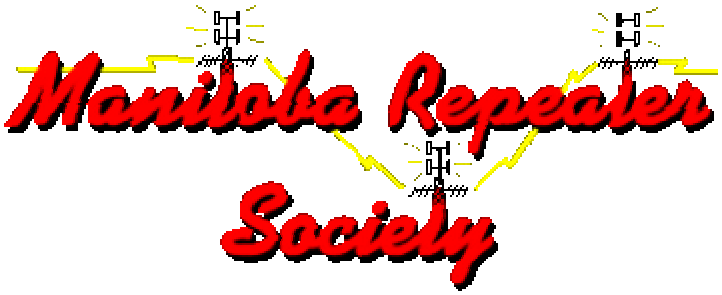

VE4 - Section

Our Hobby of Amateur Radio

CONVERTED FOR THE VE4 SECTION

BY DEREK HAY, VE4HAY

FROM MATERIAL BY JUSTIN GILES-CLARK VK7TW

(vk7tw@wia.org.au)

Draft Version: 1.2 2004.06.03

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Preamble

ACKNOWLEDGEMENT

This document has been compiled from information from many Amateur Radio organizations and sources (see References: section for a listing of all sources) and acknowledgement and thanks are given to those individuals and organisations for this material. I thank Justin Giles-Clark VK7TW who created the original version of this document for the Tasmanian Division of the Wireless Institute of Australia. I also thank those who have contributed to Justin's original document and those who helped and contributed to this Canadian version.

PURPOSE

The purpose of this document is two-fold:

1. To assist and equip anyone interested in the art and science of radio communications including amateurs and short-wave listeners, to inform, demonstrate and promote our hobby of Amateur Radio. This forms the first eight sections of this document; and,

2. Initiate high-level discussion on the strategic direction of Amateur Radio within Canada. This is covered in the last five sections of this document.

This document was originally compiled as a series of short articles that were heard on the VK7 WIA Division weekly news broadcast over 8 weeks in early 2002. The compiler and author at the time was the Southern Branch President of the Tasmanian Division of the WIA. Some expansion and additional articles have been added since they appeared on the broadcast.

DISCLAIMER

I have attempted to give acknowledgement wherever material has been used. If I have inadvertently missed an acknowledgment, I apologise unreservedly. Please contact me and I will update in the next version of the document.

1. Amateur or "*Ham*" Radio

So what do you say when someone you know at work, down the pub or meet in the street, finds out you are an Amateur Radio operator, "a ham" and they want to know more about this fascinating hobby? What do you tell them?

OUR EXPERIMENTAL RADIO COMMUNICATIONS SERVICE

Well, I can hear you saying with a very authoritative tone, *"this hobby of ours is an experimental radio communications service!"* WOW, now that sounds impressive but, what does that really mean?

Experimental

Experimental means we can design, build, operate and modify all the equipment we use to communicate on the frequencies allowed by our licence conditions. This is a definite privilege in Australia, however, that is not the case in some countries like Canada who will not allow you to build the transmitter portion of your radio system unless you hold an Advance Certificate.

Radio Communications

It's a form of technical communication. This links with the experimental side of the hobby too. The *Radiocommunication Regulations* describe the *Amateur Radio service* as a "radiocommunication service in which radio apparatus are used for the purpose of self-training, intercommunication or technical investigation by individuals who are interested in radio technique solely with a personal aim and without pecuniary interest."

Non Commercial

Amateur radio is non-commercial, meaning we don't gain any financial benefit; it is a leisure and recreational activity. We get other benefits like:

- the challenge of getting something working like communicating through a satellite or a QRP (low power) transmitter;

- the pleasure from talking with like-minded people locally and internationally, nets, collecting QSL cards, equipment, participating in contests and certificates;

- the self improvement and experience gained through operation of different equipment, modes and mediums;

- making contributions through experimentation to the fields of science, technology and engineering;

- the self-training and educational value; and,

- providing skilled personnel in emergency situations and community service with activities like Jamboree on the Air (JOTA) and the Manitoba Marathon.

Ham radio has many facets and therefore many opportunities however with these opportunities there are many issues and pressures that are now affecting the hobby at this point in time. More about this can be found in section 11.

The International Telecommunications Union (ITU) is the world governing body for telecommunications which recognises the Amateur Radio service and amateur satellite service in section 25 of their Radio Regulations:

1.56 *Amateur service: A radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.*

1.57 A*mateur-satellite service: A radiocommunication service using space stations on earth satellites for the same purposes as those of the amateur service.*

References:

Material used from the following sources:

- ITU Radio Regulations relating to the Amateur and Amateur Satellite Service - http://www.iaru.org/rel030703att2.html

THE AMATEUR'S CODE

The Radio Amateur is

- CONSIDERATE...never knowingly operates in such a way as to lessen the pleasure of others;
- LOYAL...offers loyalty, encouragement and support to other amateurs, local clubs, Radio Amateurs of Canada and International Amateur Radio Union, through which Amateur Radio in Canada is represented locally, nationally and internationally;
- PROGRESSIVE...with knowledge abreast of science, a well-built and efficient station and operation above reproach.
- FRIENDLY...slow and patient operating when requested; friendly advice and counsel to the beginner; kindly assistance, cooperation and consideration for the interests of others. These are the hallmarks of the amateur spirit.
- BALANCED...radio is an avocation, never interfering with duties owed to family, job, school or community.
- PATRIOTIC...station and skill always ready for service to country and community.

Updated for Australian Amateur Radio context after Paul M. Segal, W9EEA (1928).

References:

Material used from the following sources:

http://www.arrl.org/acode.html

2. How to become an amateur

LICENCING REQUIREMENTS:

All administrative activities for Amateur Radio, such as the issuance of Amateur Radio operator certificates and call signs, changes of mailing address and requests for special event or special prefix call signs, are carried out from a central location: the Amateur Radio Service Centre (see reference for web page) which is a department of Industry (IC) in Ottawa. Accredited examiners are available in many areas throughout Canada to provide both Morse code and written examinations on behalf of Industry Canada. They may be contacted through Amateur Radio clubs, technical schools or the Amateur Radio Service Centre.

Contact		Address	Location	Home#
Richard	Holder	P.O. Box 1011	Beauséjour	204-268-1702
Ron	Samchuk	P.O. Box 454	Birtle	204-842-3753
James	Mcauley	336-26th St.	Brandon	204-727-1742
Peter	Obelnicki	Box 373	Fisher Branch	204-372-6483
Albert	Webber	6 Boudry Avenue	Flin Flon	204-687-3964
Theodore	Figura	262 Dadson Row	Flin Flon	204-687-6801
Paul	Arsenault	Box 109	Komarno	204-278-3517
Jack	Adams	P.O. Box 1288	Russell	204-773-3343
Bill	Bowman	744 Christie Avenue	Selkirk	204-785-2701
Filidor	Palavecino	599 Young St.	Winnipeg	204-772-1369
Sam	Schneider	201 - 349 novavista dr.	Winnipeg	204-257-8301
Margarito	Cruto	1103 Strathcona Street	Winnipeg	204-779-4616
Witold	Kinsner	Univ. Of Man. Elect. & Compt. Eng.15 Gillson St.	Winnipeg	204-474-6490
Richard	Lord	23 Harbour	Winnipeg	204-275-6980
Wayne	Warren	408 Hillary	Winnipeg	204-888-0823
Albert	Diamond	537 Montrose St.	Winnipeg	204-488-7317
Adam	Romanchuk	26 Morrison St.	Winnipeg	204-339-3316
Ken	Barchuk	1012 London Street	Winnipeg	204-667-3286
Lowell	Sandwith	459 Adsum Dr	Winnipeg	204-633-2877

Contact the person nearest you for details about when the next examination is being held and the form and fee requirements. For example the Winnipeg Seniors Citizens Radio Club holds courses each September. Contact the club for details at 204-233-3122 Also check the http://www.rac.ca/regulatory/examiner.htm for a complete index of examiners for Canada

EXAMINATIONS

Amateur radio examinations cover a combination of the following areas dependent on the licence grade:

- Electronics & radio communication theory (two levels (Basic & Advanced) dependent on licence grade required);
- Government radio regulations;
- Morse code, sending and receiving (dependent on endorsement required);

Basic Qualification Examination - An examination of 100 questions is made by drawing from a series of questions applicable to the following topic areas

Regulations and Policies	25 questions
Operating and Procedures	9 questions
Station Assembly, Practice and Safety	21 questions
Circuit Components	6 questions
Basic Electronics and Theory	13 questions
Feedlines and Antenna Systems	13 questions
Radio Wave Propagation	8 questions
Interference and Suppression	5 questions

Advanced Qualification Examination - An examination of 50 questions is made by drawing a series of questions applicable to the following topics.

Advanced Theory	5 questions
Advanced Components and Circuits	12 questions
Measurements	6 questions
Power Supplies	4 questions
Transmitters, Modulation, Processing	9 questions
Receivers	5 questions
Feedlines - Matching Antenna Systems	9 questions

Not all examination elements need to be taken at the same time. You may focus on the theory and regulations and take your Morse code endorsement at a later time

Morse Code Qualification Examination - The examination for this qualification consists of sending and receiving Morse code at a speed of not less than 5 w.p.m. for three consecutive minutes.

The Morse code examination is in plain language and may include the twenty-six letters, the ten numbers, comma, period, question mark, dash, fraction bar, Q-signals and emergency signals. In both the sending and receiving examinations, each character omitted or incorrectly sent or received is counted as one error. A pass mark is awarded for five errors or fewer. The examiner will allow candidates two minutes to review and correct their copy before it is graded.

The following table summarises which examinations need to be taken for each licence grade:

Examinations are closed book. Reference material must not be made available during the examination. Use of calculators with capability of storing information in memory or any other similar devices are prohibited during the examination.

There is no time limit specified for examinations. Most examinations are completed within an hour and would normally not take more than two hours to complete. Examiners will use their discretion in ensuring reasonable time is made available for the examination

More information on the Examination process can be found on Radio Information Circular 3 (RIC3) Information on the Amateur Radio Service (see reference page for web site)

COURSES AVAILABLE

There is a range of options available to study for Amateur Radio examinations:

- Self study – there are many courses of study available through books, the Internet and CD-ROM; or,
- By completing correspondence courses; or,
- Study in a radio class.

The Winnipeg Senior Citizens Radio Club holds classes periodically through the year. Contact them directly at 233-3122 for the next start date.

References:

Material used from the following sources:

- Amateur Radio Service Centre - http://strategis.ic.gc.ca/epic/internet/insmt-gst.nsf/vwGeneratedInterE/sf01862e.html#servicecentre
- http://www.rac.ca/regulatory/examiner.htm
- Industry Canada - Information on the Amateur Radio Service - http://strategis.ic.gc.ca/epic/internet/insmt-gst.nsf/vwGeneratedInterE/sf01008e.html

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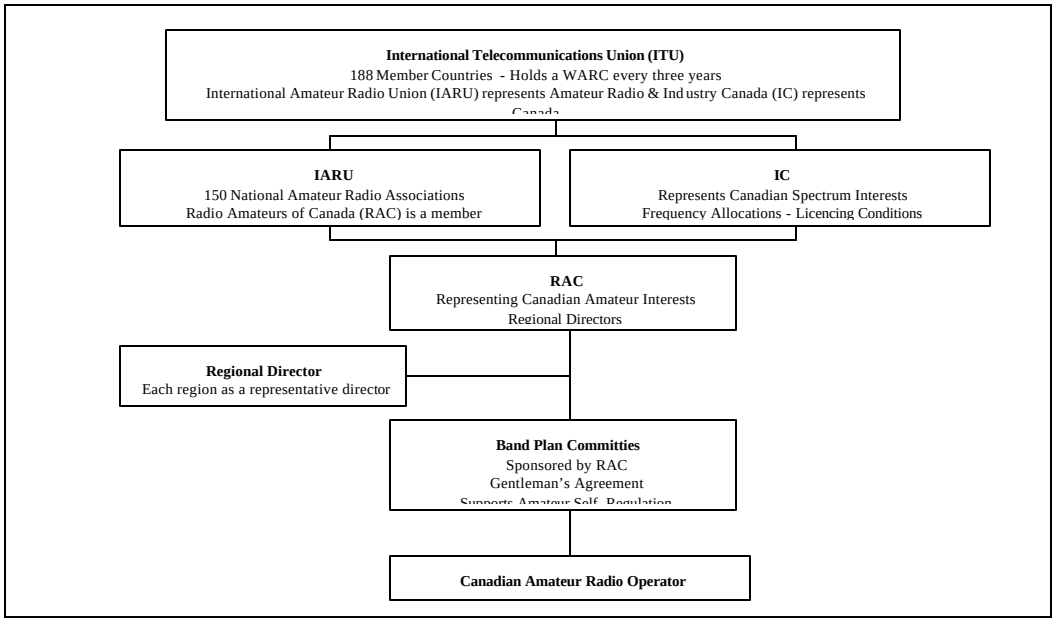
3. Amateur Radio Frequencies

INTERNATIONAL LEGISLATIVE FRAMEWORK

There are many different frequencies and modes that are available to the radio amateur in Canada. These frequencies are set via the following international regulatory structure:



CANADIAN AMATEUR BANDS

The following bands are available for Amateur Radio use dependent on the type of licence held:

Licence > Band \/	HF Adv	HF	Basic Adv	Basic	Max bandwidth	Frequency Designator
160M (1.8 – 2.0 MHz)	✓	✓			6 KHz	MF
80M (3.5 – 4.0 MHz)	✓	✓			6 KHz	HF
40M (7.0 – 7.3 MHz)	✓	✓			6 KHz	HF
30M (10.1 – 10.15 MHz)	✓	✓			1 KHz	HF
20M (14 – 14.35 MHz)	✓	✓			6 KHz	HF
17M (18.068 – 18.168 MHz)	✓	✓			6 KHz	HF
15M (21 – 21.45 MHz)	✓	✓			6 KHz	HF
12M (24.89 – 24.99 MHz)	✓	✓			6 KHz	HF
10M (28 - -29.7 MHz)	✓	✓			20 KHz	HF
6M (50 – 54 MHz)	✓	✓	✓	✓	30 KHz	VHF
2M (144 – 148 MHz)	✓	✓	✓	✓	30 KHz	VHF
1.25 M 220 – 225 MHz	✓	✓	✓	✓	100 KHz	
70CM (430-450 MHz)	✓	✓	✓	✓	12 MHz	UHF
(902 – 928 MHz)	✓	✓	✓	✓	12 MHz	
23CM (1.24 – 1.3 GHz)	✓	✓	✓	✓	Not Specified	UHF
13CM (2.3 – 2.45 GHz)	✓	✓	✓	✓	Not Specified	UHF
9CM (3.3 – 3.5 GHz)	✓	✓	✓	✓	Not Specified	SHF
6CM (5.65 – 5.925 GHz)	✓	✓	✓	✓	Not Specified	SHF
3CM (10 – 10.5 GHz)	✓	✓	✓	✓	Not Specified	SHF
1.25CM (24-24.05 GHz)	✓	✓	✓	✓	Not Specified	SHF
Various from 24 – 250GHz	✓	✓	✓	✓	Not Specified	SHF/EHF
Max Power (watts)	1000	250	1000	250		

BAND USAGE GUIDE

The following table is a general guide in relation to the communications possible on the various amateur bands

	Band (metre)	Use[1]
HF	160	night
	80	night and local day
	40	night and local day
	30	CW and digital
	20	world wide day and night
	17	world wide day and night
	15	primarily a daytime band
	12	primarily a daytime band
	10	daytime during sunspot highs
VHF	6	local to world-wide
	2	local and medium distance
UHF	70 cm and above	local

CALLSIGNS IN CANADA

Callsigns

Once licenced, Canadian Amateur Radio stations are allocated a callsign consisting of two letters followed by one numeral and two or three letters. Callsigns normally commence with the letters 'VE', 'VA', 'VO' or 'VY". To commemorate special events, the use of 'CG', 'CF', 'VB' or 'VC' may be authorised on a temporary basis. Other Prefixes are also available. The numbers in the callsign correlates to the home province of operation:

[1] It should be noted that band conditions vary for many reasons and thus all of these bands can at times take on the characteristics of others.

Call signs are assigned to an individual for a life-time, however there are cases when call signs become available for re-assignment. In the case of an amateur requesting a replacement call sign, the unwanted call sign would be returned to the block of available call signs at the time of exchange.

In the case of a deceased amateur, our policy allows for a member of the immediate family to apply for the call sign. Immediate family includes: father, mother, stepparents, foster parent, guardian, brother, sister, spouse, child, grandchild, stepchild or adopted members of the family.

If one year after the death no family members have applied for the call sign, it is returned to the block of available call signs. All call signs become available for re-assignment when the current year equals the certificate holder's birth date plus 125 years.

Two-Letter Suffixes

In Newfoundland, Nova Scotia, Quebec, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia the demand for two-letter suffixes exceeds the availability. In some areas, waiting lists for two-letter call signs have been held in district offices for many years. With the introduction of the centralized Amateur Radio Service Centre, two-letter call sign waiting lists have been discontinued. Any applicant in the VE1 - VE7 and VO1 call sign areas who is qualified to install or operate an Amateur Radio station may apply for a two-letter call sign, if he/she meets the following eligibility criteria:

- (a) the amateur has been the holder of a Canadian Amateur Radio Operator Certificate - Basic Qualification for a minimum of five years, or;
- (b) the amateur is applying for the two-letter call sign of a deceased family member.

ELECTRO-MAGNETIC RADIATION EXPOSURE LIMITS

Every Amateur Radio Operator should be aware that there might be health risks associated with exposure to Radio Frequency (RF) energy. Normally, the levels of power, and antennas used by Amateurs result in levels which are

considered safe by government authorities, but if you run the legal power limit, or lower than average antennas, read on....

In Canada, the rules and guidelines covering the subject of RF Safety, are published by the Federal Government in a document entitled **"Safety Code 6"** It is a long and very technical document, but reading the material available at the following web sites should help to understand the significance.

Industry Canada does not require that all Canadian amateurs evaluate their transmitting stations for compliance with Safety code 6, but Radio Amateurs of Canada provides the following information to help you decide what might be appropriate in your situation. More information can be found at

http://www.electric-words.com/cell/industry/canadian/safety.html

References:

- http://strategis.ic.gc.ca/epic/internet/insmt-gst.nsf/vwapj/ric9.pdf/$FILE/ric9.pdf
- http://strategis.ic.gc.ca/epic/internet/insmt-gst.nsf/en/sf01226e.html
- http://www.rac.ca/regulatory/arast.htm#Call%20Signs
- http://www.rac.ca/regulatory/rfe.htm
- http://www.electric-words.com/cell/industry/canadian/safety.html

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4. Amateur Radio Modes

There are many modes available to radio amateurs to use on various bands. A summary of the main modes currently in use is found below:

CW:

Where it all started! Stands for "Continuous Wave" becasue it is the keying of a continuous wave (frequency) at the required spacing by a Morse key. This mode has the narrowest bandwidth of any Amateur Radio mode and can be considered both an ue and digital mode.

For more information: http://www.qsl.net/n9bor/n0hff.htm

ATV:

Amateur Television uses experimental radio communications techniques to transmit both audio and video over the amateur bands. Cameras and microphones are used as the input devices and the resultant signal is usually sent on the VHF and UHF bands. The ATV modes include, high and low definition TV, slow scan TV, digital TV and facsimile for still images.

For more information: http://www.cq-tv.com/electronic/atv.pdf

SPACE COMMUNICATIONS:

This mode involves the communicating via one of three types of earth orbiting satellites. Low Earth Orbiting (LEO) ue or digital, High Earth Orbiting (HEO) or occupied spacecraft like the International Space Station (ISS). Ranges of frequencies are used from HF through to SHF. The simplest satellites carry beacons and the more complex satellites have transponders and/or repeaters for both voice and digital methods.

For more information: http://www.amsat.org/amsat/intro/faqs.html

PACKET RADIO:

This mode uses a terminal or computer running a terminal program through an interface or Terminal Node Controller (TNC) connected to an Amateur Radio transceiver to communicate with other packet Amateur Radio stations using the AX.25 protocol and variants. Usually on the VHF and UHF bands using 1200, 9600, 19.2K or 56.7K baud. Operation includes digipeaters, bulletin board systems, keyboard to keyboard, DX packet clusters, networking, Internet wormholes and satellite communications. Other protocols used over AX.25 are NET/ROM, ROSE and TCP/IP over AX.25 (commonly KA9Q NOS). Packet radio is also used in association with the GPS in a system called Automatic Packet Reporting System (APRS) which enables the information about location to be transmitted via packet radio using the GPS geostationary satellites. APRS receiving stations can get real-time information on their location from an APRS-equipped station. Amateurs are using APRS technology to assist in providing communication for sporting events and emergency location information.

For more information: http://www.tapr.org/tapr/html/pktf.html

MODES (AM SSB DSB FM):

These are probably the most common modes used in Amateur Radio and mainly relate to the transmission of voice over the amateur bands. These ue modes can be used in any band however, AM, SSB and DSB are usually found in the HF bands with FM and SSB used on the higher frequency bands.

For more information: http://my.integritynet.com.au/purdic/rad_term.htm

DIGITAL MODES (PSK HELLSCH FSK441 SPREAD SPECTRUM….):

Most of these modes use a computer with sound card or interface connected to a transceiver that generates the required modes. These include modes like AMTOR, PACTOR (I, II & III), G-TOR, CLOVER, RTTY, PSK31, Hellschreiber, MT63, Throb, MFSK16, JT44, FSK441, spread spectrum and APRS/GPS. There are specific frequencies allocated for these modes within the band plan. Each of these modes varies in their capabilities and uses.

For more information: http://home.teleport.com/~nb6z/about.htm

EME AND METEOR SCATTER:

Earth Moon Earth is usually associated with high power moon bounce experiments where a signal is aimed at the moon and a very weak return signal is received. It has recently become popular again with the new techniques of EME echo that the sub-noise level, weak signal experimenters are using.

Meteor scatter is a technique where a signal is reflected from the ionised trail left by the meteor. The meteors are usually no larger than a grain of sand and can produce a trail several km's long and a few tens of meters across. These ionised trails last for very short periods of time and abbreviated QSO procedures and high-speed protocols are used to assist in the exchange of information.

For more information: http://www.tased.edu.au/tasonline/vk7wia/Wsjtinoz.htm

REPEATERS/IRLP:

Repeaters are usually automatic devices that extend the range of a transceiver. These devices are usually found in VHF/UHF bands but some HF repeaters are available. Reception and transmission frequencies are offset to enable simultaneous transmission and reception. Additional functions can be enabled on the repeater via DTMF and/or CTCSS tones including linking, message and reporting modes.

Internet Repeater Linking Project is a relatively new mode that enables connection of repeaters using the Internet as a communications backbone. Developed by Canadian ham, VE7LTD, the IRLP enabled PC links to a repeater and responds to DTMF tones to connect to another IRLP enabled repeater somewhere else on the Internet. The IRLP uses Voice-Over-IP (VoIP) custom software and hardware. Coupled with the power of the Internet, IRLP will link your radio site to the world in a simple and cost effective way. IRLP operates a network of dedicated servers and nodes offering very stable worldwide voice communications between hundreds of towns and cities. All this with unsurpassed uptimes and the full dynamic range of telephone quality audio.

For more information: http://www.irlp.net/

QRP:

Low power Amateur Radio. This involves all aspects of Amateur Radio using low power usually below 5 watts for CW and below 10 watts for other modes. The motto of QRP'ers is *"doing more with less"* and a range of milliwatts per kilometre awards are available. Many QRP amateurs' homebrew (build there own equipment). Low power means that most equipment can be battery powered and easily become portable and mobile. Antenna efficiency is critical for good QRP DX contact and many portable and fixed installation designs and tuning units are available.

For more information: http://www.alphalink.com.au/~parkerp/qrp.htm

References:

- http://www.qsl.net/n9bor/n0hff.htm
- http://www.cq-tv.com/electronic/atv.pdf
- http://www.amsat.org/amsat/intro/faqs.html
- http://www.tapr.org/tapr/html/pktf.html
- http://my.integritynet.com.au/purdic/rad_term.htm
- http://www.tapr.org/tapr/html/ssf.html
- http://home.teleport.com/~nb6z/about.htm
- http://www.alphalink.com.au/~parkerp/qrp.htm
- http://www.irlp.net/
- http://www.tased.edu.au/ta sonline/vk7wia/Wsjtinoz.htm
- http://members.ozemail.com.au/~andrewd/hamradio/hamfaq.html

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5. Amateur Radio Activities

There are many activities available to radio amateurs to use on various bands. A summary of these modes is found below:

EXPERIMENTATION:

Experimentation takes many forms. It can be homebrewing a low power (QRP) transceiver (rig), it can be propagation studies of low frequency signals around Canada, and it can be trying to make a distance record. It can include meteor scatter and tropospheric experimentation and establishing contacts using this mode. It can be building and modifying an antenna to better suit your needs or making it more efficient or using it on another frequency. It can be testing a theory or using pre-loved components in a project to save some money. In fact, in amateur circles it's going on all the time.

DESIGNING/BUILDING/TESTING EQUIPMENT:

From simple crystal sets to power supplies to complex transceivers, amateurs have been designing, building, modifying and testing equipment used within Amateur Radio. There is a great deal of satisfaction from hand building something, getting it working. Then, each time you use the equipment you can be proud that you built it. You can also recycle parts from old equipment. Commonly called *"homebrewing"*, this aspect of the hobby is in sad decline due to many of the off-the-shelf solutions that have become available.

For more information: See Amateur Radio Magazine, RadCom Magazine, Silicon Chip Magazine, etc

ARES:

Stands for the Amateur Radio Emergency Service. In an emergency, efficient and effective communications are essential. In such an emergency ARES Amateur Radio operators who use their own equipment and expertise are able to provide the authorities with an invaluable communication resource that would otherwise not have been available.

ARES operators in Manitoba train by providing and operating communications infrastructure for events like the Manitoba Marathon and the Sled Dog Races. The amateur operator not only provides equipment for emergency service but also, more importantly brings skills and experience in radio theory and operation that can be used in the field to overcome communications problems. These events provide an invaluable training ground to effectively respond in an emergency situation.

For more information:

http://members.shaw.ca/mbares/ or http://www.winnipegares.ca/

DX/DX HUNTING:

DX is short for "long distance" and many amateurs actively seek out Amateur Radio operators in rarely heard countries. Making that rare DX contact is the Holy Grail for many amateurs. Sometimes a group of amateurs will arrange a trip to countries without an Amateur Radio service or a rare island in a "DXpedition". This gives amateurs from around the world an opportunity to work a location that they normally would never get the chance to work. 'DX clusters' operate via the Internet or packet radio and can provide early warning of the appearance of a particularly sought-after station.

For more information: http://www.dx-central.com/

AWARDS/CONTESTING:

There are hundreds of Amateur Radio contests that are run all over the world. These range from DX phone and CW-to-CW only and digital mode only contests. The aim in most contests is to gain the maximum number of contacts and/or points with a particular mode of operation. Probably the most important contests on the Canadian calendar are the Canada Day Contest held each year on July 1st and the RAC Winter Contest, which is held at the last full weekend in of December (except, when Christmas falls on a weekend).

For more information: http://www.rac.ca/opsinfo/infocont.htm

RAGCHEWING:

Whereas a normal DX contact usually consists of a quick exchange of signal, name, QTH and maybe weather, ragchewing is where the amateur talks at length about many topics. This is a favourite past time of many amateur operators.

MOBILE/PORTABLE:

A mobile or portable station can be set up in a car, boat, trailer, plane, train, bus, bicycle, pedestrian or even a tent. These modes usually rely on lower power battery operation and give the freedom of operation in different locations to make use of terrain and/or conditions to improve the chance of making contacts. If you like the great outdoors and are an Amateur Radio operator then mobile operation combines the two with the added challenge of operating outside your normal shack environment.

For more information: http://www.alphalink.com.au/~parkerp/nofeb97.htm

ARDF/FOX HUNTING:

Locating a hidden transmitter (the fox) using a range of techniques is the aim of Amateur Radio direction finding. You can be on foot, in a car; it can be in a small area or a large district. It is open to all ages and there are even serious international competitions held. It can range from a loop antenna and a handheld transceiver up to complex switched antenna arrays and Doppler shift electronics. It can be arranged much like orienteering where a range of transmitters on different frequencies need to be found and visited.

For more information: http://www.rac.ca/opsinfo/ardf.htm

PROPAGATION STUDIES:

Radio waves propagate or move through the various parts of the atmosphere differently dependent on a range of factors that include: frequency, atmospheric conditions, sunspot cycle time, auroral activity, antenna type, power levels, etc. This creates many different recognised types of propagation that include:

- *auroral* where the earth is bombarded with higher levels of charged solar wind particles,
- *backscatter* where a detectable fraction of a radio signal is sharply reflected around the area of the transmitting station, E_s where short skip off the E-layer of the ionosphere, *F2* where sky waves are reflected off the F2 layer,
- g*ray-line* occurs along the sunrise/sunset zones,
- *tropospheric and ionospheric scatter* is the spreading of radio waves in the troposphere (~10km up). The scattering of electromagnetic waves is caused by small changes in humidity, temperature and pressure.
- *Ionoscatter* is similar except the scattering takes place in the ionosphere some 75-85km up providing greater range,
- *trans-equatorial* which occurs between equator stations in low sunspot times and in spring and autumn and
- *ducting* where two or more inversions appear at different altitudes and tunnelling of a VHF/UHF signal may occur for unusually long distances. For more information: http://ecjones.org/propag.html

References:

- http://www.terrigal.net.au/~rosser/wicen/wicen_introduction.htm
- http://www.amsat.org/amsat/intro/faqs.html
- http://www.dx-central.com/
- http://prop.hfradio.org/
- http://ecjones.org/propag.html
- http://members.ozemail.com.au/~andrewd/hamradio/hamfaq.html
- http://members.shaw.ca/mbares/
- http://www.winnipegares.ca/
- http://www.rac.ca/opsinfo/infocont.htm
- http://www.rac.ca/opsinfo/ardf.htm
- http://www.alphalink.com.au/~parkerp/nofeb97.htm
- Amateur Radio Magazine February 1997

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6. Amateur Radio Clubs in Manitoba

AUSTIN
MANITOBA AMATEUR RADIO MUSEUM, INC
VE4ARM / VE4MTR
Box 10,
Austin, MB ROH OCO
E-mail:dsnydal at mb.sympatico.ca

BEAUSEJOUR
Beausejour Amateur Radio Club
P.O Box 1011
Beausejour, MB R0E 0C0

BIRTLE
Birtle Amateur Radio Club
Box 253
Birtle, MB R0M 0C0

BRANDON
Assiniboine Community College
1430 Victoria Avenue East
Brandon, MB R7A 1B6

BRANDON AMATEUR RADIO CLUB
PO Box 20003, RPO Brandon South
Brandon, MB R7A 6Y8
E-mail: dsnydal at mb.sympatico.ca

CARMAN
South-western Manitoba Amateur Radio Club
Box 365
Carman, MB R0G 0J0

DAUPHIN
DAUPHIN AMATEUR RADIO CLUB
PO Box 17 Dauphin Manitoba R7N 2T9
Meetings Day/Time: 3rd Friday / 19:30 local time
Meeting Location: 115-1St SW Dauphin
Classes Offered: Yes

Contact Name/telno/e-mail/pkt: Jack Adams VE4JA (204) 773-2335 E-mail:ve4ja at rac.ca
Repeater(s) for Member Contact: VE4SRR Swan River 146.94- / VE4BNR Baldy Mountain 147.03- / VE4BVR Russell 147.24+ / VE4SHR Spear Hill 146.70- / VE4LDR Lundar 146.97 / VE4SIX Woodlands 145.43 / VE4EDU Winnipeg (private) 147.30+ linked / VE4BAS Basswood (private) 145.15- linked
Web Site URL:
Source / Date: Jack Adams VE4JA / 16 Oct 02

FLIN FLON
Flin Flon Amateur Radio Club
2 Boundary Avenue
Flin Flon, MB R8A 0P2

SELKIRK
TRIPLE S COMMUNICATIONS GROUP*
744 Christie Avenue
Selkirk, MB R1A 2H9
E-mail:bill at bmsl.mb.ca
http://www.sirnet.mb.ca/~ve4sss/

SHILO
CFB Shilo Amateur Radio Club
PO Box 806
Shilo, MB R0K 2A0

SAINT ANDREWS
Eastman Amateur Radio Club
5505 Highway 9
Saint Andrews, MB R1A 2W8
Meetings Day/Time: 1st Wednesday / 19:30 local time
Meeting Location: Gaffer's Restaurant
Contact Name/telno/e-mail/pkt: Doug Henry VE4TG (204) 757-4694 E-mail: ve4tg at qsl.net
Repeater(s) for Member Contact:
http://www.qsl.net/ve4tg
Source / Date: Doug Henry VE4TG / 21 Mar 04

TEULON
INTERLAKE AMATEUR RADIO CLUB*
Box 957, Teulon MB R0C 3B0
Meetings Day/Time: 1st Tuesday / 19:30 local time
Meeting Location: Green Acres Art Centre, Teulon, MB

Classes Offered: Yes
Contact Name/telno/e-mail/pkt: Paul Arsenault VE4AEY (204) 886-2735 **E-mail:hambel at mb.sympatico.ca**
Repeater(s) for Member Contact: VE4TEU 145.410- / VE3ARB 147.000- / VE4ARC 145.230-
Web Site URL:n/a
Source / Date: Paul Arsenault VE4AEY / 17 Apr 02

THOMPSON
Thompson Amateur Radio Club
Box 23
Thompson, MB R8M 1M9

WINNIPEG
1st Sun Valley Venturers
c/o 47 Mutchmor Close,
Winnipeg, MB R2K 3R5
E-mail:ve4svv at rac.ca
http://members.shaw.ca/sunvalleyventurers/

735 Communication Regiment
969 St. Mathews
Winnipeg, MB R3G 0J7

Amateur Radio Association of Winnipeg
87 Belton Street
Winnipeg, MB R2R 2L3

CBC Employees Amateur Radio Club
541 Portage Avenue
Winnipeg, MB R3G 1T9

Girl Guides Canada
c/o VE4WSC,
598 St Mary's Road West
Winnipeg, MB R2M 3L5

MANITOBA REPEATER SOCIETY*
598 St Mary's Rd
Winnipeg, MB R2M 3L5
Meetings: Twice per year
Meeting Location: Winnipeg Seniors Centre and MARM Hamfest
Contact Name/telno/e-mail/pkt: Ed Richardson VE4EAR (204) 254-8425 E-mail: ve4ear at rac.ca

Repeaters: VE4WPG 149.390 / VE4VJ 443.500 / VE4WRS 145.450 / VE4MAN 146.610 / VE4CDN 145.270 / VE4NEP 147.210 / VE4GIM 146.850 / VE4MIL 145.210 / VE4EMB 147.360 / VE4PLP TBA
http://ve4.net/mrs
Source / Date: Ed Richardson VE4EAR / 13 Nov 03

Pathfinders Amateur Radio Club Inc
86 Wendon Bay,
Winnipeg, MB R2R 1X9
Meetings Day/Time: Last Saturday of the month / 08:00 local time
Meeting Location: Aristocrat Restaurant
Classes Offered: n/a
Contact Name/telno/e-mail/pkt: Sunday B. Satiada VE4SBS /(204) 772-3676 /E-mail: ve4par at rac.ca
Repeater(s) for Member Contact: VE4PAR 444.750+ / 146.550
Source / Date: Sunday Satiada VE4SBS / 21 Nov 01
Pugad Lawin Amateur Radio Club
81 Amersham Crescent
Winnipeg, MB R2N 3H1

Radio Tribung Pinoy Inc
1103 Strathcona Street,
Winnipeg, MB R3G 3G7
Meetings Day/Time: n/a
Meeting Location: n/a
Classes Offered: n/a
Contact Name/telno/e-mail/pkt: E-mail: ve4rtp at hotmail.com
Repeater(s) for Member Contact: n/a
Source / Date: VE4MAR / 04 Feb 02

Royal Canadian Sea Cadets Amateur Radio Club
51 Navy Way
Winnipeg, MB R3C 4J7

University of Manitoba Amateur Radio Society
Box 73 University Centre
Winnipeg, MB R3T 2N2

WINNIPEG AMATEUR RADIO CLUB
598 St Mary's Rd,
Winnipeg Manitoba R2M 3L5
Meetings Day/Time: 2nd Monday (unless a holiday, then 3rd Monday) / 19:30 local time
Meeting Location: Sturgeon Creek Regional Secondary School

Classes Offered: Yes
Contact Name/telno/e-mail/pkt: Glen Napady VE4GWN (204) 831-8082 **E-mail:ve4bb AT rac.ca**
http://ve4.net/warc/
Repeater(s) for Member Contact: n/a
Source / Date: Glen Napady VE4GWN / 13 Nov 03

WINNIPEG ARES INC.
39 Allan Blye Drive
Winnipeg Manitoba R2P 2S5
Meetings Day/Time: 2nd Tuesday / 19:00 local time
Meeting Location: Sir William Stephenson Library
Classes Offered: n/a
Contact Name/telno/e-mail/pkt: Jeff Dovyak **E-mail:wpgares at escape.ca**
http://www.winnipegares.ca/
Source / Date: Jeff Dovyak VE4MBQ / 23 Feb 02

Winnipeg DX Club
Box 52, Grp 327, Rr 3
Winnipeg, MB R0E 0C0

WINNIPEG SENIOR CITIZENS RADIO CLUB VE4WSC***
c/o VE4WSC
598 St Mary's Rd,
Winnipeg, MB R2M 3L5
E-mail:ve4wsc@mts.net
http://www.mts.net/~ve4wsc/

References:

- http://www.rac.ca/cdn_clubs/region_midwest.htm
- http://www.ve4.net/manitoba.html

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7. Manitoba Repeaters, Beacons and Nets

REPEATERS:

By Frequency

CALL	LOCATION	FREQUENCY	INPUT	NOTES
VE4VHF	WINNIPEG	50.036s		BEACON
VE4BCN	BRERETON LAKE	50.083s		BEACON
VE4BAS	BASSWOOD	145.150-	144.550	O,T3A
VE4VRG	WINKLER	145.190-	144.590	O
VE4MIL	MILNER RIDGE	145.210-	144.610	O,L1
VE4ARC	WINNIPEG	145.230-	144.630	O,T3A
VE4CDN	MORRIS	145.270-	144.670	O,L1
VE4PAS	THE PAS	145.350-	144.750	O
VE4WNR	WINNIPEG	145.350-	144.750	O,A,E,LSL,L3
VE4PIN	LAC DU BONNET	145.370-	144.770	O,E,H4,A
VE4TEU	TEULON	145.410-	144.810	O
VE4SIX	WOODLANDS	145.430-	144.830	O,H2,L1
VE4WRS	WINNIPEG	145.450s		C,A,S
VE4MAN	STARBUCK	146.610-	146.010	O,L1,E
VE4FAL	FALCON LAKE	146.640-	146.040	O,L1
VE4DPN	DAUPHIN	146.640-	146.040	O,A,H2
VE4SHR	SPEARHILL (ASHERN)	146.700-	146.100	O,A,H2
VE4SLK	EAST SELKIRK	146.730-	146.130	O,E,L6
VE4TED	BRANDON	146.730-	146.130	O
VE4FLN	WINNIPEG	146.760-	146.160	O
VE4INT	BIRDS HILL	146.820-	146.220	O,H4
VE4GIM	GIMLI	146.850-	146.250	O,L1
VE4HS	BRUXELLES	146.880-	146.280	O
VE4TWO	PORTABLE	146.910-	146.310	O
VE4TGN		146.910-	146.310	
VE4MTR	AUSTIN	146.910-	146.310	O
VE4AGA	MANIGOTOGAN	146.910-	146.310	
VE4SRR	SWAN RIVER	146.940-	146.340	O,H2,E,IRLP
VE4FFR	FLIN FLON	146.940-	146.340	O
VE4BDN	BRANDON	146.940-	146.340	O
VE4LDR	LUNDAR	146.970-	146.370	O,H5
VE4BMR	BALDY MOUNTAIN	147.030-	146.430	O,H2,E
VE4PCL	FOXWARREN	147.060+	147.660	O
VE4MBR	SELKIRK	147.060+	147.660	O,E,L1,T3A
VE4NOD	HAYWOOD	147.130+	147.730	O
VE4PTG	PORTAGE	147.165+	147.765	O
VE4NEP	NEEPAWA	147.210+	147.810	O,L1
VE4RAG	ELIE	147.240+	147.840	O,T3A
VE4BVR	RUSSELL	147.240+	147.840	O,H2
VE4UMR	WINNIPEG	147.270+	147.870	O,E,T3A,A
VE4EDU	WINNIPEG	147.300+	147.900	O,H2

VE4RRC	WINNIPEG	147.330+	147.990	O
VE4EMB	HADASHVILLE	147.360+	147.960	O
VE4WPG	WINNIPEG	147.390+	147.990	O,L1,L2,T3A
VE4BRC	BEAUSEJOUR	147.540s		C,A,S
VE4WDX	WINNIPEG	147.780-	147.180	C
VE4RPT	WINNIPEG	224.940-	223.340	O
VE4KEG	WINNIPEG	433.750+	438.750	T5Z
VE4EDU	WINNIPEG	434.000+	1253.250	ATV
VE4KUG	WINNIPEG	442.025s	UNKNOWN	C,TWA
VE4MBR	SELKIRK	443.000+	448.000	O,E,L1,T3A
VE4SRR	SWAN RIVER	443.400+	448.400	C,H2,E
VE4VJ	WINNIPEG	443.500+	448.500	O,L1
VE4UHF	WINNIPEG	444.000+	449.000	O,B,T3A
VE4SLK	EAST SELKIRK	444.150+	449.150	O,E,L6
VE4PAR	WINNIPEG	444.750+	449.750	O,T3A
VE4BMR	BALDY MOUNTAIN	448.400-	443.400	C,H2,E
VE4KIL	KILLARNEY	449.500-	444.500	O,3A
VE4KEG	WINNIPEG	1280.500-	1268.500	T5Z
VE4EDU	WINNIPEG	1289.250-	915.000	ATV

LEGEND:

*** = PROPOSED**	**A = AUTOPATCH**	**ATV = TELEVISION**
C = CLOSED SYSTEM	**D = DIGIPEATER**	**E = EMERG POWER**
H = HARD LINKED TO H#/L#	**L = LINKED TO L#**	**N = NETWORK NODE**
O = OPEN SYSTEM	**+/- = INPUT OFFSET**	**S = SIMPLEX**
T = CTCSS ACCESS	**# = CHANGED INFO [VE4UB MAR-31-2004]**	

BY Location

LOCATION	CALL	FREQUENCY	INPUT	NOTES
	VE4TGN	146.910-	146.310	
AUSTIN	VE4MTR	146.910-	146.310	O
BALDY MOUNTAIN	VE4BMR	147.030-	146.430	O,H2,E
BALDY MOUNTAIN	VE4BMR	448.400-	443.400	C,H2,E
BASSWOOD	VE4BAS	145.150-	144.550	O,T3A
BEAUSEJOUR	VE4BRC	147.540s		C,A,S
BIRDS HILL	VE4INT	146.820-	146.220	O,H4
BRANDON	VE4TED	146.730-	146.130	O
BRANDON	VE4BDN	146.940-	146.340	O
BRERETON LAKE	VE4BCN	50.083s		BEACON
BRUXELLES	VE4HS	146.880-	146.280	O
DAUPHIN	VE4DPN	146.640-	146.040	O,A,H2
EAST SELKIRK	VE4SLK	146.730-	146.130	O,E,L6
EAST SELKIRK	VE4SLK	444.150+	449.150	O,E,L6
ELIE	VE4RAG	147.240+	147.840	O,T3A
FALCON LAKE	VE4FAL	146.640-	146.040	O,L1
FLIN FLON	VE4FFR	146.940-	146.340	O
FOXWARREN	VE4PCL	147.060+	147.660	O
GIMLI	VE4GIM	146.850-	146.250	O,L1
HADASHVILLE	VE4EMB	147.360+	147.960	O
HAYWOOD	VE4NOD	147.130+	147.730	O
KILLARNEY	VE4KIL	449.500-	444.500	O,3A

LAC DU BONNET	VE4PIN	145.370-	144.770	O,E,H4,A
LUNDAR	VE4LDR	146.970-	146.370	O,H5
MANIGOTOGAN	VE4AGA	146.910-	146.310	
MILNER RIDGE	VE4MIL	145.210-	144.610	O,L1
MORRIS	VE4CDN	145.270-	144.670	O,L1
NEEPAWA	VE4NEP	147.210+	147.810	O,L1
PORTABLE	VE4TWO	146.910-	146.310	O
PORTAGE	VE4PTG	147.165+	147.765	O
RUSSELL	VE4BVR	147.240+	147.840	O,H2
SELKIRK	VE4MBR	147.060+	147.660	O,E,L1,T3A
SELKIRK	VE4MBR	443.000+	448.000	O,E,L1,T3A
SPEARHILL (ASHERN)	VE4SHR	146.700-	146.100	O,A,H2
STARBUCK	VE4MAN	146.610-	146.010	O,L1,E
SWAN RIVER	VE4SRR	146.940-	146.340	O,H2,E,IRLP
SWAN RIVER	VE4SRR	443.400+	448.400	C,H2,E
TEULON	VE4TEU	145.410-	144.810	O
THE PAS	VE4PAS	145.350-	144.750	O
WINKLER	VE4VRG	145.190-	144.590	O
WINNIPEG	VE4VHF	50.036s		BEACON
WINNIPEG	VE4ARC	145.230-	144.630	O,T3A
WINNIPEG	VE4WNR	145.350-	144.750	O,A,E,LSL,L3
WINNIPEG	VE4WRS	145.450s		C,A,S
WINNIPEG	VE4FLN	146.760-	146.160	O
WINNIPEG	VE4UMR	147.270+	147.870	O,E,T3A,A
WINNIPEG	VE4EDU	147.300+	147.900	O,H2
WINNIPEG	VE4RRC	147.330+	147.990	O
WINNIPEG	VE4WPG	147.390+	147.990	O,L1,L2,T3A
WINNIPEG	VE4WDX	147.780-	147.180	C
WINNIPEG	VE4RPT	224.940-	223.340	O
WINNIPEG	VE4KEG	433.750+	438.750	T5Z
WINNIPEG	VE4EDU	434.000+	1253.250	ATV
WINNIPEG	VE4KUG	442.025s	UNKNOWN	C,TWA
WINNIPEG	VE4VJ	443.500+	448.500	O,L1
WINNIPEG	VE4UHF	444.000+	449.000	O,B,T3A
WINNIPEG	VE4PAR	444.750+	449.750	O,T3A
WINNIPEG	VE4KEG	1280.500-	1268.500	T5Z
WINNIPEG	VE4EDU	1289.250-	915.000	ATV
WOODLANDS	VE4SIX	145.430-	144.830	O,H2,L1

CTCSS (PL) (EIA) TONE FREQUENCIES IN HZ

67.0-XZ	85.4-YA	107.2-1B	136.5-4Z	173.8-6A	218.1-M3
69.3-WZ	88.5-YB	110.9-2Z	141.3-4A	179.9-6B	225.7-M4
71.9-XA	91.5-ZZ	114.8-2A	146.2-4B	186.2-7Z	229.1-9Z
74.4-WA	94.8-ZA	118.8-2B	151.4-5Z	192.8-7A	233.6-M5
77.0-XB	97.4-ZB	123.0-3Z	156.7-5A	203.5-M1	241.8-M6
79.7-WB	100.0-1Z	127.3-3A	162.2-5B	206.5-8Z	250.3-M7
82.5-YZ	103.5-1A	131.8-3B	167.9-6Z	210.7-M2	254.1-0Z

0Z-254.1	3A-127.3	5B-162.2	8Z-206.5	M6-241.8	XZ- 67.0
1A-103.5	3B-131.8	5Z-151.4	9Z-229.1	M7-250.3	YA- 85.4
1B-107.2	3Z-123.0	6A-173.8	M1-203.5	WA- 74.4	YB- 88.5
1Z-100.0	4A-141.3	6B-179.9	M2-210.7	WB- 79.7	YZ- 82.5
2A-114.8	4B-146.2	6Z-167.9	M3-218.1	WZ- 69.3	ZA- 94.8
2B-118.8	4Z-136.5	7A-192.8	M4-225.7	XA- 71.9	ZB- 97.4
2Z-110.9	5A-156.7	7Z-186.2	M5-233.6	XB- 77.0	ZZ- 91.5

BEACONS:

FREQ MHz	CALLSIGN	LOCATION	AREA	GRID
6 metre (VHF)				
50.018 MHz	VE4ARM/B	Austin, MB	60W – 3el beam fixed NE	EN09mw
50.037 MHz	VE4VHF/B	Headingley, MB	50W – ½ wave at 330’	EN19kv
2 metre (VHF)				
144.281 MHz	VE4ARM/B	Austin, MB	30W – 5el beam fixed SE	EN09mw
70 cm (UHF)				
432.300 MHz	VE4ARM/B	Austin, MB	35W – 5el beam fixed SE	EN09mw

NETS:

Nets are pre-arranged gatherings of Amateur Radio operators on a particular frequency and time. The net can have a specific purpose, for example, to enable the gathering of points for a particular award or a group of amateurs with a particular interest or a club. There is usually a net controller who maintains a list of amateurs and facilitates the orderly conduct of the net. They are also there for use in the event of an emergency situation. The use of controlled nets is a way of training net controller operators and monitoring hams, proper technique and skill, should they ever be required. The following is a list of some of the nets that occur in Manitoba:

The MRS Net: (The Manitoba Repeater Society)

The MRS linked system, and other systems Training exercise, Bulletins, Arrangements, Swap & Shop Thursdays @ 9:00 PM Local time Sundays @ 9:00 PM Local time.

The Senior's Net:

The VE4WPG Repeater (other links to be established)
Information exchange of WSCRC news, and informal talk
Weekdays @ 9:00 AM local time.

Aurora Net

7.060 LSB Daily @ 8:00pm

Manitoba Evening Phone Net

3.760 LSB Daily @ 7:00pm

Manitoba Morning Weather Net

3.7430 LSB Daily @ 8:30am

MANITOBA AWARDS/CONTESTS

Worked All Winnipeg Award

The "Worked All Winnipeg Award" is sponsored by the Winnipeg Amateur Radio Club Inc. It is awarded to an Amateur Radio Operator to recognize his/her outstanding achievement in having accomplished two-way communications with the required number of VE4 radio stations located within the City of Winnipeg.

The award is a truly beautiful certificate, on parchment paper stock. It features drawings along the borders, which shows many of the attractions of the City of Winnipeg, along with our provincial emblem.

The Rules:

- Stations within Manitoba, including the City of Winnipeg, must work at least 25 different Winnipeg stations to qualify.
- Stations outside Manitoba, but within North America, must work at least 15 different Winnipeg stations to qualify.
- Stations outside North America must work a minimum of 10 different Winnipeg stations to qualify.
- Any band and any mode may be used, but all contacts between two individual stations must be direct contacts. (repeater contacts are not allowed)
- All contacts from January 1, 1956 are acceptable.

- QSL cards are not required. A certified COPY of your logbook, with the signatures of two other Hams who have checked your log, is all that is necessary.

This copy should be mailed, along with $2.00 to cover the cost of the certificate and postage to:

"WORKED ALL WINNIPEG AWARD"
Custodian, Dick Maguire VE4HK
c/o Winnipeg Senior Citizens Radio Club Inc.
598 St. Mary's Road
Winnipeg, MB
R2M 3L5.

For more information please take a look at: http://ve4.net/warc/awards.html

For a listing of Awards in Canada please look at:

http://www.rac.ca/opsinfo/awards2.htm

References:

- http://www.sirnet.mb.ca/~ve4sss/repeater.html
- http://www.ve4.net/radionets.html
- http://ve4.net/warc/awards.html
- http://www.rac.ca/opsinfo/awards2.htm
- Bruce Johnson, VE4KQ

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8. Basic Operating Procedure

So you have your Amateur Radio licence, transceiver and antenna and you wish to make contact with another amateur? The following section is a concise explanation of basic operating procedures. There are variations on these procedures dependent on the band being used. The best way to pick-up these variations is to listen to the band in question.

MAKING CONTACTS

In all cases, it is wise to tune across the band which, you intend to use prior to transmitting. This provides a general impression of band conditions. In order to maximise the chance of obtaining contacts, and to minimise interference with other operators, the Amateur Radio bandplans should be adhered to at all times. Essentially this means not operating SSB on frequencies reserved for CW or digital modes. Bandplans are published on the RAC website http://www.rac.ca/opsinfo/bandplan.htm.

There are three main ways of obtaining contacts:

1. ***Responding to a CQ call:*** Tuning across the band may reveal one or more stations calling CQ. A CQ, which is a general call to all-amateur stations and is your invitation to respond. Such a response takes the form of sending the other station's callsign, followed by your own, perhaps sent several times if signals are weak.

If the calling station is VE4HK, and your callsign is VE4BB, your response on SSB could be: -

VE4HK, This is Victor Echo Four Bravo Bravo, VE4BB.

On CW, you would send: -

VE4HK de VE4BB VE4BB VE4BB K

In this case, 'de' means from, while 'K' is an invitation to transmit (or 'over' on voice)

If the station replies to another station, you may wait until the contact finishes, or move to another frequency. On the other hand, the

calling station may ask 'QRZ?'. This indicates that the station heard a signal, but was not able to decipher the callsign. The correct procedure in this case is to repeat your call, possibly speaking the phonetics (or sending) a little slower this time.

2. ***Calling CQ:*** If no other stations are calling CQ, it is a good idea to issue a call yourself, especially if you have reason to suspect that the band may be open. After selecting a clear frequency, it is polite to ask if it is in use. On SSB, this is accomplished by announcing your callsign and asking if the frequency is occupied, on CW operators simply send 'QRL?'. If no response is received, the frequency is yours to use.

The length of CQ calls depends on band activity and conditions; if band occupancy is sparse, a longer CQ call is suggested to attract the attention of the casual listener tuning across the band.

On SSB, a typical CQ call is as follows: -

CQ CQ CQ THIS IS VE4BB, VICTOR ECHO FOUR BRAVO BRAVO, VE4BB, CALLING CQ AND LISTENING

A CQ call on CW may be: -

CQ CQ CQ DE VE4BB VE4BB VE4BB K

3. ***'Tail-ending':*** Another effective means of obtaining contacts (especially if using low power) is by 'tail-ending'. This means listening in to a conversation, and calling one of the stations involved immediately after the contact ends. Timing is important here, particularly if unable to hear all stations on frequency.

When 'tail-ending', the call made can be just as if one was answering a CQ. If used with care, 'tail-ending' is probably the best way to make contacts on the HF bands.

DURING THE CONTACT

Once contact has been established, the first few exchanges normally involve a swapping of readability/strength and if CW (tone) (RST see acronyms section for details) signal reports, names and locations ('QTH') with the other station. This may extend to the antenna and equipment, weather and anything else that

each station cares to mention. The amateur regulations and ethics mean that there are some topics best left alone.

At at the beginning and end of a QSO and at least once every 30 minutes station identification is important. This takes the form of mentioning each stations callsign:

This is VE4BB in contact with VE7DD

At the end of an QSO, the simplest station identification takes the following form:

VE7DD this is VE4BB

Where VE4BB has just finished the QSO and is handing it back to VE73DD.

ENDING A CONTACT

Try to end contacts cleanly and keep the number of 'final-finals' to a minimum; this makes it easier for other stations who might want to call one of those about to depart. Once salutation and goodbyes have been said there are many ways amateurs end a contact, below is just a few:

this is VE4BB clear and listening…73

this is VE4BB clear

this is VE4BB bye

VE4BB is now clear and going QRT

On CW, the use of 73, BCNU, CUL, CUAGN and other abbreviations are used.

EMERGENCY PROCEDURES

Distress Signal

Use of the distress signal indicates that a ship, aircraft or person is threatened by grave and imminent danger and requires immediate assistance. The CW (telegraphy) distress signal consists of the group

ditditditdahdahdahditditdit (SOS), transmitted as a single character. The phone (voice) distress signal consists of the word '*MAYDAY*.

Distress call and message

The **distress call** consists of:

1. the distress signal sent three times;
2. the words 'THIS IS' or 'DE'; and
3. the callsign or other identification of the station in distress sent three times.

The **distress message** consists of:

1. the distress signal SOS (CW) or MAYDAY (Phone/Voice);
2. the name, or other identification, of the station in distress;
3. particulars of its position;
4. the nature of the distress and the kind of assistance required; and
5. any other information, which might be of assistance.

Obligation to accept distress traffic

A distress call or message has absolute priority over all other transmissions and may be heard on any frequency. Consequently, operators in the Amateur service should be prepared to accept such traffic at all times.

When a distress call is heard, you must:

1. immediately cease all transmissions;
2. continue to listen on the frequency; and
3. record full details of the distress message (the information should be recorded in writing and, if possible, by tape recorder).

If a distress message is received, defer acknowledgement for a short interval to see if the message has been received by a station better placed to render assistance. If the distress message is not acknowledged within a reasonable time, the Amateur operator is obliged to assist.

Notifying Appropriate Authority

After acknowledging or attempting to acknowledge receipt of the distress message, you should immediately forward details of the distress situation to:

1. for land based distress situations - the nearest police station by calling 911 and asking for the police;

2. for air or sea based distress situations - Joint Aeronautical and Maritime Rescue Coordination Centres The telephone number is 1-800-267-7670 These lines are open 24 hours; or

3. any other appropriate authority.

You should resume listening and keep the respective Authority informed of any developments. Any assistance practicable should be given until cessation of distress traffic is announced by means of the operating signals 'QUM' in CW or 'SEELONCE FEENEE' in phone, or until you are advised that assistance is no longer required.

Urgency Signals

In cases where the use of the distress signal is not fully justified, the 'URGENCY' signal may be used. In CW (telegraphy), the urgency signal consists of three repetitions of the group ‘XXX’, sent with the letters of each group and the successive groups clearly separated from each other. It shall be transmitted before the call.

In phone (voice), the urgency signal consists of the group of words 'PAN PAN’, each word of the group pronounced as the French word 'panne'. The urgency signal shall be repeated three times before the call.

The urgency signal has priority over all other transmissions except distress. All stations hearing an urgency signal should:

1. ensure that they do not cause interference to the transmission of the message that follows; and

2. be prepared to assist if required.

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- http://www.aca.gov.au/aca_home/publications/reports/info/regs.htm
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- Amateur Radio Magazine, June 1996.
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9. Convincing Governments and the Public about the benefits of Amateur Radio

The five main benefits that we can use to convince governments and the public are:

1. Amateur Radio is an emergency communication capability in times of crisis;

2. It's a non-commercial experimental radio communications service with a great history and tradition of home experimentation and self-education;

3. There are intergenerational benefits through the provision of self-training, development and communications environment for future electronic and communications engineers;

4. Amateur Radio promotes international relations and friendship; and,

5. Amateur Radio provides recreational and leisure activity that improves the well being of community including the aged and disabled.

The following sections focus on the emergency communications and international relations aspects of our hobby. Chapter 11 considers some of the other benefits.

EMERGENCY COMMUNICATION CAPABILITY:

In times of emergency the amateur service has the capacity to provide a flexible range of communications services including voice and data over short, medium and long distances using both portable, mobile and fixed installation equipment. Some examples of emergencies include fires, floods, tornados and terrorist attack. Amateur radio operators and stations are found throughout Canada and the world providing a flexible, multi-path, multi-band network of stations.

The ability to use a range of bands, modes, antennas and usually greater power gives the average amateur station a much greater capability than most purpose built commercial services. The equipment is operated by licenced amateurs who are knowledgeable and skilled in the technology which, they use and able to employ this skill to maintain and improve a communications capability when required.

The RAC sponsors its own province based emergency radio service called the Amateur Radio Emergency Service (ARES) which, provides a pool of skilled and trained operators and technicians. In Manitoba, these operators hone their skills through providing high quality communication services to events like Sled Dog Races and the Manitoba Marathon.

Where a major disaster occurs it is not unusual to hear Amateur Radio operators are assisting the authorities with communications. The recent terrorist attacks on the World Trade Centre provide a good example. Two dozen or more volunteer amateurs from the New York Amateur Radio Emergency Service and Radio Amateur Civil Emergency Service (RACES) provided 24/7 covering communications and logistical support for the New York City Office of Emergency Management, the American Red Cross and the Salvation Army using a 2 metre repeater network. During the crisis more than 800 hams volunteered over 15,000 work hours.

As amateur operators we are responsible citizens who are always willing to provide our equipment and services at no cost to the community.

A good Manitoba example is the 1997 "Flood of the Century". Many mobile and portable amateurs operators were involved, along with fixed installation amateur operators, in providing radio communications various agencies including; City of Winnipeg Water and Waste Department, City of Winnipeg Emergency Operations Centre, City of Winnipeg Emergency Operations Centre, Manitoba Emergency Measures Organization and all the local governments in the affected flood areas. Check the follloiwng web site for more info - http://www.winnipegares.ca/flood.htm For more information on ARES check out http://www.rac.ca/fieldorg/racares.htm

INTERNATIONAL RELATIONS

This hobby of ours frequently crosses international boundaries through the use of HF bands, satellites and more frequently, IRLP systems.

It was recognised back in 1925 that Amateur Radio needed a global voice and some far-sighted amateurs from 25 countries established the International Amateur Radio Union (IARU) at the first meeting in Paris. In 1927 the IARU won the right to use substantial HF spectrum most of which we still have access to. Today the IARU has 150 national associations, including RAC, representing amateurs from almost all countries of the world and is recognised as the voice of amateurs by the International Telecommunications Union (ITU).

The ITU is a specialised agency of the United Nations and coordinates international standards, regulations and promotes the efficient use of the electromagnetic spectrum. The ITU has 188 member countries and runs biannual World Administrative Radio Conferences (WARC) where a range of matters are discussed and decisions are made affecting the spectrum that is vital to our hobby. RAC has been involved in these WARC conferences for many years and they take the interests of Canadian amateurs to these conferences. The conference happens every three years with the next one is in 2006.

It is not unusual for an amateur to contact a number of amateurs in other countries during a session on the air and many long and enduring friendships have been established through Amateur Radio contacts. Exchanges commonly include information about the location, the weather and climate, lifestyles, travel plans as well as the usual technical information and signal reports. In many cases this can lead to travel and the hospitality of Canadian amateurs is widely acknowledged, giving tourism a boost potentially for both countries.

In times of disaster in other countries, Canadian amateurs have provided emergency communication services and in some cases, they actually travelled to the country to assist with communications. Marine emergencies in international waters have seen amateurs handle traffic between the vessel and the authorities where amateur equipment was the only communication means. There are cases where the relaying of emergency medical information has saved lives and arranged for the delivery of medicines and help.

The international goodwill that is built up by Amateur Radio operators cannot be under estimated. How many hobbies can boast that you talk and exchange ideas and information with people from all over the world on a regular basis?

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- http://www.hudson.arrl.org/

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10. Space Communications:

The following chapter focuses on amateur space communications. To begin there is a short history lesson on amateur satellites, or "birds" as they are often called.

There is a little known fact that the story of AMSAT actually began in Australia. A group of University of Melbourne students created an amateur satellite to evaluate the suitability of the 10 metre Amateur Radio band for future satellite transponders and demonstrate the feasibility of controlling a spacecraft via uplink commands. Unfortunately, the completed satellite languished as launch delay followed launch delay and a group of amateurs with space-related experience in Washington DC met and formed what initially became known as the East Coast Project OSCAR which stands for Orbiting Satellite Carrying Amateur Radio. This was all going on around the same time as the Russian Sputniks and American Explorer satellite race was occurring in the early 1960s. These first OSCAR's were constructed by interested and experienced amateurs in their garages and basements and piggy-backed on to commercial satellites to get them into orbit.

AMSAT, The Radio Amateur Satellite Corporation was born as an educational corporation in the District of Columbia on March 3, 1969. One of its first tasks was to arrange for the launch of OSCAR 5 (later to be called Australis-OSCAR 5, or simply AO-5), which was successfully launched on a NASA vehicle in 1970. AO-5 was the satellite constructed by University of Melbourne students and they tested amoung other things the innovative idea of passive magnetic attitude stabilisation using two bar magnets to align with the earth's magnetic field, a first at this time in satellite development.

There is a rough classification scheme for amateur satellites. Phase I designs comprised the low earth orbit (LEO), short lifetime, predominantly beacon-oriented satellites. Phase II series OSCAR's are LEO "birds" but launched into higher orbits and are designed to last longer. These include ue, packet radio systems and digital modes. This category includes the MICROSAT's that are designed to carry one or more store-and-forward digital transponders. This category makes up the bulk of the nearly 20 AMSAT satellites currently in orbit. Phase III satellites are designed for high elliptical orbits first pioneered by the Soviet Union. This high orbit offer users longer access time through being available to whole hemispheres, higher power and more diverse communication transponders. This includes the most complex amateur satellite to date, the AO-40 (Phase 3D) satellite which is currently being commissioned.

Much of the experimentation and development of low earth orbiting satellites was originally pioneered by hams and many techniques are now adopted in the commercial satellites orbiting today.

There are many different modes that amateurs from around the world use for space communications, these include voice, digital modes, bulletin boards, store and forward systems, image transfer and monitoring systems. These are used when communicating not only with satellites. Communication can be with the International Space Station (ISS), and the more adventurous amateurs even bounce their signals off meteor trails, auroras, the moon, and even the ion trail behind a re-entering Space Shuttle. How many hobbies can boast they can communicate via the ISS or a satellite for that matter!

Many space related communications techniques have seen the development of equipment and software by amateurs who have an interest in this area. A current example is weak signal meteor scatter techniques and the work done by Joe Taylor K1JT in developing the WSJT (Weak Signal communications by k1JT).

NASA and the Russian space agency use Amateur Radio as a recreational activity on their missions and a permanent station has been setup on the ISS and there used to be an active station on the de-orbited Russian space station MIR. Many students from around the world who have taken part in contacts with astronauts using amateur space communications systems. McKenzie Public Almonte School took part in a question and answer session with an astronaut on the space station and provided people with an experience they will not forget and this was achieved all with Amateur Radio.

Australian Amateur Radio operators have one of the highest participation rates of any country in the area of space and satellite communications and this has lead to Australian amateurs being invited to talk at conferences and planning workshops and many routinely participate within the AMSAT organisation.

Speaking personally there was a special buzz when I heard my first satellite beacon (RS-12) that led me to my first contact and now I've caught the bug and am experimenting with the more difficult to contact satellites. Recently, I was fortunate enough to have demonstrated to me the usage of AO-40 using the 2.4GHz/70cm voice and digital modes from a good friend David, VK5DG. The high (40-60,000km) elliptical orbit of AO-40 means the satellite footprint is almost a whole hemisphere providing a long window of opportunity and Dave has contacted many countries using AO-40 and is furthering his knowledge and skill in satellite communications and providing valuable RUDAK satellite monitoring information back to AMSAT.

I have included the following section verbatim from the history of AMSAT document, as I believe it sums up what Amateur Radio is all about:

"The story of AMSAT is one of simplicity, selfless donation of time and resources, and a pioneering spirit. The Amateur Radio Operators of Project OSCAR, and their later counterparts in AMSAT, have built and launched over 30 OSCAR satellites since 1961. Their efforts are largely responsible for many of the commercial satellite technologies we take for granted today.

Many people may scoff at a bunch of "amateurs" who work in their basements and garages to build space satellites. However, the past and present volunteers of AMSAT are "amateurs" only in the sense that the Wright Brothers, Marconi or Robert Goddard were "amateurs". The latter were pioneers who used available materials and creativity to design, build and operate devices whose modern day counterparts we now take for granted.

For the past 25 years international AMSAT groups have played a key role in significantly advancing the state of the art in the space sciences, space education and space communications technology. Undoubtedly, the work now being done by AMSAT's volunteers throughout the world will continue to have far reaching, positive effects on the very future of Amateur Radio communication, as well as other governmental, scientific and commercial activities in the final frontier.

There are over 20 operational amateur satellites now orbiting the Earth and they are a living testament to the spirit and vision of AMSAT's membership. Rarely has a group of volunteers managed to do so much ...for so many...with so little."

References:

Material used from the following sources:

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11. Pressures and Issues Impacting on the Hobby:

What are the pressures, issues and challenges confronting Amateur Radio and where are the opportunities?

I am sure that you can think of many that you may have personally experienced. The following list is by no means exhaustive but, it does give a small sample of the some of the issues that confront this hobby and the practitioners:

TECHNOLOGICAL PRESSURES:

- Why do you need radio if we have a Cell phone or a CB/FRS radio or the Internet?

- Broad band power-line transmission modes have and are being developed that effectively blanket the lower HF bands in the local area of usage;

- Low Interference Potential Devices (LIPDs): these devices interfere with the UHF bands and although are intermittent devices they do have the potential to trigger and interfere with repeaters. The same problem we occasionally have with pagers in the low end of the 2 metre band;

- Computers and the Internet can be used for a wide range of things ranging from logging, packet wormholes, linking of repeaters, eQSL, email, digital modes and information sharing. Again, this adds another level of technical complexity to a shack, as hams need to be aware and proficient in a range of different information technology skills if they are wish to use computers in the shack.

TECHNOLOGICAL CHALLENGES

Those technological pressures are not really an issue:

- Cell phones and CB/FRS radios are particular types of communication devices and have their place in the spectrum but, if you think about it, most Cell phones only cover the same area as low power UHF transceivers and you need to be within a cell to work. In two words it is coverage and cost. This is not much more than line of sight and calls cost you each time you use the device. CB

whether it's UHF or HF, have regulations covering power and therefore have range limitations as well.

- The network of networks called the Internet has already proven to be a wonderful tool and platform for Amateur Radio. In true experimenting spirit, amateurs have created packet radio wormholes, linked repeaters enabling novice and limited licence holders to communicate worldwide, eQSL for quicker and safer QSL exchange, information sharing via email, newsgroups for exchanging and sharing information like DX windows and many different digital modes have all been enabled through the use of the internet. Computers are crucial to all the above activities and many amateurs are self-taught in this technology and use it to experiment and further the hobby. The number of hams using computers and the level of Amateur Radio activity on the internet conclusively proves that, in the true spirit of experimentation, ham radio operators are embracing this technology and using it for the betterment of the hobby.

- Low Interference Potential Devices (LIPDs) are like hams, valid users of the spectrum and as technology advances these devices are only going to increase as wireless high-speed networks, spread spectrum and other wireless devices become popular and more are installed. This presents a challenge for ham radio. As experimenters we need to find technical solutions that can overcome any interference problems. As amateurs we overcame the problem with pagers in the 2 metre band and we will have to find solutions to LIPDs and other wireless devices in the future;

- A more insidious issue is the use of broadband power-line transmission modes (BPL) that have the potential to blanket the lower HF bands in the local area of usage. This challenge needs to be approached from another angle. Using technical expertise, Amateur Radio operators have the ability to present a case to the regulating bodies to clearly demonstrate the detrimental effect this type of system can have on parts of the hobby and try to have the regulations changed;

SOCIAL PRESSURES:

- Young people today are exposed to many different and competing interests and possible hobbies ranging from the Internet, games, sport, school, scouts/girl-guides, cadets, etc. How to attract young people is a major issue we need to work on.

- It is acknowledged that the working population is now working longer hours than previous working generations. This means that leisure and recreational time has been reducedto the detriment of any hobby. Include into this mix are some family commitments and this makes the time available for playing Amateur Radio even less;

- An ageing population means we have greater numbers of retirees. These people are usually time rich. If these people could be attracted to the hobby, their time contribution alone would be invaluable. For those retirees who are becoming increasingly immobile, ham radio provides a hobby that enables communication with the world without having to travel;

- Generation X are the 18-35 year olds who have grown up in a post baby boomer era. These people are more interested in a challenge, not preoccupied with security of employment. They work to get a life and they embrace technology and telecommunications. These people are the future managers and leaders in the community: if it's not interesting then they are not interested;

- Ham radio is one of the few hobbies that is open to the disabled. Equipment can be operated from a bed or wheelchair, many modes do not require speech, visual or audible recognition;

SOCIAL CHALLENGES

The social pressures are a little more challenging but not insurmountable!

- The key to marketing Amateur Radio to young people is to find out what interests them and attempt to focus on that to attract them to the hobby. If it's the Internet, then demonstrate how we use the Internet to experiment and communicate. Another way is the use of regular events like Jamboree on the Air (JOTA) for Scouts and Guides. Demonstrating amateur TV (ATV), satellite techniques, packet radio and IRLP that are all modes that most people, young and old, would not immediately associate with ham radio. During the recent International Space Station conversations, Canadian Schools demonstrated the potential of Amateur Radio. Amateur radio self-training and development has the capacity to kick-start a young person's career in the world of electronics, radio and engineering;

- RAC has recently developed the Youth Education Program to encourage Amateur Radio as an innovative way of learning in schools across Canada, and a good way to make connections across the curriculum. The RAC Youth Education Program will provide financial and personal support to teachers and schools in all regions of the country. Teachers who wish to include an element of radio technology in their classroom programs will be eligible for assistance in acquiring the necessary equipment, books and other resources. The ultimate goal of the Program is to:

    - encourage young people to look to the sciences and technologies for possible career and personal development;

- provide for the revitalization and growth of Amateur Radio with an infusion of young people.

- Much like the younger people, the generation Xers, the 18-35 year olds are more interested in a challenge and what the advantage is for them. The big advantage we have with Amateur Radio is that our hobby is technology-based and GenXers embrace technology and telecommunications. Therefore, to attract them we need to market the hobby for its cutting edge experimentation in areas like satellites (AO-40), meteor scatter, spread spectrum and Automatic Position Reporting System (APRS);

- Promoting Amateur Radio and attracting an aging population is a priority as retirees are usually time rich and their time contribution alone would be invaluable;

- For the disabled, including the blind and deaf, Amateur Radio can provide a hobby through a range of modes and technology that enables communications with people both locally and internationally. Not too many hobbies can boast that!

- Finally one of the hardest issues to address is the requirement for a three-way balance that needs to be struck between our working life, our family life and our hobby.

- Unemployment does not preclude involvement in the hobby of Amateur Radio and in fact could provide useful supplemental experience for the gaining of a job. Homebrewing and second hand equipment is a cheap alternative to getting into the hobby.

POLITICAL PRESSURES:

- From the introduction of Cell phones the Government has seen the potential of leasing and selling radio spectrum. This tradable commodity is commercially lucrative for the Government and in comparison to Amateur Radio where we use reasonable amounts of the spectrum; the Government only gets a small return. How do we justify to the Canadian taxpayer our allocation of spectrum for virtually no payment?

- Recently the Electro Magnetic Radiation (EMR) regulations (Safety Code 6) have been introduced. These regulations realise that radio frequency (RF) radiation can have a detrimental effect on human beings although what level is dangerous is still under debate. These regulations add yet another layer of restrictions that ham radio operators need to be aware of;

- Many local governments have planning regulations that impact on the erection of antenna towers and antennas. These regulations are yet another potential issue that amateurs need to address when playing radio;

POLITICAL CHALLENGES:

- Progressive governments have seen the potential of leasing and selling radio spectrum. The Spectrum Management, a department of Industry Canada in the late 90s dropped the License fee requirement for the Amateur Radio service. Will Industry Canada still back up the regulations for the Amateur Service now that we are no longer paying a yearly license? How about spectrum auctions now that the spectrum we use is considered to be a tradable commodity that can be commercially lucrative for the government of the day. This is not a new concept as Marconi even encountered this in the 1920! However, the issue confronting Amateur Radio is how do we justify to the Canadian taxpayer such a generous allocation of spectrum for virtually no payment. One response is to demonstrate the five-fold benefits that the amateur service brings to the community. These benefits are:

    1. Amateur Radio is an emergency communication capability in times of crisis.

    2. Amateur Radio is a non-commercial experimental radio communications service with a great history and tradition of home experimentation and self-education that in many cases has led to the development of vital new technology;

    3. Amateur Radio offers intergenerational benefits through providing a self-training, development and communications environment for future electronic and communications engineers;

    4. Amateur Radio enhances international relations and friendship; and,

    5. Amateur Radio offers recreational and leisure activity that improves the well being of communities including the aged and disabled.

- Another political challenge facing the amateur service is increased regulation of various aspects of the service, two examples are:

    1. Governments are responsible for the regulation of spectrum and the associated equipment. This is evident in the newly introduced Electro Magnetic Radiation (Safety Code 6) regulations. These regulations realise that radio frequency radiation can have a detrimental effect on human beings although what level is dangerous is still under research.

Although these regulations add yet another layer of restrictions that ham radio operators need to be aware of, they are put in place to protect the users and the public from a potential risk. For most of the amateur service these regulations will not affect them greatly and most higher power uses are already aware of the potential risks involved and take suitable action;

2. Many local governments have planning regulations that impact on the erection of antenna towers and antennas. These regulations are yet another challenge that amateurs need to be aware of and conform with when playing radio. This challenge provides the necessity for invention and experimentation. Many new and creative solutions have been designed in response to a lack of space or lack of height, etc, especially in city environments. With the advent of IRLP, the necessity for HF communication has diminished somewhat. This is another area where the experimenting spirit of the amateur service has and will continue to flourish.

ECONOMIC PRESSURES:

- Many radio communication companies produce “all singing all dancing” rigs that have an “all singing all dancing” price tag. The general public then see Amateur radio as a cheque book hobby where the main limitation is the amount of money you are prepared to spend.

ECONOMIC CHALLENGES:

- The general public potentially see Amateur Radio as a "*cheque book*" hobby where the main limitation is the amount of money you have and are prepared to spend. This could not be further from the truth. Home-brewing and experimentation is alive and well and effectively means that you do not have to spend vast amounts of money on the hobbyto get equal, if not more enjoyment from it. The Amateur Radio service has a great history of re-building and modifying existing equipment. This was prevalent after World War II when surplus defence equipment became available. Older models, second hand and pre-loved equipment are all cheaper options for people wanting to get into Amateur Radio with limited financial resources. I still use a couple of 1970/80s rigs for HF that I bought cheap and they still go very well. Home brewing is an even cheaper option that also provides a great learning and self-education environment. I still remember my delight at getting my first crystal set going then my first transistor radio going and my first computer program going and that

continues to instil a love of home-brewing. In fact, I would prefer to make it than buy it.

- Home-brewed, second hand and pre-loved equipment are all options for people wanting to get into Amateur Radio with limited financial resources.

  I am sure that you have all personally experienced some of the issues/pressures! Well don't get too depressed, with each pressure/issue that confronts us there are equally if not more opportunities and ways we can address these challenges.

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12. Strategic Positioning of Amateur Radio

In times of need the amateur service has come to the aid of many people, organisations and causes. When World War II broke out there was a need for skilled radio people to operate and maintain defence radio equipment. Amateurs filled this need and also instructed others on operating and maintaining this equipment.

One such person was Max Loveless VK7ML. He was an amateur before WWII and became involved in the war as a signals operator with "Sparrowforce" on Timor with the AIF. With the Japanese invasion a group of about 200 Australian soldiers became trapped. Max was able to cobble together from damaged radio sets a CW transceiver that enabled them to contact Darwin and arrange a rescue. This transceiver became known as "Winnie the War Winner" and is in the War Memorial in Canberra.

In a little known operation during the Gulf War, Amateur Radio operators were clandestinely conveying intelligence from Kuwait to the UN controlled forces by amateur packet radio.

The recent terrorist attacks proved yet again that the Amateur Radio service is willing, ready and able to assist the authorities with communications in times of need. More than 800 hams volunteered in excess of 15,000 work hours to provide a 24/7 service that covered communications and logistical support for the New York City Office of Emergency Management, the American Red Cross and the Salvation Army using a 2-metre repeater network. September 11, 2001 as with wars and many natural disasters within Canada and the world have provided evidence of the strategically important nature of Amateur Radio. Even the President of the United States and many US State Governors have recognised and allocated weeks and months to Amateur Radio appreciation and awareness.

The ARRL is capitalising on the creation of the Office of Homeland Security in the United States. It sees its role as providing services in three main areas:

1. Monitoring – including programs to monitor the amateur bands through intruder watch and radio direction finding techniques;

2. Communications – on long range (HF and satellite) and short range (VHF/UHF) and provide amateurs and short wave listeners with news and bulletins in time of emergency. There are many nets that are available for relaying messages across the provinces and the world, if necessary; and

3. Human Resources: The amateur service has considerable capabilities with telecommunications especially with radio.

This will enable the Amateur Radio service within the United States to become more involved in emergency service provision and further raise the profile of the amateur service with the emergency authorities, government and the community. The Canadian counterpart is Critical Infrastructure Protection and Emergency Preparedness (OCIPEP) and Canadian hams are very much involved in providing emergency communications.

If you think about it, the amateur service has a strategic importance by the very fact that:

1. We can operate either fixed or mobile from locations in most inhabited parts of Canada and the world. That alone is one very impressive network;

2. We can operate multi-band – thus overcoming many potential propagation, interference and equipment limitations issues;

3. We can operate multimode – again being able to send voice and data at a range speeds and modes like:

   - ATV;
   - Space communications (voice, digital, EME, meteor scatter);
   - Packet;
   - modes (CW, SSB, DSB, AM, FM);
   - Digital Modes (PSK, Hell Schreiber, APRS, etc);
   - Repeaters/IRLP;
   - QRP;
   - ARDF;
   - And more.

4. As amateurs, we have the skills and knowledge to analyse, adapt and adjust equipment and antennas to take advantage of the conditions, location and circumstances during fixed, mobile and portable operation; and

5. Many of us design, build, program and experiment with many forms of Amateur Radio equipment to support, maintain and progress our hobby.

And,if you think about it, there must be something in this Amateur Radio thing! Most countries allow Amateur Radio use and support the worldwide and regional band plans and to support this, the ITU has allocated 300 different radio prefixes exclusively for Amateur Radio use throughout the world.

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13. Summary

In summary, our hobby is **an experimental radio communications service.**

We design, build, operate and modify the equipment we use. Our hobby is a non-commercial leisure and recreational activity. There are self-training and educational benefits, community and emergency service opportunities and of course there is the friendships and camaraderie.

There are many **pressures that impact on our hobby.** These include Cell phones, CB/FRS, the Internet, LIPDs, power line transmission methods and there are not too many shacks these days that don't have a computer in them. We are having difficulty attracting young people to the hobby, the working population is working longer hours and consequently there are less leisure hours. We have an ageing population with a greater number of retirees and a generation of 18-35 year olds that just aren't interested.

If that's not enough the government is consideringour spectrum as a money spinner. EMR regulations have to come into force and trying to put up a tower these days means negotiating with the local council planning regulations.

Although the above are pressures they also create **opportunities and challenges.**

Depressed, Don't be! There's a silver lining to be found through the ingenuity and challenges that have kept the amateur service going all these years. Cell phones and CB/FRS are fine for short distances. However, we have a greater number of bands, modes and power levels than these services provide. Computers and the Internet are being embraced as a great tool to further our hobby. Greater interference creates more ingenious solutions and this is where the technical ingenuity of the amateur service can deliver solutions.

Marketing of Amateur Radio needs to change to appeal to a generation that is now being bombarded with, amongst other thing, the Internet. Retirees are the un-tapped resource of the Amateur Radio service and are usually time-rich and less mobile. We need to prove to successive governments that the amateur service provide an emergency communications capability. We experiment, self educate and provide intergenerational benefits through training and development opportunities to our young people and we increase the well being of the communityby providing a recreational and leisure activity.

The **international goodwill** that is built up and maintained by Amateur Radio operators cannot be underestimated. How many hobbies can boast that you talk and exchange ideas and information with people from all over the world on a regular basis?

In times of emergency the amateur service has the capacity to provide a flexible range of **emergency communications services** including voice and data over short, medium and long distances using both portable, mobile and fixed installation equipment. Some examples of emergencies include fires, floods, tornados and terrorist attack.

We have a substantial **space communications capability.** Starting in the 1960s the first OSCAR's were constructed by interested and experienced amateurs in their garages and basements and piggy-backed on to commercial satellites to get them into orbit. Much of the experimentation and development of low earth orbiting satellites was originally pioneered by amateurs and many techniques are now adopted in the commercial satellites orbiting today. Experimentation has progressed to create highly complex high elliptical orbit satellites.

Space communication can utilise many modes and the more adventurous amateurs even bounce their signals off meteor trails, auroras, the moon, and even the ion trail behind a re-entering Space Shuttle. How many hobbies can boast they can communicate with the ISS or through a satellite! Canadian Amateur Radio operators have one of the highest participation rates of any country in the area of space and satellite communications.

Amateur radio is of strategic importance and needs to be fostered and developed. In times of need the amateur service has come to the aid of many people, organisations and causes. World War I and II saw many amateurs become signals operators and technicians. There are many stories of amateurs who played special roles in rescues and intelligence operations during the war.

The recent terrorist attacks proved yet again that the Amateur Radio service is willing, ready and able to assist the authorities with communications in times of need. September 11, as with wars and the many natural disasters within Cabada and the world have provided evidence of the strategically important nature of Amateur Radio.

The strategic importance of the amateur service lies in the fact that:

1. We can operate either fixed or mobile from locations in most inhabited parts of Canada and the world. That alone, is one very impressive network;

2. We can operate multi-band – thus overcoming many potential propagation, interference and equipment limitations issues;

3. We can operate multimode – again being able to send voice and data at a range speeds and modes;

4. As amateurs we have the skills and knowledge to analyse, adapt and adjust equipment and antennas to take advantage of the conditions, location and circumstances during fixed, mobile and portable operation; and

5. Many of us design, build, program and experiment with many forms of Amateur Radio equipment to support, maintain and progress our hobby.

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14. CONCLUSION

Our hobby has come from a long history of experimentation, self-education and home brewing; I quote a paragraph from the 1930, sixth edition of the ARRL Handbook:

"When Marconi announced that is was possible to send messages without wire and proved it by transmitting the letter "S" across the Atlantic Ocean, the older heads murmured in awe and consulted their Bibles. Our youthful electrical experimenters, on the other hand, perceived immediately that here was something a hundred-fold more engrossing than "electricity". With one voice they asked, "How does he do it?", and with one purpose of mind they proceeded to find out for themselves. At least one American amateur had a receiver built at the time of the first Trans-Atlantic experiment, nor was his enthusiasm in any degree dampened by its failure to perform.

Enter, Amateur Radio!"

Many of the pressures that impact on our hobby have been around from the start and again I quote from the 1930 ARRL handbook:

"Legislation has always been the arch enemy of the amateur. We have already seen that but for human erring on the part of the early lawmakers in 1912, the first encounter with this formidable antagonist would have likely ended in virtual extinction…Grumblings and dark glances greeted moves on the part of the Radio Inspectors to get amateur stations down to at least 220 meters in 1921 and 1922…A menace of another kind put in its appearance during 1926 and 1927. There appears a tendency on the part of municipalities to create city ordinances restricting local amateur operation."

Yet the amateur service has thrived, developed, embraced and overcome many of the challenges presented. The old adage could not be closer to the truth *"necessity is the mother of invention"* and the ingenuity and skill demonstrated by many in the amateur service will continue to underpin the hobby's future.

In other parts of the world the focus of the amateur service is shifting more to the communications capability that they can provide to the authorities in times of emergency and from a strategic perspective this is the definite strength of the amateur service.

AMSAT has consistently been at the leading edge of amateur satellite development and has again proven how much the amateur service can do with limited resources, primarily volunteer home-brewers and provide a service to the worldwide amateur community.

I don't know about you but if you look through the historical binoculars at what has been, what exists and the potential created, then the future, although it may be a little uncertain, is definitely exciting.

73 and thanks for reading.

VK7TW de Justin. – *Originating Author*

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Acronyms and Terms

The following table is by no means exhaustive however; it does give a ready reference to the more common acronyms and terms used within the hobby.

Acronym/ Term	Description
73	Best Regards
ADSL	Asymmetrical Digital Subscriber Line
AM	Amplitude Modulation
AMRAD	Amateur Radio Research Development Corporation
AMSAT	Radio Amateur Satellite Corporation
AMTOR	Amateur Teleprinting Over Radio
AOCP	Amateur Operators Certificate of Proficiency
APRS	Automatic Position Reporting System
ARDF	Amateur Radio Direction Finding
ARES	Amateur Radio Emergency Service
ARRL	American Radio Relay League
ASCII	American Standard Code for Information Interchange
ATU	Automatic Tuning Unit
ATV	Amateur TeleVision
AX-25	Amateur X.25 Protocol
Barefoot	Unamplified
BFO	Beat Frequency Oscillator
BNC	Coax connector commonly used with VHF/UHF equipment
CTCSS	Continuous Tone Controlled Squelch System
CB	Citizen Band
CQ	General call to all stations
CW	Continuous Wave (Morse code)
dB	Decibel
dBi	Decibels over isotropic
DSB	Double Side Band
DTMF	Dual Tone Multi Frequency
DX	Distant Station Reception
DXer	A person who engages in the hobby of distant radio/television reception
DXing	The hobby of listening to distant radio or television signals
DXpeditions	DX Expeditions (trips to the boonies by radio listeners)
EHF	Extremely-High Frequency (30-300GHz)
EIRP	Effective Isotropic Radiated Power

EME	Earth-Moon-Earth (usually refers to moon bounce experiments)
ERP	Effective Radiated Power
FAQ	Frequently Asked Questions
FAX	Facsimile
FM	Frequency Modulation
FRS	Family Radio Service
FSK	Frequency Shift Keying
FSK441	Frequency Shift Keying at 441Hz used mainly for meteor scatter
GHz	Gigahertz
GMT	Greenwich Mean Time (has been replaced in most applications by UTC)
GOES	Geostationary Operational Environmental Satellites, US geostationary weather imaging satellite constellation
GPS	Global Positioning Satellites
HEO	High Earth Orbiting satellite
HF	High Frequency (3-30Mhz)
Hz	Hertz
IC	Industry Canada
IARU	International Amateur Radio Union
IF	Intermediate Frequency
IRC	International Reply Coupon
IRLP	Internet Repeater Linking Project
ITU	International Telecommunication Union
ISS	International Space Station
kbps	Kilobytes per second
kHz	Kilohertz
km	Kilometer
kW	Kilowatt
LEO	Low Earth Orbiting satellite
LF	Low Frequency (30-300kHz)
LIPD	Low Interference Potential Devices
LSB	Lower Sideband
LW	Longwave (150-300 kHz)
mA	Milliampere
mA/h	Milliampere per hour
MF	Medium Frequency (300-3000kHz)
MFSK	Multi Frequency Shift Keyed
MHz	MegaHertz
ms	milliseconds
MSK	Minimum Shift Keying
MUF	Maximum Useable Frequency
mW	Milliwatt

MF	Medium Frequency (0.3-3 MHz)
MW	MegaWatts
NAOCP	Novice Operators Certificate of Proficiency
NiCd	Nickel Cadmium Battery
NiMH	Nickel Metal Hydride battery
Packet	Amateur radio error correcting mode
PACTOR	Teleprinter system that combines certain aspects of Packet and SITOR.
PAL	European TV broadcasting standard utilizing 625 scanning lines
PSK	Phase Shift Keying
PTT	Push To Talk keying method
QRA	The name of my station is ...
QRM	Interference from another station
QRN	Interference from natural sources (i.e. lightning, etc) or from man-made sources other than radio stations (ignition noise, vacuum cleaners, etc)
QRP	Low power operation
QSL	A card or letter confirming reception of a radio station
QSO	Communications between two or more stations
QTH	Location
RAC	Radio Amateurs of Canada
Rcvr	Receiver
RDF	Radio Direction Finding
RF	Radio Frequency
Rig	Term used for transceiver/transmitter/receiver
RSGB	Radio Society of Great Britain
RST	Readability/Strength/Tone Scale: **Readability** 1 unreadable 2 barely readable, occasional words distinguishable 3 readable with considerable difficulty 4 readable with practically no difficulty 5 perfectly readable **Signal Strength** 1 faint weak signals barely perceptible 2 very weak signals 3 weak signals 4 fair signals 5 fairly good signals 6 good signals 7 moderately strong signals 8 strong signals 9 extremely strong signals

	Tone 1 Fifty cycle a.c. or less, very rough and broad 2 Very rough a.c, very harsh and broad 3 Rough a.c. tone, rectified but not filtered 4 Rough note, some trace of filtering 5 Filtered rectified a.c.but strongly ripple-modulated 6 Filtered tone, definite trace of ripple modulation 7 Near pure tone, trace of ripple modulation 8 Near perfect tone, slight trace of modulation 9 Perfect tone, no trace of ripple or modulation of any kind
RTTY	Radioteletype
Rx	Receiver
SASE	Self Addressed Stamped Envelope
S - band	Microwave frequencies above UHF
SINAD	Signal to noise and distortion ratio
SINPO S - Meter	A code system used by radio hobbyists to indicate how well a station was received: S=Strength, I=Interference, N=Noise, P=Propagation, O=Overall Signal Strength Meter
S/N Ratio	Signal – to - Noise Ratio
SPST	Single Pole Single Throw (switch)
SQL	Squelch
SW	Shortwave (high frequency HF)
SWR	Standing Wave Ratio
SHF	Super-High Frequency (3-30GHz)
Sporadic E	E layer ionospheric propagation
SSB	Single Side Band
TCP/IP	Transmission Control Protocol/Internet Protocol
TNC	Terminal Node Controller
TOR	Teleprinting Over Radio
TVI	Television Interference
Tx	Transmit
UHF	Ultra-High Frequency (300-3000MHz)
UTC Vac/VAC	Universal Time Coordinated Volts Alternating Current
Vdc/VDC	Volts Direct Current
VF	Voice Frequencies (3-30 kHz)
VFO	Variable Frequency Oscillator
VHF	Very High Frequency (30-300MHz)
VLF	Very Low Frequency (3-30kHz)
VOX	Voice Operated Relay
VSWR	Voltage Standing Wave Ratio
WARC	World Administrative Radio Conference

wpm	Words Per Minute
WWV	National Bureau of Standards Time Station, Ft. Collins, CO
WWVH	National Bureau of Standards Time Station in Hawaii
WWW	World Wide Web
Zulu	Military time zone (same as UTC)

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