



the RARRA RAG

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ROCHESTER AMATEUR RADIO ASSOCIATION, INC.

VOL. 41

FEBRUARY 1989

No. 6

RARRA MEETING FEBRUARY 3rd

The program for the February 3, 1989 will be held at the 40&8 Club, 933 University Avenue, at 8 p.m. The speaker for the evening will be announced.

FUN IN THE SNOW?

It's time to play in the snow. Saturday, February 11, 1989 is the date for the annual RARRA Winter Funfest at Mendon Ponds Park. It all starts at 12:00 noon and continues until... Hopkins Lodge has been reserved for the day.

In addition to hots, hamburgs and snacks, home made chicken soup and chili there will be snacks (peanuts, chips, etc.) available.

The usual contest to determine the best dessert made by a YL (or OM) will be held, so gals dust off your cookbook and bring your favorite gourmet dessert. Prizes will be awarded for the tastiest entries.

Now how to get there—from the west side of county, follow Clover Street (Route 65) to the center entrance to the park (first road south of Canfield Road — this entrance brings you directly to Hopkins Lodge. From the east side use Pittsford Mendon Center Road to Canfield Road, turn west and take the first road south after passing Douglas Road. If all else fails try the talk-in on 52/52 or the 88 repeater. There are signs at all park entrances directing you to the lodge.

There is a charge of \$2.00 per person with a max of \$5.00 per family. See you all there to partake of Gos's chicken soup and Dave's chili and a chance to sample the gourmet desserts entered in the contest.

Jerry, KB2DVV, we would appreciate a LITTLE snow.

(See map on back page.)

PUBLIC SERVICE '89

by Ed Holdsworth, N2EH

The first request has come in for our assistance. I have received a request for communications support at a Cross Country Ski Event to be held in February.

The event is the Mid Atlantic Bill Koch Cross Country Ski Festival to be held on the weekend of February 18 and 19. This event is for youngsters up to sophomore in High School and will have several different races up to 10K. This event will be held in either Mendon Ponds Park, Pittsford-Sutherland High School or Powder Mill Park. They would like operators available on Saturday from approximately 0900 hrs to 1500 hrs and on Sunday from 0830 hrs to 1430 hrs.

I don't believe you will have to be an accomplished Cross Country Skier to participate, but it will probably be helpful if we were to have a few skiers. I will have the usual signup sheets at the January meeting and will have more details on this event at that time. If you are unable to attend the meeting (*shame on you*) you can call me at home and I will be glad to add your name to the list.

EXPENSIVE CODE TEST

If you flunked this code test, it cost you money! At the recent Miami Hamcation, Gordon West tied a code player into a string of lights surrounding his Gordon West Radio School banner. The lights would blink in Morse Code. A 13 wpm Morse Code message could be heard audibly with the lights blinking away. The message was sent over and over again on an endless loop tape cassette. What the message said was "... If you can read this, see me for a \$50 bill. ...". Apparently no ham took the time to read it! Gordon still has his \$50 bill.

The next time you hear a cw message at a hamfest, take time to read it. Gordon says he is going to have similar COPY FOR CASH messages at other hamfests. And if you can't read 13 wpm, brush up on your cw.

ROCHESTER HAMFEST

MAY 19-20-21, 1989

Tnx AUTO CALL

the RARa RAG

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SOME GOOD NEWS

The FCC is being flooded with Petitions for Reconsideration involving the Amateur Radio Service. Most, although not all, are protesting the recent re-allocation of the 220-222 MHz portion to the land-mobile service. The ARRL filed their Petition of Reconsideration on General Docket 87-14 with the FCC during the last week of October. The ARRL maintained that in appropriating the band from the Amateur Radio Service and allocating it for the development of narrowband techniques for the land-mobile service, the Commission ignored the comments of more than 5,000 amateur radio operators, numerous public service and relief agencies ... and others which opposed the reallocation. The ARRL also charged that the FCC:

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Amateur Radio News Service

- 1) ...clearly "predetermined" the outcome of the proceeding;
- 2) ...failed to address the arguments of the amateur commenters;
- 3) ...extended the reply comment dates after the deadline;
- 4) ...accepted comments from United Parcel Service more than six months after the close of the already extended deadline because the record lacked support for the position the Commission had already chosen;
- 5) ...refused to release internal documents under the Freedom of Information Act supporting the need for additional land mobile spectrum;
- 6) ...allocated permanent spectrum to narrow-band ACSB technology which is still in the development stage;
- 7) ...failed to disclose the data on which its assumptions were based, thus depriving commenters of the ability to evaluate that data;
- 8) ...greatly overstated the spectrum efficiency of ACSB to Congress;
- 9) ...refused to consider reasonable spectrum alternatives in the 30-50 MHz band;
- 10) ...never considered replacement spectrum for displaced amateur users at 220-222 MHz and;
- 11) ...reached conclusions concerning the need for additional land mobile allocations, the amateurs use of the 220 MHz band ... and the ability to reaccommodate displaced amateurs without relevant or adequate data.

The well-done petition was filed by ARRL counsel, Chris Imlay, N3AKD. The ARRL requested that the Commission "reconsider and reverse its decision and grant the Amateur Radio Service primary use of the 220-225 MHz band."

Tnx W5YI Report via Cheese Bits

SOME MORE GOOD NEWS

On November 3, President Reagan signed the FCC authorization bill which contained the concurrent resolution supporting the Amateur Radio Service and its emergency communications efforts. This bill has been designated as Public Law 100-594. While it does not force a change in the FCC position to reallocate the 220 MHz band, it may become an important building block toward an eventual solution.

Tnx Cheese Bits

THINGS KEEP GETTING SMALLER

If you can remember the size of some of the old tubes and equipment, like the 01A's, the push-pull 71A's or the DeForest 1's, then you'll appreciate this latest bit of news from down south. Engineers from Martin Marietta Corporation, working at the Oak Ridge Lab in Tennessee, have developed a silicon microchip to track migrating bees. The chip can be glued to the thorax of a bee, weighing only 35 milligrams, contains its own power source, an array of miniature solar cells and a laser diode transmitter that can send signals to ground based receivers many miles away.

Presumably the bees will have no code or license requirements, and will be able to work DX under favorable conditions.

QCWA Inc. via Metroplex

MORSE SUNK IN HIGH SEAS

Emergency and distress messages sent using the Morse Code by human operators will all but disappear from the high seas by 1993! This is the decision of the International Maritime Organization—the UN Agency responsible for the safety of shipping and pollution prevention.

The traditional “SOS” sent by Morse Code is being replaced by the new and highly sophisticated Global Maritime Distress and Safety System which transmits and receives messages automatically. The computer-based communications system uses a satellite inter-tie and is designed to prevent ships from disappearing without a trace because of no time to send a message in Morse. With the new system, any person need only push a single button to send a message worldwide that contains all the data needed to affect a rescue.

Tnx Westlink via Metroplex

WANTED— Used 2-meter, synthesized, no frills base station transceiver. John Wenrich, K2RY, 663-0095.

RaRa CALENDAR FOR FEBRUARY

- 2 - GROUND HOG'S DAY
- 3 - RaRa Meeting - 8:00 p.m.
40 & 8 Club, 933 University Avenue
- 5 - North American Sprint - CW -
0000 Z to 0400 Z
- 8 - Ash Wednesday
- 9 - RAPS (packet) Meeting - 7:30 p.m. -
111 Westfall Road
- 10 - VHF Group Meeting- 111 Westfall Rd.
- 11 - W1AW Qualifying Run - 10-40 WPM
starts at 2200 EST
- 11-12 - YL-OM Contest - Phone -
1400 Z 2/11 to 0200 Z 2/13
- 12 - LINCOLN'S BIRTHDAY
- 12 - North American Sprint - Phone -
0000 Z to 0400 Z
- 14 - VALENTINE'S DAY
- 17 - RRRRA Meeting - 8:00 p.m. -
Pittsford
- 18-19 - ARRL International DX Contest - CW
0000 Z Sat. to 2400 Z Sun.
- 20 - Washington's Birthday Observed
- 22 - WASHINGTON'S BIRTHDAY
(traditional)
- 24 - W1AW Qualifying Run - 10-35 WPM
starts at 1600 EST
- 24-26 - CQ World Wide 160 Meter Contest -
2200 Z Fri. to 1600 Z Sun.
- 25-27 - YL-OM Contest - CW -
1400 Z Sat. to 0200 Z Mon.

RRRA MEETING — FEBRUARY 17th

February RRRRA Meeting will feature a look at the state of the art television facility. The program will feature Tom, NS9E, with a tour in pictures and words of the studio and transmitter facilities of local uhf Station WXXI, Channel 21. Most of the program will deal with an explanation of the 55000 watt Harris VHF transmitter. Did you know that this very modern transmitter uses of all things TUBES and that they are over 6 feet tall. The hottest thing since color will be discussed also, TV Stereo. In a quick look of the future High Definition Television. So let's see you all there for this very interesting and High-Tech subject.

Brad Allen, KB2CHY

WANTED — 500 Hz CW Filter for Kenwood TS-520S. Tim, N2TW, (315) 451-8956 or (716) 671-4430.

PCB'S IN DUMMY LOADS AND CAPACITORS

by George Spencer, VE3OZW

The hysteria created by the news media and some pseudo-environmentalists regarding PCB's has caused many radio amateurs to become concerned. Many suspect that their dummy load contains a PCB and that the same might be true of some oil-filled capacitors which many of us have from World War II and later surplus and often found on tables at hamfests.

I have had words with some journalists on the subject and my suggestions fell on stony ground. I concluded that the truth makes a dull story, not what they want to write about nor does it sell newspapers. Correct information is available in most public libraries contained in technical electrical and chemical handbooks. Of course the terminology in these books is such that a journalist is bound to conclude that it couldn't be anything but dull.

Anyhow, during my working career I have relocated many times and found that movers will not accept a number of inflammable or corrosive items for transport for obvious reasons. Banned items include paints, solvents, oils, and wet batteries.

This meant that I always had to empty my dummy load and buy some new coolant at the new location. It is not possible to purchase one gallon amounts of transformer oil and I always had to buy a five gallon or as now, a twenty litre pail. I then had to sell or give away the balance after filling my one gallon Heathkit dummy load. Subsequently I was accused by some of the recipients of having sold them a PCB. This accusation arose from the use of improper terminology by certain writers, especially those not capable of discerning the difference between a mineral oil and a PCB.

Now, let's deal with some facts. PCB's in this case are not printed circuit boards but poly-chlorinated biphenyls. The type most commonly produced in large volume was developed for use in the cooling of large electrical transformers. The purpose of such development was to create a fireproof liquid coolant to replace a mineral oil called transformer oil. Transformer oil has been around since near the turn of this century and is used in large power and smaller pole-type transformers. Primarily, it convects the heat away from the winding and iron core which comes from the I squared R losses in the copper and the hysteresis losses in the iron. The coolant also has a high dielectric strength and makes possible closer spacing between turns and windings within the transformer.

The big problem with oil is that it is inflammable and would create a fire hazard in indoor installations. The Canadian Electrical Code requires such transformers to be located in a tub capable of containing all the oil and to be surrounded by a fire resistant vault. Of course these expensive specifications provided an incentive to come up with a liquid coolant which would not burn and would have all the desirable characteristics of transformer oil.

A PCB having the desired insulating and heat transfer characteristics was developed in 1932 but did not reach the market in any significant volume until after WW II. Probably the most installations were made during construction of industrial and commercial buildings in 1960-1970 era. Although transformers cooled with PCB were more expensive than the oil filled types, construction savings more than offset the extra cost.

This product was sold under various trade names. For example, GE called it Pyranol, Westinghouse called it Inerteen, and many used the generic term of Askarel. The important thing to remember is that it is not an oil. It is a synthetic chemical compound created for a specific purpose.

It was not known at the time that continued exposure at high levels of concentration of PCB's (and many other substances) produced cancer in rats. When this was established, an ideal subject for inflammatory journalism was created.

The specific gravity of transformer oil is 0.88 while the S.G. of Askarel is 1.56, almost twice as heavy. The flash point of transformer oil is 135 degrees Centigrade or 275 degrees Fahrenheit while no flash point is given for the extremely stable Askarel. The difference in S.G. provides an easy test for finding out what is in your dummy load. Put some water in a glass container and take the lid off your dummy load. Dip a piece of wire into the liquid in the dummy load and shake a drop off the wire into the water. If it sinks, it is most likely a PCB. If it flattens out on the surface, it is oil.

The lack of a flash point indicates that it is very difficult to destroy a PCB but it can be converted to a different substance at extremely high temperatures.

Askarel is a strong solvent for some of the varnishes and other materials used for insulation in oil-filled transformers so different materials had to be used for Askarel filled transformers. This meant that it was not possible to simply drain the oil from an oil filled unit and substitute Askarel to obtain an indoor transformer. The reverse procedure is possible but consideration would have to

be given to reduced dielectric strength and to housing requirements outdoors.

There has been mention in the news media of oil contaminated with PCBs. The small number of parts per million found suggests that this may have been caused by the fact that during the early days of its use, the same hoses and pumps were used for both oil and Askarel in many cases. This may have casued some journalists to create a new term – "PCB oil". There is no such thing. Askarel for use in capacitors is more viscous than that used for transformers and has a higher dielectric constant. Although Askarel was more expensive than oil, its use produced a smaller capacitor for the very large units required for power factor correction in industrial and utility applications.

The relatively small oil filled capacitors used in radio and electronic circuits (0.1 mf to say 10 mf) do not fall under the CSA and NEC code requirements for vaults, etc. They are still made and may be purchased new today. It says "oil filled" on the case and that means mineral oil. PCBs are now forbidden by law. The cost of Askarel was always higher than that of oil when it was permitted to be sold so small capacitors having no need for code requirements were not filled with Askarel. Likewise for reasons of cost, amateurs did not purchase Askarel for use in dummy loads but some may have wandered out the back door of some industrial plant or utility.

Power capacitors are used in industry and by utilities for power factor correction. We use smaller, usually variable, capacitors in transmatches to do exactly the same thing but we call it cancelling out inductive reactance or impedance matching. Power capacitors at 60 Hz, when required to be indoors, were filled with Askarel and because of the advantages given above were also installed outdoors. The smallest of these would be rated at 10KVA which at 60 Hz and on 600 volts would consist of three banks, phase wye connection. Such capacitors are often 100 KVA rated and more in industrial applications and even larger at higher voltages in utility applications. You can see why the fire hazard develops if such large capacitors are installed indoors and use oil as a dielectric.

*de FEEDLINE
Niagara Peninsula ARC Inc
via The Groundwave*

FOR SALE – Heath kit - SB301 and SB400 - both in excellent working order. Transmitter recently had \$345.00 work done and new finals. \$375.00. All manuals and cables included. Please call 671-6579 evenings or 987-2627 days. Jack, KB2FXD.

FCC SHUTS DOWN UNLICENSED RADIO STATION

FCC engineers shut down an illegal repeater station in Manhattan, New York recently.

The station, located at the residence of William Matos on South Street in downtown Manhattan, was operating on 148-149.9 MHz, frequencies reserved for use by the US government for fixed, mobile and satellite communications. The unauthorized repeater was being used for personal communications by an estimated dozen individuals in the New York area.

In a latter news release, the FCC said that six Manhattan residents were fined \$750 each for using the repeater. The individual who installed the repeater station, identified by the FCC as Michael Munoz, of Astoria NY, was fined \$2000.

Speaking of unlicensed radio stations, remember the pirate shipboard station called Radio New York International? Anchored off Long Island, the ship was broadcasting "rock and roll" on the high end of the AM broadcast band. It was boarded and taken off the air by FCC and other federal agents in the summer of 1987, creating a national news event.

It seems that Radio New York International's founders had again publicly announced plans to resume the broadcasts from another ship, so the government filed suit to enjoin them from doing so. The case was heard in US District Court in Boston. The judge, in granting summary judgment for the government, said that the First Amendment does not grant anyone the right to broadcast by radio and that government regulation of broadcasting is constitutional. The judge stated that the FCC must allocate the limited available broadcast frequencies by way of the licensing process, and that this type of regulation best serves the public interest. He further concluded that such regulation of the radio bands does not infringe upon the constitutional rights of the defendants.

Tnx ARRL Letter



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RaRa CODE AND THEORY CLASSES

by Ed Gable, K2MP, Course Director

The Fall 1988 RaRa Code and Theory Classes were the most successful in RaRa's long history of such community service. Imagine the look on the face of Novice Class Director Bob O'Connell, NF2Z, when 50 people turned up in September for his class! Bob, and code instructor Joe Phillips, W2DHV, arose to the challenge by changing schedules and breaking the class down into two groups. In the end, 37 new Novices were graduated on December 12th. Bob and Joe are to be commended for their excellent work with this group and the extras provided which included guest speakers, demonstrations, class photos donated by Carty Ellis, KA2Y, and an impressive graduation ceremony. Likewise, the Extra Class group of 12 people under the tutelage of Dave Schwitek, NW2T, had a nice session as did the 25 students in the Technician and General theory Classes under Ed Gable, K2MP, and Bud Young, WA2UGE, doing the code portion. As is usual for the Fall session the Instructors hosted a Christmas party for the students on the last evening. Traditional Christmas Pizza (!) was the pick of the evening. RaRa members should be proud of the dedication of the above named instructors who quietly work for your Club, putting in a minimum of 125 hours per year, year after year! Also contributing this year by way of on-the-air demos, lectures, and etc were: NO2Z, KB2CHY, KB2GYW, N2HXJ, N2HYU, N2ILL, NS9E, N5LXS and WB2ZHD. A special thanks to all of these fine guys and gals for their help.

The Spring 1989 session will begin on February 13th at 7:30 p.m. in the auditorium at the County Office building, 111 Westfall Road. Classes will be offered for Novice, Tech/General and Advanced. The courses run about twenty dollars depending on membership status and this includes all text materials. No prior registration is required—just show up. However, if there are any questions regarding the classes call Ed Gable at 621-6692.

Call the same number if you are interested in assisting in this important activity. I am especially interested in setting up a program of "job sharing". I see this as a cadre of instructors who are "experts" in one field such as propagation, antennas, modes of transmission, etc. These experts would prepare one "knock-out" presentation that they would have to give only twice a year. As such, the entire task is spread out over several people. If you like working with and helping new people, and enjoy challenging and rewarding experiences give a call today—right now. It's fun!

THE RaRa RAG 20 YEARS AGO — FEBRUARY 1969

by Ed Gable, K2MP

This issue announces the loss of a popular local Ham and past RaRa President, Charlie Hooker, W2SXX. Charlie was an active Ham on both HF and VHF and sported an unusual antenna support, the steeple at his Parsells Avenue Presbyterian Church where he was Pastor. The Rochester VHF Group reported, through Guest VHF Editor Chuck Oneske, K2YCO, that the just completed VHF contest had 140 participants and 90 logs turned in as of that date counting for 210,000 points. The February Rochester VHF Meeting will feature Mel Wilson, W2BOC, Assistant Director of Engineering for General Dynamics, speaking on his favorite subject, VHF propagation. A Special Business Meeting is being called for part of the regular February RaRa meeting to vote on changes to the Certificate of Incorporation and By-Laws of the Corporation. An attempt to pass the changes previously failed due to lack of a quorum at regular meetings. Did you know: RaRa was formed on December 21, 1931, and the first officers were John Long, W8ABX; Ken Gardner, W8BGN; Al Balling, W8ALY and Charlie Houk, W8APD. RaRa issued a publication called the *Monitor* published by Jerry Hall, W8AHK; Joe Hertzberg, W8JE; Perry Eston, W8BOX; and Pat Hoke, W8CYG. DX was an avid past time in those early days with many firsts such as Al Grabb, W8DOD, making first area DXCC, W8MC (W2MG) accomplishing first 10 Meter WAC and Bruce Kelley, W8ACY (W2ICE), making first DXCC and WAC on 20 Meter phone. In this issue a reprint of the advertisement for the 11th Annual Hamfest indicated registration and banquet cost a dollar and twenty-five cents. Since it was held at the Central YMCA, a standard event was a bowling contest!!

ARRL FILM WINS GOLD MEDAL

The ARRL film "The New World of Amateur Radio" (TNWOAR) won the Gold Medal in the Science and Technology category of the 1988 International Film and TV Festival of New York. The hefty (6.7 oz.) gold-plated brass medal and information on the entries in its category is now at HQ.

It was especially pleasing to note that "TNWOAR" had eight competitors including Public Broadcasting "heavyweights" WGBH in Boston and WNET in New York. The medal will be proudly displayed in one of the new trophy cases gracing the lower hallway at ARRL HQ.

Tnx ARRL Letter

NEW MICROWAVE RECORDS

Records were recently set by US amateurs on three microwave bands. Moonbounce, at 10 GHz, has long been dream when EME enthusiasts let their imaginations run wild. It is a dream no longer, thanks to the pioneer work of KF5N, WA5VJB, WA7CJO and KY7B.

On August 27, the four managed a contact between a station set up at WA5VJB's QTH near Dallas and that of WA7CJO in the Phoenix area. At the Texas end, 55 watts from a TWT (traveling wave tube) provided the RF to a 12-foot dish with a receiver noise figure of 2.1 dB. At the western end of the circuit, a 16-foot dish and a TWT delivering 90 W was used with a receiver noise of 1.5 dB. During the week rain hampered their attempts. Due to water absorption at 3 cm, rain and even clouds result in significant attenuation. In addition signal spreading, apparently due to moon roughness, and 20 kHz of Doppler Shift contributed to the challenge. Both groups were able to hear moon noise which aided in knowing that they were pointed correctly. Congratulations are certainly in order to this group for a difficult job well done in accomplishing the first 10-GHz EME QSO.

The second record-breaking contact occurred on 47 GHz. Terrestrial communications at 47 GHz are not an easy feat to master, especially when attempting to attain distances greater than a few miles. However, on August 6, 1988, microwave enthusiast WA3RMX/7 and the gang at the Tektronix Employees Radio Amateur Club of Beaverton, Oregon (call sign K7AJU made long distance communication on this band seem easy. On 47.040025 GHz at 2145 UTC that day, using a 3.5 mW and 28.5 inch dishes on both ends, the group made a 65.37 mile (105 km) QSO on SSB with signals averaging S3 (after clouds lifted, signals became even stronger). For this contact both stations were located in grid square CN82.

As with 10 GHz, moisture content in the atmosphere greatly affect communications on these high microwave bands. Attenuation at these frequencies is very severe and becomes even worse with clouds present. Clear skies and low humidity allow the greatest distances to be achieved.

Congratulations to WA3RMX/7 and the Tektronix gang K7AJU for their accomplishment of what should prove to be both a new United States and world distance record of 47 GHz.

It has been a couple of years since the last 3456 MHz record was set, but that doesn't mean that amateurs have been dormant on the band. Recently a new US record was set on the morning of

August 7, 1988, between KX0O (located on Pikes Peak) in Colorado and WB5AFY in Northern Texas. This contact of 454 miles (730 km) shatters the old North American record of 288 miles set in 1986. KX0O was using 13.5 W into a 29-inch dish, while WB5AFY used a 250 W and a 6-foot dish.

On August 6, KX0O worked WB5ULA on 902 MHz for a distance of 615.2 miles (990 km) - 8 miles short of 623 miles US and world distance record set by WB6ULA (Texas) and W4ODW (Florida) on March 22, 1988.

You can be certain that all microwave operators, and especially the above-mentioned enthusiasts, will be attempting to create new records. Microwave activity in the United States is alive and well!

*Pack Rats Cheese Bits
via Harmonics*

QSL ADDRESS FOR U1 MIR

We have recently been made aware of the following address for those who have worked Musa and Vlad on board the orbiting Soviet space station, Mir. Send QSL cards to:

B. Stephanov
Box 679
Moscow 107207
USSR

Tnx ARRL Letter

FOR SALE: KENWOOD SUPER STATION
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MICHAEL G. RICE

(KB2SG)

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FCC PROPOSES TO EXPAND 6-METER REPEATER SUBBAND

The FCC has proposed, in Docket 88-527, to expand the 6-meter repeater subband by 1 MHz, to include 51-52 MHz. The proposal is in response to two petitions filed by two repeater groups on the West Coast, The Southern California Six Meter Club (SCSMC) and the Southern California Repeater and Remote Base Association (SCRRBA). Both groups requested expansion of the 6-meter repeater subband in order to accommodate a growing number of repeaters in the band.

The FCC stated: "It appears that an expansion of the 6-meter repeater subband would provide for additional flexibility in the use of the 6-meter band. The amateur community could determine for itself the exact usage to which the 1 MHz of additional spectrum would be put. In urban areas, the 1 MHz could be utilized to make possible additional repeater operation. In less populated areas, where there may be no present need for additional repeater operations, the spectrum could continue to be available for other types of operation."

The FCC noted it was concerned with the effect the expansion may have on the present users of the 51-52 MHz segment and invited comments on the need for repeater expansion and its impact on existing users. Comments on the proposal are due January 27, 1989, with reply comments due February 28, 1989.

Tnx ARRL Letter

OSCAR 13 HANDBOOK AVAILABLE

AMSAT-UK in collaboration with AMSAT-DL, have completed the first *OSCAR 13 Operator's Handbook*. The sixty-page book provides all the critical data needed to utilize OSCAR 13 and understand how it works. Some of the topics discussed are: history of OSCAR 13, bandplan, station requirements, and communicating with the bird; transponders: modes and scheduling; antenna systems, and telemetry formats and decoding information.

The *Handbook* is available in North America from Project OSCAR. For further details, send an SASE to:

AO-13 Handbook
Project OSCAR
P.O. Box 1136
Los Altos, California 94023-1136

Tnx ARRL Letter

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