly voice replied.

Kenneth Lamar unstrapped himself from his reclining seat, and ambled back to the laboratory area. As he entered the lab, his four colleagues were preparing for their own vital experiments.

Lao Ching, a Nobel laureate, represented the People of Republic of China. Besides conducting an important experiment in solar wind, he would personify the goodwill of the American people toward the newly-recognized Republic.

Ramon Suarez was an astronomer in Brazil; now he would learn more about those elusive "black holes" in space. His specially-designed telescope would study celestial objects without the degrading effect of a smoggy atmosphere!

Ivan Klamoff was the first Russian to be invited aboard an American space mission. He had trained for months at NASA, and now he would conduct an experiment in neutrino communications...signals which go through nearly anything without interference. His findings would be reported jointly to an international body of scientists upon his return.

Betty Nelson was a microbiologist, an American presently on loan to Sweden through an HEW grant. If Einstein was right, her precious cargo of bacteria should age at a slower rate than those left on earth, due to the high orbital speed of the shuttle. Biophysicists worldwide awaited the results of her crucial experiment.

Back in the cockpit area, the commander sat cautiously by his console, awaiting word from the ground. Why should there have been a hold? Everything on board was working perfectly. Could there have been a malfunction in the ground support equipment? No, Bob Adams specifically said that the hold was administrative, not functional.

"Challenger, this is Cape Comm" blared the speaker.

"Go ahead, Cape" Edwards replied.

"Challenger, switch to S-band multiples communications and deactivate all UHF radio gear," an obviously-nervous Bob Adams requested firmly. "We're going 'secure'."

Although S-band communications were the primary mode for two-way radio aboard the shuttle craft, UHF was normally used simultaneously as a back-up. It provided an extra measure of safety because it was easy to receive on earth with very simple radio equipment.

S-band was very sophisticated, requiring complex receivers and elaborate antennas. Going "secure" meant the use of speech scramblers! Was there a danger of interception of communications?

The commander complied by switching off the UHF transmitters and activating the voice security system.

"UHF radios off; S-band on." Edwards notified Cape Comm, "What's going on down there? Are we being monitored?"

"I hope not, Damon." Bob Adams was deadly serious. "We've got a real problem. Is anyone else on board able to hear our communications?"

"Not unless I punch up 'intercom'," Commander Edwards replied. "Will you tell me what this is all about? My stomach is all in knots!"

There was a long silence. When the radio speaker came on again, a new voice was heard.

"Commander Edwards, this is General Travis."

General Travis? Why would the Chief of Staff of Air Force Security be taking over a civilian operation like this scientific mission?

"Commander", he continued, "We are under Code Red."

Code Red? Edwards sat back; his heart pounding. Code Red meant to abort the mission! On the ground, it would be a simple matter. Vacate the shuttle immediately, because an explosion was imminent. But in space? Would the mission become a giant fireball for hundreds of millions of people to see? A fatal fireworks display at a cost of hundreds of millions of dollars, and seven lives?

"Commander", the voice went on, "just before lift-off we received what we judged to be a crank 'phone call. It seemed to be one of those sick thrill-seekers threatening to blow you up. We've gotten them before, but they were always handled by the front office, and nothing ever came of it. That's why we resumed the countdown after a consensus agreement at mission control. This character's different. He called back again after lift-off and gave us some facts and figures."

"What kind of facts and figures, General?" Edwards requested apprehensively.

"This guy seems to have intimate knowledge of our telecommand system", the General continued. "He knows our command destruct frequency, and claims that unless we turn over ten million dollars, he will detonate the Challenger!"

Command destruct! A safeguard built into all orbital and deep space missions as an effort to protect inhabited areas from the devastation of a runaway missile. A tone-sequence is transmitted on a reserved frequency which activates an on-board bomb, annihilating the space ship, and raining the dead fragments back into the atmosphere where they will burn up by friction.

"Can't we deactivate the destruct system up here, General?" Commander Edwards suggested.

"We're working on that now, Commander. Problem is, the nut has time on his side. We have less than one hour!"

One hour! That wouldn't be enough time to deactivate the system.

"Any idea who this guy is, General?" Edwards inquired, nervously keeping up the chatter.

"We've got a good idea, Edwards, but that won't help us find him. He could have that telemetry transmitter anywhere, beamed right on you!"

"Can't his call be traced?"

"Yes, but we need some time. He's keeping his calls down to a few seconds. We think it might be Joe Hartley. Anyway, Intelligence is checking the voiceprint."

Joe Hartley! During NASA's heyday in the '60's, Hartley was head design technician for telemetry systems. After the successful Apollo program, massive layoffs cut back research and development; Hartley and his prime team of engineers were among the first to get the axe. He was bitter, but silent. Most of his colleagues admired his stoic attitude, but a few were skeptical. Hartley had worked day and night to perfect his telemetry system, almost to the brink of a mental breakdown.

Almost? Edwards wondered.

If the caller was Hartley, this was no bluff!

As soon as the commander had switched off the intercom Paula Krieger knew something was wrong. Although she was still wearing her protective headgear and was isolated from ground communications, she could see the strain on her Commander's face, and sensed the urgency of his motions. Reaching across the console, she pointed toward the intercom selector to include her headset; Edwards switched it on.

"Intelligence just called," General Travis announced. "They

got a positive ID on Hartley's voice! Looks like he means business."

Paula Krieger searched Edwards' eyes for an explanation. For a moment, he avoided acknowledging her stare. Slowly, his eyes turned to meet those of Krieger. His face was glistening with nervous prespiration.

"What is it, Damon?" suspecting that she did not really want to hear the answer.

"Joe Hartley, the designer of the command destruct system on board the Challenger is threatening to blow us up!"

"You're kidding!" she replied.

"I only wish I were." Edwards' voice sounded strained. "He can do it. He knows the access code, and has the technical ability to command-destruct the bird. He says if the government doesn't give him ten million bucks, he'll push the button!"

Paling, Paula Krieger sat back in her plush seat. "Isn't there anything we can do up here to prevent reception of the destruct signal?"

Kenneth Lamar interrupted the conversation as he returned to the cockpit after making his rounds.

"Everything is A-OK back there, Damon. Looks like a routine mission, doesn't it?"

"Yeah" replied Edwards, his eyes staring blankly down at the console.

"What's the matter, Paula? You look like you've seen a UFO!" Lamar quipped.

Just then the speaker came on again. "Challenger, this is Cape Com. Do you copy?"

"Roger. Go ahead."

"Damon, we're going to try something down here." There was some comfort in hearing Bob Adams' familiar voice again.

"We're sure open to suggestions up here!" Edwards replied lightly, trying to take the edge off the pall that was hovering inside the cockpit of the Challenger.

"The command destruct signal will most probably come from a UHF up-link. Although your receiver is always on, you might be able to disconnect the antenna from the receiver in the avionics room."

"How much time to do we have?" queried the commander.

"That's the bad news. We are trying to stall Hartley by pretending to go along with his blackmail arrangement; but he's no dumb bunny. He's sticking to the one hour limit.... you've got ten minutes!"

Ten minutes! Edwards had only a passing acquaintance with the avionics equipment.

"Paula! Do you have any idea where that antenna connector is?"

"Not exactly; but all the antenna cables come to a connector box in the avionics room. They're marked! I'll go down and check!"

Quickly, Paula Krieger disconnected her wiring harness from the console and stealthily worked through the hatch, down to the avionics room. Once there, she plugged her communications harness into the intercom system.

"Damon, I'm in front of the patch panel. There are dozens of cables coming in here, but they are labelled!"

"Make every second count, Paula. We've got about six minutes before Hartley activates the destruct signal."

The panel was a nightmare. To conserve precious space, the cabling was densely packed. Even if Paula found the right connector, could she disconnect it in time? The hardware was tightly installed to prevent loosening from vibration.

"Damon! Here it is: 'Command Destruct Telemetry Receiver'. I'm trying to turn the connector, but it won't come loose!"

By now, Kenneth Lamar had put the pieces together, and knew that there was trouble. He emerged into the avionics room through the hatch opening, and plugged his communications harness into the intercom.

"Can I help?"

"Boy, can you ever. We're going to be blown to bits unless we disconnect the command destruct antenna from the telemetry receiver, Ken!"

Lamar automatically lunged for the tool compartment; springing the lid open, he grabbed a special wrench. With the agility that only years of dedicated training can provide, he fitted the tool over the connector; a quick twist, and the cable sprang loose!

As the cable swung free, a red flashing light beaconed its alert, and an audible alarm pierced the tension in the avionics room. "My God!" Ken exclaimed, "That command destruct signal was actually sent! The preamplifier is still connected to the antenna and picked up the signal. We were seconds away from eternity!"

Back in the cockpit, the radio speaker blared out.

"Challenger...Challenger.... Do you copy?"

"Roger, Cape. Go ahead."

"Thank God, Damon! Hartley actually did it! That crazy nut really tried to carry it off!" Bob Adams' voice was trembling..broken. It had been an emotionally exhausting experience.

He continued. "We got a fix on him, though.

Our ground-based tracking stations got good cross-bearings on his signal when he transmitted. We've got choppers, jeeps, Highway Patrol...everybody on the way! He's going to think World War Three has broken out in his backyard!"

Damon Edwards collapsed back into his cushioned seat. His eyes pressed closed wearily. He sighed. He saw his wife, smiling, and felt her embrace. He heard his children's voices laughing and calling "Daddy". How he wanted to be home.

The famous Tower Bridge over the River Thames in London is just a few blocks away from the Studios of the BBC.

BBC Celebrates Golden Anniversary

by Roger N. Peterson

On December 19 the BBC World Service celebrated its Golden Jubilee - 50 years of broadcasting to listeners all over the World.

The first broadcast a half century ago was at 0930 GMT and was directed to Australia. In those days the BBC was known as the "BBC Empire Service" and was intended primarily for British expatriots and the English speaking people of the old British Commonwealth.

A week later - on Christmas Day, 1932 - King George V initiated a royal tradition which is still in effect - the annual message from Buckingham Palace.

To most of us in shortwave listening, the BBC was one of the first stations we turned in. This is simply because, for many years now, the BBC has been on the air with English language programs for twenty-four hours a day. With a strong signal via relay stations in Canada and the Caribbean, BBC broadcasts are easily heard here in North America.

I can recall very clearly the first time I heard a BBC broadcast. It was a few days before the Invasion in June 1944.

I had just been shot down over France by German fighter planes; I succeeded in bailing out of my crippled aircraft and escaped detection by German troops when I landed.

That night I was being hidden by a French farmer and his family--they had the radio on, listening to the BBC.

I didn't realize it at the time but, along with broadcasting news to occupied Europeans, the BBC also sent out clandestine signals to Allied secret agents and French Resistance groups. The BBC in those days furnished one ray of hope to occupied Europe.

Later on during the war, as a prisoner of war in a German prison camp, we had several radios which we kept hidden from the Germans simply by partially stripping them down and having a number of individuals carry the

parts around all day on their person.

The Germans used to search our barracks regularly but they never discovered our radios. Thus we were able to tune into the BBC every day and receive and pass on to our fellow British and American POW's the latest in news from London.

News, of course, is one of the things the BBC does best today, too. In fact, ask any SW listener what he hears on the BBC and, the chances are that he'll say, "News". And for good reason.

The BBC is probably the best news broadcaster in the world today- and that includes US stations. I've been in the newsrooms of both the BBC and CBS radio in New York and believe me, the London-based broadcaster's facilities were by far the most impressive.

The new electronic newsroom in Bush House, London has been in operation now for somewhat over two years. It processes the distribution of some 250 news bulletins a day in 39 languages. When an important news story comes in, the computer codes, stores and delivers print-outs to 90 terminals within seconds.

The BBC Newsroom contains a central writing unit of 110 journalists working a 24-hour 3-shift system to keep up with the constant flow of stories coming in from its own worldwide foreign correspondents and the wire services, additionally, famous BBC Monitoring Service constantly listens to 100 radio stations around the globe.

Next time a big story breaks here in the U.S. - a big political story, a major airline crash, check out the BBC against our own Voice of America. I have done it many times and the BBC always seems to win - even when the big news breaks occurs in Washington, D.C. itself!

The local BBC correspondent simply phones his story in and presto! - the next BBC World Service news broadcast carries it. This might be ten or fifteen minutes after they get the report in London.

BBC broadcasts world news 17 times a day - 0000, 0200, 0300, 0400, 0500, 0600, 0700, 0800, 0900, 1100, 1300, 1600, 1700, 1800, 20000, 2200, and 2300.

Best frequencies (MHz) I find (in the N.E.) are 7.325 MHz in the evenings from 2300 to 0330 GMT, 9.51 in the late evening and early morning hours of 0430-0915 GMT; 11.775 and 6.195 for the early morning hours of 1100-1330; 21.71 for middle of the day; 11.75 for afternoons and 15.070 for most of the 24 hours.

As great as the BBC news is, other good broadcasting also comes out of London these days. Excellent music programs, the best in drama and many interesting interview and other types of programs are available to the listener of the BBC.

A good way to keep up with BBC programming is to listen to their "Look Ahead" which previews programs for the day. It's on daily at 0940 (ex. Suns) and at 1943 Mon-Fri.

Another program to check into is called "In the Meantime" and covers what is new on the BBC.

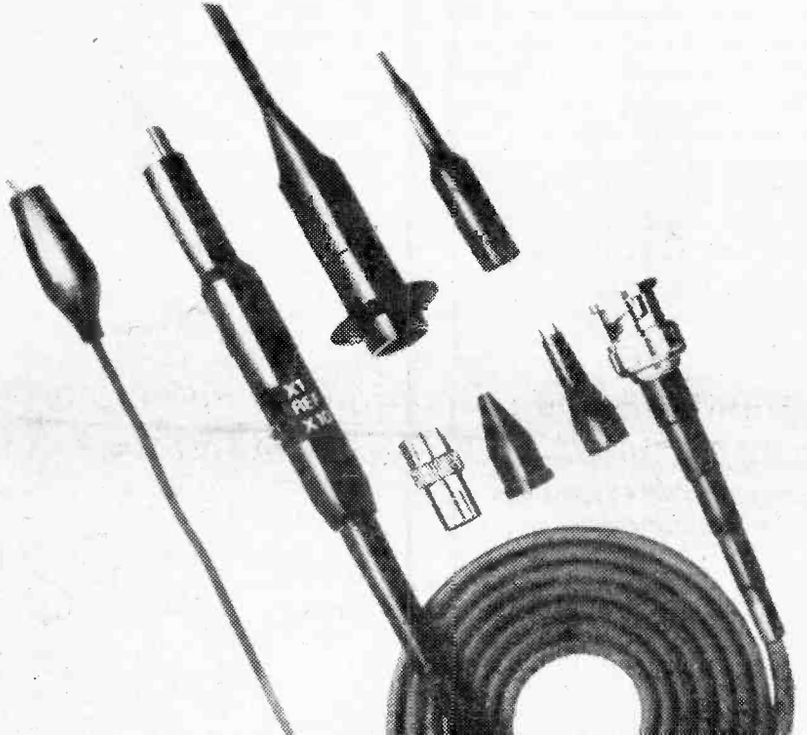
If you are really into listening to the BBC you will want to consider subscribing to their publication London Calling. It costs $12 a year (8 pounds in case the dollar changes by the time you read this) and you simply send your check to Box 76, Bush House, London WC2B 4PH, Great Britain.

Strangely enough, the BBC does not have a DX program. For many years their World Radio Club program was one of the most popular DX programs on the air but they dropped it a year or so ago.

Now they have "Waveguide" which was developed to keep you informed of BBC frequency changes, etc. It's heard on Mondays at 0915, Tuesdays at 0100 and Wednesdays at 0430 and 1735 GMT.

So rather than give listeners frequencies of their competitors, the BBC simply decided to make sure you were up-to-date on theirs!

Rumor has it, however, that the BBC is going to re-enter the DX program field and the betting is that "Waveguide" will be the vehicle to broadcast it. And maybe this Golden Anniversary year is the time for them to do it. Stay tuned to London.



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a Monitoring Times exclusive.

Also, the BMG Super Direction Finder for scanners .....a product review

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WANTED: Tunable receiver above 30 MHz in good operating condition. Please give all frequencies in MHz, age, condition, make, price. KE4FO, 3331 Bankhead Avenue, Montgomery, AL 36106.

FOR SALE: 225-400 MHz UHF receiver. AN/URR 35B with manual, headphone, and spare tubes. Needs alignment. $85.00. Thomas Marcotte, 300 Lozes Street, Apt. B-1, Lafayette, LA 70508.

FOR SALE: Bearcat BC-100 hand-held programmable scanner. Excellent condition with antenna, case and charger-$275. Also, Bearcat Jolly Roger AM radio with 2-channel UHF scanner, excellent condition with antenna and AC adaptor -$25. Also, ground plane antenna cut especially for 225-400 MHz. Excellent condition - $12. Harry McCabe, 898 Old Orangeburg Road, Lexington, SC 29072.

Yaesu FR-101D digital, solid state receiver. 2-160 meters with slow, fast or no AGC attack. Xtal control of 4 independent channels. Noise blanker and a self contained AC supply or DC operation. Detectable emissions: USB, LSB, CW,

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Model 33RO TTY Exc. Cond., $75; TRS-232 Interface for TRS-80 MOD. 1, $50; Hammarlund SP-600/JX very good cond., $125; CV-89A/URA-8A RTTY Convertor W/Scope Exc., $75; M-80 Ham Interface for TRS-80 RTTY & CW, $60; 23 Ch. Johnson CB Radio, $50; Minolta 16mm Minature Camera W/attch., $75. All above items for Sale or Trade --What do you have?? Make an offer!!
Glen Card
219-825-5010

Listeners Log

In an effort to achieve balance and wide appeal, contributors are urged to send in interesting, unusual or comprehensive lists of frequencies in the LF, shortwave, VHF/UHF or satellite ranges. Routine loggings like WWV, coastal stations or widely-monitored broadcasters are discouraged

SUBSCRIBERS PLEASE NOTE YOUR EXPIRATION DATE IS SHOWN BELOW YOUR ADDRESS.

Government Discloses Classification

by Richard Prelinger

The Department of Commerce has released documents that reveal its reasons for classifying all Government radio frequency information. The documents were released in response to a Freedom of Information Act request.

The National Telecommunications and Information Administration (NTIA) originally requested the assistance of the National Security Agency (NSA) in determining the security risk of releasing unclassified government frequenty information. NSA referred the question to the Defense Department.

DOD indicated that a collection of non—sensitive frequency listings "identifies, by their absence, confidential frequency locations within the frequency spectrum. With such information an adversary would be able to concentrate his SIGINT (Signal Intelligence) resources on those frequencies which have thus been identified. Therefore, disclosure of the composite unclassified GMF (Government Master File of frequency assignments) can reasonably be expected to cause identifiable damage to national security and warrants classification at the Confidential level."

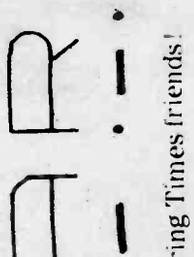
Although some 13,000 assignments (out of a total of 175,000) were previously classified Confidential on an individual basis, no overall classification existed for the list as a whole. This decision for the first time places a security classification on all Government frequency information and brings the United States into a class with foreign countries who rigidly control the dissemination of information on their radio facilities.

So, if you're wondering--yes, National Weather Service frequencies and the frequency of your local airport control tower are now classified!

Caveat Emptor: TV Decoders

Monitoring Times Reader L.D. Ferrill of Waukegan, Illinois sent an interesting clipping from which we quote:

"Beware of ordering one of the electronic decoding devices that enable home television sets to receive pay-TV signals free. A Canadian manufacturer is flooding some parts of the country with advertisements for the decoders. But their sales are prohibited in the U.S., and the Customs Service is seizing them as they cross the border. Since they are shipped only after your check clears the bank, you could lose the decoder and you money."



ing Times friends!