

JANUARY 1990

THE GROUNDWAVE



NEXT MEETING WILL BE HELD
WEDNESDAY, JANUARY 3, 1990

Club Call VE3RC

Repeater VE2CRA



Official Bulletin of the Ottawa Amateur Radio Club, Inc.

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THE OTTAWA AMATEUR RADIO CLUB, INC. is an association of Radio Amateurs devoted to the promotion of interest in Amateur Radio communications in the National Capital Area; and to the advancement and achievement of club members.

REGULAR MEETINGS of the OARC, Inc., are held on the first Wednesday of each month (except July and August) at the National Research Council Auditorium, 100 Sussex Drive, Ottawa, at 2000 hours. A bulletin board is available for posting notices of interest to other members about 1915 hours. Further details about each meeting is elsewhere in this publication.

PACKET RADIO MEETINGS are held at 19h30 on the last Thursday of every second month beginning in September, at the McNabb Community Centre, Percy and Gladstone. This is an OARC technical meeting open to all who have an interest in packet radio.

THE OARC EXECUTIVE normally meets on the second Wednesday of each month at 1930 hours. Contact the President to confirm the date of the next meeting.

DEADLINE FOR COPY is the second Wednesday of each month. Make yourself better known to fellow members and other amateurs, too, by giving us an article, technical or otherwise, relative to our hobby.

MATERIAL PUBLISHED herein does not necessarily represent the official OARC viewpoint. Items may be reprinted by Amateur Radio or other publications provided that proper credit is given to the author and to the OARC, Inc.

JUNIOR MEMBERSHIPS - To encourage young people to join the club and to participate in amateur radio, the club is opening a junior class of membership. Dues will be at a 50% discount but the junior member must pick up his/her copy of the Groundwave (preferably at the meeting).

RADIO AMATEUR CALL BOOKS are available at many local libraries. Ask at the information desk.

SAFETY BELTS, 2-METER RIG AND AN ENGRAVING PENCIL are available for loan to club members. The 2-meter rig may be borrowed by members who are hospitalized. The engraving pencil (to mark valuables for identification in case of loss or theft) and the safety belts with pole straps are available to any members. A \$100 refundable deposit is required for the belts. Contact the President for the 2-meter rig or the engraving pencil; and Paul, VE3ICV, at 820-6643 (West End) or Brian, VE3JKZ, at 523-1535 (East End) for the belts.

THE CAPITAL CITY NET meets every Monday at 2000 hours on the Club Repeater VE2CRA (146.34/.94) to pass traffic and to make announcements of interest to amateurs in the National Capital Region.

PACKET RADIO VOICE NET meets following the Capital City Net on VE2CRA at 2040 hours. This is an informal net to answer questions about packet radio, pass along operating hints and provide information for future packet operators.

THE SWAP NET is a service provided and conducted by Ed Morgan, VE3GX. This feature appears on the Capital City Net, noted in the foregoing paragraph. To list items and make inquiries, call Ed Morgan at 733-1721.

POI-HOLE NET is a SSB/HF net sponsored by the Ottawa Valley Mobile Radio Club, and conducted every Sunday at 1000 hours on 3.760 Mhz. All amateurs are welcome to check in. The Swap-Net is a regular feature.

POI-LID CW NET is an informal slow-speed CW net sponsored and conducted by Ed, VE3GX, and meeting every Sunday, except during July and August, at 1100 hours on 3.620 Mhz, to promote interest in CW and CW procedures.

REPEATERS
 VE2CRA Voice 146.94/34 443.300/448.300
 VE3OCR Packet 145.01(sx) Inter city links
 VE3OCR Packet 145.07(sx) Local Area net for QSO and Packet BBS.

For further information, please contact repeater chairman.

MINUTES OF THE OARC GENERAL MEETING
OF DEC 6, 1989

The December meeting of the Ottawa Amateur Radio Club was called to order at 2007 local by the president, Dave VE2ZP.

The CARF news bulletin was presented by VE3PAP. The highlight of the bulletin was news of preliminary merger talks between CARF and CRRL, with an initial meeting being held in Coburg on the 25th of November.

VE3GSA presented the CRRL bulletin, which also highlighted progress on the CRRL/CARF merger.

The feature talk of the night was presented by Ken Tapping of the NRC Herzberg Institute of Astrophysics, on the subject of amateur radio astronomy.

After coffee, Paul Cooper presented his DX tips, which included information on the upcoming Bouvet expeditions, one of which is scheduled to begin around the 22nd of December, the other at the end of February.

VE3RCI gave a demonstration of a "silent tuner upper" he had built, a noise bridge/tuner/dummy load combination that allows tuning up into any antenna without putting a signal on the air.

VE3LBW gave a demonstration of Icom's new R9000 receiver.

There being no further business, the meeting was adjourned at 2230.

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*****
*           JANUARY SPEAKER           *
*           Ron Schwartz, VE3VN         *
*           will speak about           *
*           6 meter DX                   *
*           This is a hot topic at the current *
*           part of the sunspot cycle     *
*****

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DIT DIT and TOOT TOOT

This is an excerpt from the Worldradio column, "The Digital Bus" by Bill Snyder W0LHS.

The other day I received a packet message from one of the SYSOPs along the HF Skipnet line. He asked me the meaning of the DIT DIT and the TOOT TOOT that I put on my packet messages to the outside world. The DIT DIT is also the end of each column -- has been for a long time.

Well, I don't know the real derivation of the DIT DIT but many years ago musicians ended many a song with a musical ditty known as "Shave and a haircut -- Six bits." If my ear serves me properly, Johnny Carson's theme song on the Tonight Show ends with it. Although the ditty is composed of a number of different notes on the scale, the rhythm was adapted by telegraph and radio CW ops as a final sign-off signature. I don't remember when I started using it, but it was a very long time ago. One station would send the "Shave and a Haircut" part (DIT DIDDY DIT DIT) and the other op would finish with the DIT DIT.

It has caught on around the world. I have seen it from JA1ACB, UT5RP and a host of other RTTY DXers. It puts a "button" on the contact. On packet, I tack it on each message along with the usual 73.

The TOOT TOOT comes from my father, a telegraph operator. Two blasts of the whistle is the railroad engineer's signal that he is moving forward - leaving the station, so to speak. My Dad used to say "TOOT TOOT" as he left the office after his day's work. It was his way of saying "goodbye" to the next trick operators.

So, to my rail fans - I happen to be one - I use TOOT TOOT instead of DIT DIT. End of explanation. DIT DIDDY DIT DIT - TOOT TOOT.

DECEMBER TALK
AMATEUR RADIO-ASTRONOMY

The talk was given by Ken Tapping, who has been both an amateur and professional radio astronomer. He did not distinguish between the two in many instances. Radio-astronomy started in 1932 when short wave communication was becoming interesting commercially. Janski, at Bell Laboratories, was doing research into sources of interference using a large steerable antenna. He had identified everything he could hear except that at one azimuth setting the "receiver noise" was greater than in other directions. This azimuth changed during the day and turned out to be the Milky Way. Real DX!!! He made a radio map of the sky but this was of no interest to professional astronomers or to his employer. Amateur radio enthusiasts took over the work and Reiber made a more complete radio map of the sky with a 30' dish at 162 MHz. The frequency was chosen because it was the frequency of a resonator built from a single standard size sheet of aluminum without cutting.

World War Two brought about great improvements in technology and war surplus radio telescopes (designed as radar sets) were used by both professionals and amateurs.

Objects which can be studied are the moon (thermal radiation), the sun (flares), the Milky Way (including the chemistry of dark - cold - clouds), supernova remnants, pulsars, distant galaxies, quasars (by means of a very large array antenna), the cosmic background (3 degrees K - left over from the big bang) and SETI - Search for Extraterrestrial Intelligence. SETI will be real DX if intelligent signals are ever found. Not all of these objects can reasonably be studied by an amateur.

Radio astronomy is characterized by its poor signal to noise ratios and the need for large antennas with low-noise

receivers. The signals are very broad band and can be received at wavelengths from 1 cm to 10 meters. Frequencies from 200 to 250 MHz are commonly used, the exact frequency being chosen to avoid QRM. For directionality, antennas are connected together as interferometers.

SKI MARATHON

Ski Marathon - this will be February 10 and 11, 1990. Keep the dates open.

SANTA CLAUS

About 12 amateurs helped the children at C.H.E.O. talk to Santa at the North Pole. We used 2 M handhelds and one substitute Claus did a contact on 450.

Santas were Ron, VE3AUM, Ron, VE3MYC, and double duty by Tom, VE3OFN.

Elves: Gerry, VE3GK
Marcel, VE3FNG
Joe, VE2DZT
Chuck, VE3PAP
Howey
Harrie, VE3HYS

Gerry King is the hospital contact and will know who is missing.

de Harrie, VE3HYS

TECH TIP

When changing antennas on a portable radio using a BNC connector, be sure to clean out the connector. Dirt or oxidation can collect, often causing poor transmission. Aerosol contact cleaner is suggested. This procedure may "cure" many a portable with poor transmit range.

de Peel ARC Newsletter and Antenna
News from Larsen Antennas

YET MORE RAMBLINGS FROM THE
MEMBERSHIP CHAIRMAN

As promised, here is the membership "snapshot" as of Dec. 12, 1989:

We have 178 members, of which 22 are new members (welcome to you all).

118 of us have Advanced licences, 32 hold an Amateur certificate, 8 hold no licence, 2 hold other licences (Digital, or foreign calls that don't have equivalents in this country) and the rest of you didn't say what your licence status is.

I only counted the "highest" licence class. Many of you marked Amateur and Advanced, some marked Advanced and Digital. Under activities and interests, the numbers are as follows:

SSB	98
FM	93
CW	70
PACKET	36
VHF	101
VHF	83
UHF	13
MICROWAVES	5

These should be taken with a grain of salt, because some people who are regularly on the local repeaters indicated no interest in FM or in VHF. Fifty-one of us indicated a willingness to help the club in some way. Some of your exec didn't bother to mark these boxes, I guess because "everybody" knows they are helping already. I don't have numbers for other clubs, but my hunch is that we have a very high percentage. Give yourselves a pat on the back. With the introduction of the new membership forms, I will not have the same info next year. Only the keenest of each group will make it into the stats.

THE NOT-QUITE-TRIVIA UNQUIZ:

This is liberally lifted from ELECTRON magazine June 1967 (do YOU remember ELECTRON magazine?)

HOW WE ENDED UP WITH 50 OHM CABLES

The impedance of a coax cable depends on the ratio of inner to outer conductor diameter. For maximum power handling capability, the conductor ratio should be 1.65:1, which makes the impedance 30 ohms. The ratio for the lowest attenuation at R.F. would be 3.6:1, or 77 ohms. For high voltage breakdown properties, the ratio is 2.7:1 or 60 ohms. Taking all of these into consideration, 50 ohms looks like a good compromise between power, breakdown voltage and attenuation, so that's what we ended up with. I can't certify that's really how it came to be, but it sounds almost reasonable. I don't see how they arrived at those ratios, though. Wouldn't power handling capability and R.F. attenuation both be best at the ratio where the inside surface area of the "shield" just equals the area of the outside surface of the centre conductor? Of course that puts them in the same space (touching), so maybe that wouldn't work too well, but what's the impedance of a cable built so the surfaces ALMOST touch? Or suppose you built a cable with a centre conductor as thin as you could get it, what would the impedance be then? Assume air dielectric. Answers next month.

That same issue of Electron has an article on amateur radio astronomy, an ad for a portable tape recorder that looks like it weighs 50 lbs., and an ad for "The unsurpassable Mark 19 Transceiver, only \$29.95 complete and ready to go on the air... Hours of DX'ing pleasure"!

73 and I hope you had a good holiday.

Mike K., VE3FFK

WHITHER PACKET?

(Editor's Note: The information in the following piece has been extracted from a memo prepared by Barry McLarnon VE3JF, 4 Nov. 1989, in his role of coordinator of the OARC Packet Working Group, and addressed to Doug Yull, VE3OCU, Chairperson of the OARC Packet Group. We apologize for the abbreviated form to meet the demands of Groundwave.)

THE CURRENT SITUATION

Packet is experiencing a tenfold growth in the number of packet equipped users attempting to access the low speed limited facilities. We are still using 1200 baud half duplex equipment now four years old. We now have BBS software that can handle multiple users on the same channel and the volume of news and other information accessible has increased enormously. Access is slower and slower and often reaches the point of saturation similar to highway gridlock.

THE SOLUTION

1. Additional frequencies.
2. Faster modems.
3. Full duplex repeaters at network nodes.

FREQUENCIES

Additional access ports are required on different frequencies at the local network node so that the load is distributed. The two metre band will continue to be the main packet arena for some time because two metre equipment is widely available. This situation will change as more users attempt to move away from the pack and as more node equipment becomes available.

The de facto allocation for packet on two metres is ten channels running from 144.91 to 145.09. This was fine when all the activity in a given area could be accommodated on 145.01. The next step

was to select another frequency from the list and reserve 145.01 for inter-city traffic. In Ottawa, the second frequency selected was 145.07. Links between the two frequencies have been set up but difficulty has been experienced because of the close frequency spacing. At Carleton University, some success has been achieved by spacing equipment in different buildings and using landline modem links for interconnection. Attempting to use a third frequency in this grouping promises further problems.

Full duplex operation is not an option within the present allocations. With regard to packet allocations on two metres, I would recommend the following: in order to accommodate full duplex packet operation, the 10 channels running from 145.51 to 145.69 (i.e., 600 kHz above the 144.91 to 145.09 discussed above) should be reserved for packet or at least be designated as the primary usage. These frequencies could be used in half duplex (as is the case with 145.57 and 154.59 in Southern Ontario) or in full duplex. Operation on 145.55 should probably be avoided because of its occasional use for space communications.

The OARC packet group expects to participate in the beta test of the TAPR 9600 bps radios early in 1990. The probable role for these radios will be to interconnect the OTTSAT satellite node, the Carleton nodes, and the VE3JF BBS. This will lighten activity on 145.07, however, a new frequency with adequate spacing will be needed. With regard to the specific Ottawa situation, I suggest we take the following steps.

- a.) Establish 144.91 as a new 1200 bps frequency for local users and one or two BBS stations (VE3NAV and possibly a VE2) while reserving 145.51 for future migration to full duplex.
- b.) Prepare to change the Carleton node to full duplex using the present frequency of 145.07 and a new use of 145.67 MHz.

c.) Apply to have one of the simplex frequencies in the 147.42 - 147.57 range allocated for packet. This would be used for the 9600 bps experiments which will require co-location with equipment on 145.01 and/or 145.07 - 145.67. My suggestion, based on a cursory examination of the repeater frequencies, would be 147.51 MHz.

(Club members who regularly use "five two" may be luke warm to this last recommendation...Ed.)

EX-MONTREALERS?

The Montreal Amateur Radio Club is nearing its sixtieth birthday. As one of its celebratory projects, Al Daemen, VE2IJ, is preparing for eventual publication the entire history of the Club and its people dating back to 1932. Al is seeking early photos of people and events, and articles of interest from early issues of the Club's journal SKYWIRE or MARCOGRAM. Former MARC members able to contribute to this project should get in touch with Al Daemen, 2960 Douglas Ave., Montreal PQ H3R 2E3. All photos and material received will be returned and credit given to the persons submitting the material. Al can be reached at (514) 737-3736.

WHO SAID THAT?

"No worries, Boss. Nobody's going to buy those little Japanese cars."
 "Who on earth would want six bottles of the same thing in a package with a handle on it?"
 "Watches with no hands? You're crazy."
 "Oh come on! Don't tell me that they can put music on Scotch tape."

IN CASE YOU MISSED IT (From the CARF News Service)

Effective 30 October 1989, Prince Edward Island amateurs will have a new prefix. It is VY2 and all amateur radio call signs assigned after that date will have the new prefix. Existing PEI license holders have the option of retaining the existing VE1 call or changing to the new prefix.

The amateurs of New Brunswick did not express an opinion on changing their prefix. Nova Scotia amateurs were overwhelmingly against any change in prefix.

(CARF 15-89, 1 Oct. 89)

Please send your outgoing QSL cards to Box 66, Islington, Ontario, NOT TO BOX 356, Kingston. This causes delay to you and extra cost to CARF.

(CARF 16-89, 15 Oct.89)

The National Museum of Science and Technology (home of VE3JW) in Ottawa will be including the story of Amateur Radio in their permanent communications display. If readers have photographs, any old equipment, interesting write-ups, etc., please advise Dan Holmes, VE3EBI, 33 Crownhill Street, Gloucester, ON K1J 7K5.

(CARF 17-89, 1 Nov. 89)

This one was aimed at Santa Claus originally but bears repeating. Radio frequency emitting equipment (e.g., hand helds) poses a danger to sensitive hospital electronic equipment. Check with hospital authorities before using!

(CARF 18-89, 15 Nov. 89)

CARF OPERATING AID

The Canadian Amateur Radio Operator's Guide
 Table 1
Authorized High Frequency Band Limits and Types of Emission

ALLOCATIONS			AUTHORIZED TYPES OF EMISSION	
METRE BAND	FREQ LIMITS (MHZ)		AMATEUR	ADVANCED AMATEUR
	LOW	HIGH	BASIC	6 MONTH ENDORSE
160	1.800	2.000	A1	A1,A3,F3.
80	3.500	3.725	A1	A1,F1.
	3.725	4.000	A1	A1,A3,F3,A4.
40	7.000	7.050	A1	A1,F1.
	7.050	7.100	A1	A1,A3,F3.
	7.100	7.150	A1	A1,F1.
	7.150	7.300	A1	A1,A3,F3,A4.
30	10.100	10.150	A1	A1,F1.
20	14.000	14.100	A1	A1,F1.
	14.100	14.350	A1	A1,A3,F3,A4.
17	18.068	18.168	A1,F1.	A1,A3,A4,A5,F1,F3,F4,F5.
15	21.000	21.100	A1	A1,F1.
	21.100	21.450	A1	A1,A3,F3,A4.
12	24.890	24.990	A1,F1.	A1,A3,A4,A5,F1,F3,F4,F5.
10	28.000	28.100	A1	A1,F1.
	28.100	29.700	A1	A1,A3,F3.

DEFINITION OF EMISSION SYMBOLS

- A0 unkeyed or unmodulated emission
- A1 telegraphy by the on-off keying of an unmodulated carrier
- A2 telegraphy by the on-off keying of an amplitude modulated audio frequency signal or by the on-off keying of the amplitude modulated carrier
- A3 telephony by amplitude modulation
- A4 (i) facsimile by amplitude modulation of a carrier, either directly or by a frequency modulated sub-carrier, or
 (ii) slow scan television.
- A5 television by amplitude modulation.
- F1 telegraphy by frequency shift keying where one of the two unmodulated carriers is being emitted at any one instant
- F2 telegraphy by the on-off keying of a frequency modulated audio frequency or by the on-off keying of a frequency modulated emission
- F3 telephony by frequency modulation
- F4 facsimile by the direct frequency modulation of the carrier
- F5 television by frequency modulation

Packet Network Development
in the Ottawa Area:

A Discussion Paper
by Barry McLarnon, VE3JF,
Technical Coordinator,
OARC Packet Working Group

(Due to space limitations this paper will be printed in the Groundwave in two parts - this is the first. Ed.)

WHERE WE ARE IN 1989

The current state of the Ottawa-area packet network is depicted in Fig.1. If you were on packet prior to 1989, you're no doubt aware that not a great deal has changed since the beginning of the year.

Only two events seem to be noteworthy... first, the OTTAWA node on 145.07 was cross-coupled to the CAPITL node on 145.01, by means of a dedicated wireline modem link. This was done (by popular demand!) primarily to extend real-time access to and from the Ottawa-Calgary satellite "wormhole" to areas outside the coverage of the 145.07 LAN. The other event was the installation of software at the VE3JF BBS to permit multiple simultaneous users. A maximum of 3 simultaneous users is currently supported.

Needless to say, neither of these events has helped ease congestion on the LAN! The nuisance of getting ***Busy responses from the BBS has been reduced, but at the cost of frequently getting slower response after you log in. The total of 3 users permitted is the sum for both the 145.07 and 145.01 BBS ports, but unfortunately, spreading the users over the two frequencies does not help matters at all. In fact, it is probably worse than when all the users are on the same frequency, due to interference between the radios on the two ports. In addition to the increased number of users, there is a very severe "hidden terminal" problem on the LAN. Other

than the OTTAWA node itself (and some people even have trouble with it), very few stations can be heard widely over the extent of the LAN. This, unfortunately, includes two of the most frequent generators of packets, the BBS and the OTTASAT node. The result is a breakdown of the CSMA (carrier sense multiple access) channel-sharing mechanism and:

Collisions --> Retries --> Low throughput
--> Frustration!

Curiously, I haven't heard very many complaints about the poor performance of the LAN. I suppose your feelings about it depend on where you're coming from... if you're relatively new to digital communications, perhaps only having experienced it via Morse or Baudot RTTY, then you may still be impressed by 1200 baud half-duplex packet. It's error-free, and it chugs along fairly well at times. If you have the patience, you can even transfer program files 'n such. On the other hand, if you're accustomed to using other computer networks, e-mail services, or even landline BBS's, you are probably not so impressed! I'll let you in on a little secret: one of the main reasons people run packet BBS's, myself included, is that it's the only way to guarantee that you'll have fast access to the BBS yourself, without having to endure those painful delays imposed by the inadequate packet channels!

I suppose that another reason few complain is the expectation of receiving this response:

If YOU don't like it, then YOU can help fix it!

That tends to subdue the complainers! In other words, if you're not part of the solution, you're part of the problem. But I digress... I certainly believe the local packet network is in bad shape and needs upgrading. I suspect many would agree with me, even if they aren't vocal about it. Which brings us to...

THE NETWORK IN 1990 (AND BEYOND)

There are a number of remedies for what ails the packet network.

Let's review some of them:

Higher-Speed Modems

A straightforward way to increase the throughput on a channel is to increase the data rate. Straightforward, that is, if you have radio gear that's up to the job. The radio has to have an IF which can pass the data without undue distortion, and it has to have fast enough T/R switching (assuming half-duplex operation) that it can turn around in a small fraction of the time that it takes to send one packet. Many radios fail miserably on the second count at only 1200 bps. Many more fail on both counts if you try to push them to higher bit rates. There are exceptions, but in general, for successful operation at rates much higher than 1200 bps, you need RF gear which has been designed for that task and is well integrated with the modem itself. In other words, "RF Modems".

Good, affordable, RF modems for higher speeds have been slow in coming, and at this moment are still not available "off-the-shelf". Those which are available(?) from AEA and GLB are too expensive to be considered affordable solutions. The WA4DSY 56 kbs modem comes closest to meeting the need: it is still only available in kit form, but it is not difficult to construct, and the performance with off-the-shelf converter/transverter equipment is excellent.

1990 will see the introduction of the TAPR PacketRadio, a 9600 bps fast-switching RF modem with 25 watt output. Initially it will be in the form of a limited number of beta-test units, like the TAPR TNC-1 and TNC-2 before it, but unlike them it will be wired and tested. Kantronics has

announced something similar, but with lower power output. These radios are the first wave of a move towards raising the "standard" rate for VHF/UHF packet to 9600 bps. This won't happen overnight of course, and there will be channels for 1200 bps users for quite some time yet. But if the prices are reasonable, once people get a taste of improved performance available from these radios, the migration could turn into a stampede! By the way, 9600 bps is the most likely choice for a new standard because it is the highest speed that can be accommodated in narrowband FM channels using simple FSK modulation techniques, and because it works well with present-day TNC hardware.

Those of us who are interested in applications like really fast file transfers, digital image transmission, and the like, are already looking beyond 9600 bps, and are experimenting with speeds from 56 kbs to several Mbs.

Elimination of Hidden Terminals

The other side of the coin in improving packet network performance is reducing or eliminating collisions from hidden terminals. You certainly won't realize the full benefits of higher-speed operation if guys who can't hear you keep clobbering your transmissions! There are several things which can be done. One simple remedy is to configure the nodes in the network so that they can all hear each other. This obviously is not practical on a channel with many low-power users scattered over a wide area, as on a typical LAN frequency. It is more applicable, however, to dedicated "backbone" channels where a small number of network nodes communicate with each other. An example of this is the 220 MHz SOPRA network in the Toronto area.

(The second part of this paper will be in next month's Groundwave.)