Ottawa Amateur Radio Club

Groundwave

P.O. Box 8873, Ottawa, Ontario, Canada, K1G 3J2

Check out our Web Page: ***www.oarc.net***

May 2007

The Annual General Meeting takes place on Wednesday, June 13 at 19:30 at City Hall. See the Notice of Elections on page 5.

Tour Nortel is looking for volunteers for communications on May 6. Contact Mike Kelly for further details.

The May meeting's presentation is Direction Finding—not the running around on foot orienteering kind, but the sit in the car and drive around kind. The talk is by Mike Kelly and Ian Jeffrey.

See you at the meeting.

Ian Jeffrey, VE3IGJ

MAY MEETING 7:30 pm, May 9th
in the Honeywell Room at Ottawa City Hall

In This Issue....

Ottawa Amateur Radio Club
Groundwave

May 2007

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Articles may be submitted for use in this publication provided that they portray events or activities that promote Amateur Radio. Letters and comments are also welcome. Submissions may be made by mail addressed to the Editor care of the OARC, or by e-mail to "ve3igj@rac.ca". Deadline for submissions occurs three days after the regular monthly meeting of the OARC.

Please support your local radio organisations. They support you!

Club Information

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 second Wednesday of each month (except July and August) in the Honeywell Room (2nd floor of the Old Teacher's College) of Ottawa City Hall (formerly Regional Municipality of Ottawa Carleton Headquarters) on Lisgar Street. Meetings commence at approximately 19:30 hours. Further details about each meeting is elsewhere in this publication.

Executive Meetings of the OARC Inc. are normally held on the first Wednesday of each month at 19:30 hours. Contact the President to confirm the date, time and place of the next meeting.

The CAPITAL CITY FM Net meets every Monday at 20:00 hours on the club repeater **VE2CRA** to pass traffic and to make announcements of interest to Amateurs in the National Capital Region.

The SWAP Net is a service provided and conducted by Ed Seib, VA3ES. This feature appears on theCapital City FM Net. To list items and make inquiries, call Ed at 613-738 8924 or e-mail him at va3es@rac.ca. Also available on the web: http://www.igs.net/~swap.

The POT-HOLE Net is a SSB/HF net sponsored by the Ottawa Valley Mobile Radio Club and is conducted every Sunday at 10:00 hours on **3.760 MHz**. All amateurs are welcome to check in.

The POT-LID CW Net is an informal slow-speed **CW** net sponsored and conducted by Ed Morgan, VE3GX, and meets every Sunday, except during July and August, at 11:00 hours on **3.620** MHz, to promote interest in CW and CW procedures.

The QCWA CHAPTER 70 Net meets every Thursday evening at 20:00 hours on repeater VE3TWO **147.300+.** You do not have to be a QCWA member to participate.

The Ottawa Valley VHF/UHF SSB Net is sponsored by the West Carleton ARC. Look for it every Tuesday night (except the first Tuesday of the month) around 21:00 on **144.250,** (roll calls after net on 50.150, 432.150, 222.150, and 1296.100.) Horizontal polarization is preferred.

VE3TEN

Tuning in the beacon so that it makes sense requires you tune to **28.175** on **cw** and read the tone that is there . The spaces between the elements are the higher tone. If that doesn't work, tune to **28.175.28** on **lower sideband** for better results.

Voice (VHF) 146.94/146.34 100Hz output tone
(UHF) 443.300/448.300

VE3TVA Amateur Fast Scan Television Repeater
Video/audio beacon & input 439.25 MHz (audio sub. 443.75)
Video/Audio output 914 MHz (FM)

IRLP Node 2040 146.94/146.34 (VE2CRA/VE3RC)
(Code 411 for info) (Code 204 for activity)
(Code 88 for time)
For further information please contact the Repeater Chair.

Note: The IRLP link is not connected to ECHOLINK. Please do not try to connect using the alpha keys on your keypad. It just confuses the operator.
Note: The IRLP link is disabled during the Capital City Net each Monday. It is disabled from 2000 to 2145 Mondays except for May to August when the link is disabled from 2000 to 2020.

Ottawa Amateur Radio Club
Groundwave

May 2007

April Minutes

Meeting opened at 19:33.
No guests were present. There were no corrections to the March minutes.

Announcements:
Five or more hams are required for the Tour Nortel which will be taking place Sunday May 6 from about 08:00 to 13:00. This is their tenth year. They have raised 3.2 million for CHEO.

There will be a work party April 12 at 19:00 for EMRG/Ottawa ARES at Fire Dispatch on. It will consist of moving things around, no brains required. Contact VE3BQP if you can help.

VE3AV is looking for an amplifier for HF.

The nominating committee (VE3OEB) has found volunteers to stand for each of the required executive positions. Nominations from members are also encouraged. Just make sure the person you are nominating is willing to stand. Nominations close and elections take place at the June meeting.

Homebrew night:
Presentations: Club project, battery charger: VE3ZTU, VE3OEB, VE3KL, VE3FFK.

Other projects: VE3BYT with various PIC microcontroller projects.

VE3KL CW oscillator for student use, HF yagi from salvaged and other homebrew parts, laptop to rig interface.

VE3UNW software suite for recording repeater outputs and automatically presenting the audio files to the internet.

VA3DB free BSD software presented at a meeting earlier this year.

VE3NPC headset microphone and modifications to tailor frequency response.

Dates to Remember

2007

Feb. 10,11	Canada Ski Marathon
Apr. 11	Homebrew Night
Jun. 13	OARC AGM and Elections
Jun. 23,24	Field Day
Jul. 1	RAC Canada Day Contest
Sep. 1	OARC Hamfest and RAC Forum
Sep. 30	Membership Renewal Deadline
Nov. 1	Joe Norton Award Subm. Due
Dec. 29	RAC Winter Contest

VE3ZRK also showed some of the items salvaged from the end of W.J Ford Enterprises in Smiths Falls.

The official winner of the VE3NPC Homebrew Award, based on originality, complexity, craftsmanship, and presentation was Richard, VE3UNW.

The winner of the Peoples Choice Award was Dave, VE3KL.

The winner of $21.50 from the 50-50 draw was Mike, VE3FFK. Paul, VE3PC won a Lee Valley gift certificate. Alan, VE3ZTU took home an internet guide book.

The meeting broke up at about 21:20.

mk-VE3FFK

Ottawa Amateur Radio Club
Groundwave

May 2007

mk's Words

I didn't hear from any of the project builders at the last meeting. Do you want to do another build session to wrap it up? I think there are about five who still have to complete the project. May 5 and 12 are still open, but I won't ask Gord to book the hall until I hear from some of you. My email address is elsewhere in the Groundwave. If you don't have email, I'm sure you know someone who does. I'm usually on the Capital City net, and monitor 146.880- most of the time.

It was nice to see a few projects at homebrew night. It would have been nicer to see more.

By the way, although we haven't finished (started) the planning for this year's trivia night, we would like you all to come up with some sort of homebrew electronic noisemaker for the game. Those bells last year were pretty lame (but thanks for trying, Janice). I'm sure you can each come up with something that will make a better noise than that.

It's a beautiful day in the neighbourhood, except for this crap raining out of the sky. Oh well, that makes it an indoor day. Catch up on QSLs, update the log from the scraps of paper. We have had so much of this stuff that I have been able to catch up on some wiring projects for EMRG recently. There has been a lot going on there, even if you don't hear much on the air about it.

A big THANK YOU to those who agreed to stand for office in the 2007-08 executive. The club wouldn't run without you. At the same time, let's also say thanks to Diane, for agreeing to stick around through the current year against her first instincts. There are a few members who have never been on the executive. Please consider it. It isn't all that hard.

A lot of you have already signed up to help with the Tour Nortel on May 6, but we could always use a few more.

It looks like there will be another transmitter (bunny) hunt on May 26. Contact Larry, VE3WEH for details. As of deadline the date isn't final. The last one was hosted by VE3WEH and VA3CMD, who got tired of waiting for someone else to do it. It was won by VA3UMP, who gets to hide the bunny next time. I'll have more to say about the whole subject at the next (May) meeting.

Before you know it, it will be field day and we will all have forgotten how to spell slush.

.Lets hope spring springs up before mosquito season gets going.

73
mk

(Continued from page 8)

Year	1997	1998	1999	2000	2001	2002
Solar Flux	81	117.9	153.7	179.6	181.6	179.5

This is an interesting chart since it indicates that the current sunspot maximum, as measured by solar flux values, was reached in 2001. Moreover, solar activity has remained near this peak for the last 3 years!

Ken Larson, KJ6RZ

Ottawa Amateur Radio Club
Groundwave

May 2007

Brainteaser

This month's puzzle:

Time

How many minutes after 4 o'clock do the hour hand and minute hand of a clock coincide?

Send your answers to editor@oarc.net.

Last month's puzzle:

Big Number!

What is the remainder of $(5^{9999})/7$? This is due to Fermat (but not his famous last theorem). It can be done with high-school math.

Congratulations to Richard Hagemeyer who got the right answer, 6.

The key is to note that $(5^n) \bmod 7 = (5^{(n \bmod 6)}) \bmod 7$, where n mod m means the remainder of n divided by m. This can be found by looking at the first few powers—$5^1 \bmod 6$, $5^2 \bmod 6$, $5^3 \bmod 6$, $5^4 \bmod 6$, etc.

So then,

Remainder of $(5^{9999}) / 7$
$= (5^{9999}) \bmod 7$
$= (5^{(9999 \bmod 6)}) \bmod 7$
$= (5^3) \bmod 7$
$= 125 \bmod 7$
$= 6$

QED

Elections

OARC Board of Directors Election

Bylaw Number 4 of the OARC Corporation provides: "that the members shall elect a Board of Directors at the Annual General Meeting. The Board will include President, Vice-President, Secretary, and three Directors-at-large. The immediate past President shall be a member of the Board. In addition, the Editor of the Groundwave, and the Chairman of the Repeater Committee, who shall be appointed by the Board, are members of the Board. … The whole Board shall be retired at each annual meeting, but shall be eligible for re-election."

The Bylaws are silent regarding a nominating committee, but the practice has been for a member of the corporation to act as a committee to determine which members of the Board wish to retire, and to seek replacements from among the membership, as may be needed. As your nominating committee for this year, I will be pleased to receive your nominations before the June meeting. At the regular meeting in May I will inform the members present of the status of the nomination process, including vacancies to be filled.

The Annual General Meeting takes place on Wednesday, June 13 at 19:30 at City Hall.

Ernie Brown, VA3OEB
Nominating Committee

Laws of the Natural Universe

Law of the Telephone

If you dial a wrong number, you never get a busy signal.

Ottawa Amateur Radio Club
Groundwave
May 2007

Understanding Solar Indices

Long distance HF radio communications is made possible by a region of charged particles in the Earth's upper atmosphere, 30 to 200 miles above the Earth's surface. This region is called the ionosphere.

The ionosphere is formed when extreme ultraviolet (EUV) light from the sun strips electrons from the neutral atoms in the Earth's upper atmosphere. The more familiar ultraviolet light has a shorter wavelength than visible light and is more energetic. Extreme ultraviolet light is even more energetic. When a bundle of EUV light (called a photon) hits a neutral atom, such as an oxygen atom, its energy is transferred to an electron in the neutral atom. This additional energy allows the electron to escape from the atom and dart freely around on its own. The neutral atom thereby becomes positively charged, because it has lost a negatively charged electron, and is known as a positive ion. The process in which the photon strips an electron from a neutral atom is known as photoionization. Recombination is the reverse of photoionization. Recombination occurs when a negatively charged electron and positively charged ion combine together again to produce a neutral atom. Recombination occurs continuously 24 hours a day. However, photoionization, caused by the EUV light from the sun, occurs only during day light hours. Thus the level of ionization in the ionosphere increases during the day when EUV light is present and decreases at night due to the lack of EUV energy and the continuous recombination process.

The ions in the ionosphere are too massive to respond to the rapid oscillations of a radio wave and thus have little affect on radio wave propagation. However, the free electrons are over 20,000 times lighter than the ions and do respond to radio wave oscillations.

Three major bands of ionization (called the D, E, and F layers) occur in ionosphere. The F layer (the highest layer) is the one primarily responsible for long distance HF communications.

The free electrons in the F layer, 140 to 200 miles above the Earth, interact with radio waves causing them to bent back toward the Earth's surface. The electrons react easier with low frequency radio waves than with higher frequency signals. As a result, a relative thin F layer will bend low frequency radio waves back to Earth. Long distance communications on the amateur radio low frequency 160 meter (1.8 MHz), 80 meter (3.5 MHz) and 40 meter (7 MHz) bands is possible at night when ionization in the F layer is low. The free electrons do not react as easily with the rapid oscillations of higher frequency radio waves. Thus a higher density of free electrons are required to bend radio waves in the 30 meter (10 MHz) and 20 meter (14 MHz) amateur bands back to Earth. Long distance communications on these bands are typically possible during the day and early evening hours when ionization levels in the F layer are high to moderate. Even higher densities of electrons are needed to bend radio waves in the 17 meter (18 MHz), 15 meter (21 MHz), 12 meter (24.9 MHz), and 10 meter (28 MHz) bands back to Earth. Long distance communications is generally possible on these bands only during the day light hours when ionization in the F layer is greatest. Very high levels of ionization are required to bend signals in the 6 meter (50 MHz) band back to Earth. Ionization in the F layer is never high enough to bend 2 meter (144 MHz), 1.25 meter (222 MHz), 70 cm (420 MHz), and higher frequency waves back to Earth. These radio waves travel through the ionosphere and into outer space. Frequencies in the 2 meter and above amateur bands are thus required for Earth satellite communications since they pass through the ionosphere. Terrestrial communications on these bands are confined to line of sight and repeater operation.

Recombination occurs more quickly in the E layer than in the F layer because the atmosphere at the altitude of the E layer (60 to 70 miles above the Earth) is more dense. Thus the E layer typically exists only during the day light hours. The E layer bends low frequency signals, in the 160 through 40 meter amateur bands, back to Earth during the

(Continued on page 7)

(Continued from page 6)
day, providing short range day time communications on these bands. The electron density in the E layer is not sufficient to bend radio waves above 20 meters (14 MHz) back to Earth.

Recombination occurs very quickly in the D layer which is about 30 to 55 miles above the Earth's surface. The D layer only exists during the day and is not sufficiently dense to bend HF radio waves back to Earth. The primary affect of the D layer is to absorb energy from low frequency radio waves, particularly radio waves in the 160 through 40 meter amateur bands. The 160 and 80 meter bands will typically be dead during the day because of D layer absorption.

Small variations occur daily in the ultraviolet energy received from the sun. On days when relatively high energy levels are received, ionization in the F layer will increase and long distance HF communications will improve. Also, the highest usable HF frequency will increase. For example, the 15 meter band (21 MHz) my be usable for communications with Australia. On low energy level days, the F layer is not as heavily ionized, the highest usable HF frequency decreases, and long distance HF communications deteriorates. During a low energy level day the 15 meter band may be dead with 20 meters (14 MHz) being the highest usable frequency band.

In addition to daily variations, the amount of ultraviolet energy received varies over an 11 year cycle in accordance with sunspot activity on the sun's surface. During a sunspot minimum there will be few if any sunspots visible on the sun's surface, ultraviolet energy from the sun will be at its lowest level, and the 20 through 10 meter amateur bands may be unusable for months at a time due to low F layer ionization. Over the following several years sunspots will gradually appear and increase in number reaching a maximum approximately 5½ years after the sunspot minimum. At the sunspot maximum over 200 sunspots are typically visible. Ultraviolet energy from the sun will be at its highest level during a sunspot maximum and reliable HF communications on the 160 through 10 meter amateur radio bands will be possible on a regular basis. The sunspots will then begin decreasing, causing a deterioration in long distance HF communications, until the next sunspot minimum is reached.

The amount of energy received from the sun is measured daily in terms of the solar flux. The solar flux can vary from as low as 50 to as high as 300. During a sunspot maximum, solar flux values will typically exceed 200 resulting in excellent long distance HF communications on the 20 through 10 meter amateur bands. Solar flux values will range from 50 to 80 during sunspot minimums yielding poor long distance communications with 40 meters (7 MHz) typically being the highest usable frequency band.

An increase in solar flux values for a period of several days generally indicates an improvement in long distance HF communications during that time period. For example, the highest usable frequency will generally increase and HF communications improve if the solar flux has been running about 110 and then jumps to around 130 for several days. In contrast, the highest usable frequency will decrease and HF communications deteriorate if the solar flux instead falls to 90.

Solar Flux	Expected Band Conditions
50 - 70	Bands above 40 meters unusable
70 - 90	Poor to fair propagation on 20 meters and below
90 - 120	Fair conditions up through 15 meters
120 - 150	Fair to good conditions on all bands up through 10 meters
150 - 200	Excellent conditions through 10 meters with openings on 6 meters
> 200	Reliable communications on all bands through 6 meters

The sun is continuously ejecting large quantities

(Continued on page 8)

(Continued from page 7)

of changed particles (atoms stripped of their electrons) into space. Some of these particles eventually arrive at the Earth and interact with the Earth's geomagnetic field. The amount of charged particles ejected by the sun varies from day to day and also with the 11 year sunspot cycle. The amount of particles arriving from the sun increases as the cycle approaches the sunspot maximum. Small numbers of particles arriving from the sun have relatively little affect on the Earth's geomagnetic field. Under these conditions the geomagnetic field is considered to be quite. Large numbers of charged particles can cause considerable disturbances in the geomagnetic field. A disturbed geomagnetic field is called a geomagnetic storm.

For any given solar flux value, HF communications will improve when the geomagnetic field is quiet, and worsen during a geomagnetic storm. A geomagnetic storm cause the F layer to become unstable, fragment, and even seem to disappear. Storm conditions are more severe in the regions around the Earth's magnet poles since the charged particles from the sun are drawn to the poles by the Earth's magnetic field. As a result, signal paths that traverse the polar regions will be more affected by a geomagnetic storm than signal paths that cross the equator.

The condition of the geomagnetic field is measured in terms of A and K values in accordance with the following table:

A	K	Geomagnetic Field	A	K	Geomagnetic Field
0 - 3	0	Quiet	48 - 79	5	Minor storm
4 - 6	1	Quiet to unsettled	80 - 131	6	Major storm
7 - 14	2	Unsettled	132 - 207	7	Severe storm
15 - 47	3 - 4	Active	208 - 400	8 - 9	Very major storm

The occurrences of solar flares also increases with increasing sunspot activity. A solar flare creates a burst of additional EUV energy and also ejects large quantities of charged particles into space. The EUV energy reaches the Earth in about 8 minutes creating what is know as a Sudden Ionospheric Disturbance (SID). The burst of EUV increases the ionization levels in the D, E, and F layers. The increased F layer ionization may help the propagation of high frequency signals (15 meters and above). However, the increased ionization in the D and E levels may result in the complete absorption of radio signals in the 160 through 40 meter bands and seriously degrade propagation at 30 and 20 meters. A SID may last from a few minutes to several hours, with conditions gradually returning to normal. The charged particles from the flare will arrive at the Earth in 20 to 40 hours. The particles will generally create a geomagnetic storm on their arrival.

Improved HF band conditions are thus indicated by higher than normal solar flux values and low A and K values.

Mid latitude solar indices (solar flux, A, and K values) are broadcast at 20 minutes after the hour by radio station WWV on 5, 10, 15, and 20 MHz. They are also available on the Internet at www.qrz.com and in the K7VVV Solar Updates that are posted regularly on the ARRLWeb at www.arrl.org. The K7VVV updates are very good and provide links to other web sites for more information on solar indices and HF propagation. A good discussion of solar indices is also provided in the September 2002 QST magazine.

K7VVV reports that the solar flux mean for December 26 through January 1 was 117.1 while the planetary A index mean was 17.1. The average daily solar flux for the past six year is shown in the table below:

(Continued on page 4)

MEMBERSHIP APPLICATION / RENEWAL

Ottawa Amateur Radio Club, Inc.
Box 8873 Ottawa, Ontario K1G 3J2

O Renewal **O** New **O** New Ham (FREE if licensed in current membership year)
O Single ($25, $20 after Feb. 1) **O** Family ($30) **O** Junior ($15)
O Emailed PDF Copy **O** Mailed Copy ***Add $5.00 for mailed copy of Groundwave***.

(**Please note**: membership year is September 1 to August 31.)

Family Name:_____ First Name/Initials: _____

Address: _____

City: _____ Prov: _____ Postal Code: _____

Home Phone: _____ Work Phone: _____ Ext _____

E-mail address: _____@_____ (***For Groundwave mailing***)

Callsign(s): |_____| |_____| |_____| Fax: _____
Qualifications: **O** Basic **O** Advanced **O** Grandfathered
Year Licenced: _____

Other Family Members

Name: _____ Callsign(s): |_____| |_____| |_____|
Qualifications: **O** Basic **O** Advanced **O** Grandfathered
Year Licenced: _____

Name: _____ Callsign(s): |_____| |_____| |_____|
Qualifications: **O** Basic **O** Advanced **O** Grandfathered
Year Licenced: _____

Name: _____ Callsign(s): |_____| |_____| |_____|
Qualifications: **O** Basic **O** Advanced **O** Grandfathered
Year Licenced: _____

Interests: _____

_____

Comments/Suggestions: _____

_____

Spring Cleaning Sale

Durham Radio is running out of space! Rather than move, we have decided to clean out our warehouse and balance our stock. The items shown below are just some of the great deals waiting for you. Visit our web site for great pricing on overstocks, demo units and one-of-a-kind items offered at the lowest prices ever!

CLICK ON THE IMAGES BELOW TO GO DIRECTLY TO THE PRODUCT PAGES.

25% Off

All in-stock Tigertronics SL1+ (non-USB versions only)

Connect between your PC's sound card and rig's mic, data or accessory port for PSK-31, SSTV, MT-63, CW, RTTY, AMTOR and Packet & more.

20% Off

All in-stock RT Systems radio cloning software

15% Off

All in-stock Amidon parts including torroids, beads and balun kits.

Alinco DX-70TH HF+6m Base/Mobile

A full 100W output on HF plus 6 metres. RX from 150 kHz to 30 MHz. Built-in narrow filters and CTCSS encode.

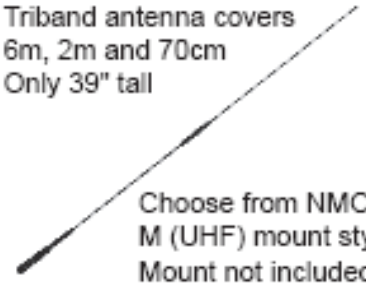
Reg. $999.00 Sale $839.97

10% Off

All in-stock Heil mics and accessories

Maldol EX-510B/NMO

Triband antenna covers 6m, 2m and 70cm
Only 39" tall



Choose from NMO or M (UHF) mount styles. Mount not included.

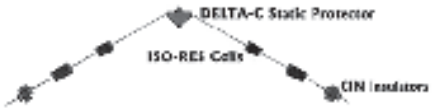
Reg. $79.00 Sale $48.97

Cushcraft AR270B

This high-performance dual-band vertical base antenna is only 7.7 feet (2.35m) high yet offers a generous 5.5/7.5 dB gain. It is broadbanded for minimum SWR on both bands. It is easy to assemble and features factory-sealed coils for best performance.

Reg. $189.00 Sale $148.97

DXLB 160/80/40m Dipole



Built with insulated 12 gau wire and stainless steel hardware. Use as a dipole or an inverted vee. Comes fully assembled. Only 100 feet overall length!

Reg. $209.00 Sale $179.97

Durham Radio Facts

Since 1993 Durham Radio has been owned and operated by Alma and Keith Carcasole. There are no other shareholders or investors. We are not affiliated with any other store in Canada. This allows us to choose products that we believe represent the best value for our customers rather than items that will make the most money for investors.

All items subject to availability. Prices in effect until April 30th, 2007

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