

From the Gavel...



September, what a month! After a 2 month summer hiatus, we were inundated with a flurry of activity. It seemed like we crammed a year's worth of activities into 30 days.

Between preparing for the ARES SET, Halton Railway, Open House, Education Classes and club station setup, it was enough to make your head spin!

Dan VE3NI and Michael VE3TKI were busy preparing for the upcoming ARES Simulated Emergency Test (SET) scheduled for October 4th. They took advantage of Radio Night to provide an overview of SET activities. This included an explanation on how messages were going to be routed between the various ARES groups. A number of procedural changes were implemented this year to overcome communication issues that arose from last years SET. Dan will be reporting to the club on how the exercise went in the near future.

Bob VE3XBB organized our annual Halton Railway event. The day started out with breakfast, followed by setup and a full day of operating under warm and sunny skies. Club turn out was great and propagation was fairly good. There was ample opportunity to meet new people and showcase our hobby. Great event Bob!

Earle VE3XEL and his education team find themselves tutoring an eager group of over 20 perspective hams. This is the largest class ever. Word is getting out that if you want to be a Ham, join MARC! A number of students have already gotten their feet wet by

participating in our Halton Railway and ARES SET events. I am sure a number of these students will be keen participants in upcoming events.

Asim VE3XAP, Gerry (Danmax) and myself spent the past weekend tuning the Force 12 40m/80m monster beam. This required the use of a 60 foot platform crane. The tuning procedure for this antenna was fairly elaborate as it required mechanical adjustment of 4 large 80m coils on the elements, adjustment of 8 phone/cw coils housed in two relay boxes, and adjustment of 4 stub-like tuning elements for 40m. The movement of the antenna and platform in the wind at the 60 foot mark made this an interesting exercise. The next task will be to get the 160m dipole back up and we should be ready for the CQ WW SSB contest on October 24. We just acquired a used Orion 2300 rotor rated at 35 sq. ft. which we plan to replace the existing rotor within the near future.

One final thing to note before I close is that the Program Manager and House Manger positions have been filled. Thomas VA3TMB replaces Lorne VE3CXT as Program Manager and Murray VE3JMY replaces Bob VE3HOW as House Manager. It looks like we will be well fed and entertained. Appreciate your help guys.

73 ... Rick Brown VE3IMG

This Month

2. Commentary
3. Club Calendar
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6. The Roving Reporter
7. QSL Cards
9. RAC Application Form

Sunday Brunch

Sunday brunches are held on the first Sunday of each month. Time is 9:30AM at Shopsy's, 6986 Financial Drive Unit 5 Mississauga (at the corner of Mississauga Rd and Derry Rd). All are welcome to come out and have an opportunity to chat in an informal setting.

Club Nets

2 Metre Tuesday Night Phone Net Join in on the chatter starting at 8:30PM every Tuesday on the club repeater. Hosted by various net controllers. 145.430MHz Tone 103.5 Minus (-) offset. Contact our VHF Net Manager, **Lorne (VE3CXT)**, if interested in becoming a net controller.

75 Metre Sunday Night Net Starts at 8:30PM every Sunday. Hosted by various net controllers. Contact our HF Net Manager, **Michael (VE3TKI)**, if interested in becoming a net controller.

CLUB CALENDAR FOR 2008 - 2009

October, 2008

02 Thu Exec Meeting
04 Sat SET (Simulated Emergency Test) / ARES
05 Sun HF - 75/80 Meter Net
06 Mon Basic Class 4
07 Tue VHF/UHF - 2 Meter Net
09 Thu Club Meeting
12 Sun HF - 75/80 Meter Net
14 Tue VHF/UHF - 2 Meter Net
16 Thu Radio Night at Club Station
19 Sun HF - 75/80 Meter Net
20 Mon Basic Class 5
21 Tue VHF/UHF - 2 Meter Net
23 Thu Club Meeting
26 Sun HF - 75/80 Meter Net
27 Mon Basic Class 6
28 Tue VHF/UHF - 2 Meter Net
30 Thu ARES Meeting

November, 2008

02 Sun Sunday Brunch - Shopsy's
02 Sun HF - 75/80 Meter Net
03 Mon Basic Class 7
04 Tue VHF/UHF - 2 Meter Net
06 Thu Exec Meeting
09 Sun HF - 75/80 Meter Net
10 Mon Basic Class 8
11 Tue VHF/UHF - 2 Meter Net
13 Thu Club Meeting
16 Sun HF - 75/80 Meter Net
17 Mon Basic Class 9
18 Tue VHF/UHF - 2 Meter Net
20 Thu Radio Night at Club Station
23 Sun HF - 75/80 Meter Net
24 Mon Basic Class 10
25 Tue VHF/UHF - 2 Meter Net
27 Thu Club Meeting
30 Sun HF - 75/80 Meter Net

December, 2008

01 Mon Basic Class 11
02 Tue VHF/UHF - 2 Meter Net
04 Thu Exec Meeting
07 Sun Sunday Brunch - Shopsy's
07 Sun HF - 75/80 Meter Net
08 Mon Basic Class 12

09 Tue VHF/UHF - 2 Meter Net
11 Thu Club Meeting
14 Sun HF - 75/80 Meter Net
15 Mon Basic Class 13
16 Tue VHF/UHF - 2 Meter Net
18 Thu Radio Night at Club Station
21 Sun HF - 75/80 Meter Net
23 Tue VHF/UHF - 2 Meter Net
25 Thu Christmas - NO Club Meeting
28 Sun HF - 75/80 Meter Net
30 Tue VHF/UHF - 2 Meter Net

Provisional Schedule Below...

January, 2009

01 Thu Exec
04 Sun Sunday Brunch - Shopsy's
05 Mon Advanced Class 0
08 Thu Club Meeting
15 Thu Radio Night at Club Station
22 Thu Club Meeting
29 Thu ARES Meeting

February, 2009

01 Sun Sunday Brunch - Shopsy's
05 Thu Exec Meeting
12 Thu Club Meeting
19 Thu Radio Night at Club Station
26 Thu Club Meeting

March, 2009

01 Sun Sunday Brunch - Shopsy's
05 Thu Exec Meeting
12 Thu Club Meeting
19 Thu Radio Night at Club Station
26 Thu Club Meeting
28 Sat HAMEX 2009

April, 2009

02 Thu Exec Meeting
05 Sun Sunday Brunch - Shopsy's
09 Thu Club Meeting - Church not available
16 Thu Radio Night at Club Station
23 Thu Club Meeting
30 Thu ARES Meeting

NOTES

1. Meetings start 7:30PM at St. Thomas A Becket Church Hall, 3535 South Common Court unless otherwise noted.
2. Brunch is at 9:30AM unless otherwise noted.
3. Classes are from 7:00PM - 9:00PM at Meals On Wheels at 2445 Dunwin Drive

Visit our website: <http://www.marc.on.ca> for any updates of the calendar.

Working your first Amateur Satellite! by Tony Langdon, VK3JED

<http://www.amsat.org/amsat-new/information/faqs/langdon.php>

It is a common perception that it requires sophisticated equipment and large circularly polarised antenna arrays to work amateur satellites. While this may be true for using some of the high altitude 'birds' or on the higher bands such as 23cm, it isn't the case for all satellites. There are several low Earth orbiting satellites which can be worked with relatively simple transceivers and antennas. This article will concentrate on voice operation, as I have no experience at all with digital satellite operation.

Amateur voice satellites can be divided broadly into two groups. Firstly, there are the traditional "linear transponder" satellites. These satellites receive a specific range of frequencies (typically 40 - 100 kHz) in one band, convert them to another band using a mixing process similar to that used in a superheterodyne receiver and amplify the converted signal for transmission back to Earth. Linear transponders are capable of relaying several different signals simultaneously. More recently, some satellites have been carrying crossband FM repeaters instead of linear transponders. These repeaters are similar to their familiar terrestrial cousins in that they receive an FM signal on a specific channel, demodulate the signal and retransmit the signal on a new frequency. Unlike linear transponders, but like conventional FM repeaters, these satellites can only carry one QSO at a time. Most amateur voice satellites use linear transponders (there is only one known orbiting FM repeater accessible in VK at the time of writing).

To successfully work an amateur satellite, you need to have transceivers suitable for the satellites you wish to work. For linear transponders, SSB and CW transceivers on the bands of interest are required. For the FM repeaters, either a dual-band FM transceiver with crossband transmit/receive capabilities or separate 2m and 70cm FM transceivers are suitable. A related issue is which bands to use. FM users don't have much choice. All of the FM satellites (operational or proposed) use 2m and 70cm, with one of these bands being used for the uplink, the other for the downlink. There are a wider variety of frequencies in use by linear transponder satellites. The suggested bands to try for a first attempt are 2 metres uplink and 10 metres downlink. If you have 2 HF transceivers, it might be worth trying the 10m/15m satellites as well.

For antennas, an existing HF dipole and VHF/UHF omnidirectional antennas will work in a pinch. The typical VHF/UHF collinears typically have a low angle of radiation, and better results may be obtained with a simple ¼ wave groundplane, or for the more serious, a turnstile

antenna. If you have crossed Yagis and AZ/EL rotators, all the better (but then this article isn't aimed at you in this case! :-). Finally, though not essential, it is very strongly recommended to have a computer, satellite tracking software and an Internet connection available. The Internet connection is for downloading the latest Keplerian elements for the tracking software (and the software itself if you don't have any), as well as checking satellite home pages for transponder schedules and other information. Besides, the Internet is fun when the birds aren't overhead!

Working your first satellite! This isn't anywhere near as daunting as it sounds. The first thing is to have a look around your shack and see what equipment you have. If, like many amateurs, you have FM only radios on VHF/UHF, then you are limited to the FM satellites. Those lucky ones with all mode transceivers can also try their hand at the linear transponders. The rest of this article will concentrate on FM operation as nearly everyone has FM gear for 2m and 70cm, and the operating techniques are easier to master. If SSB or CW satellite operation interests you, it's a natural progression to move on from FM. For those interested in exploring SSB/CW operation via linear transponders on satellites, there are several excellent introductory articles on AMSAT's web site.

First, time for an inventory, as the gear you have available will partially determine the satellite to use. As the satellite bands are outside the Novice voice segments, Novice operators will need to upgrade to a Limited, Intermediate or Full call, if they aspire to working satellites. At the time of writing, which satellite to work is an easy choice, as there is only one FM satellite available, namely the South African SUNSAT (OSCAR-35). This satellite is capable of transmitting 10 watts on either 2m or 70cm, and is usually configured to uplink on 70cm and downlink on 2m. Because of the high transponder power and relatively low orbit (650-850 km altitude during passes over VK), handheld transceivers are sufficient and will give good results. Regardless of the rig you use, it has to be capable of tuning in 5 kHz or smaller steps, to enable you to follow the Doppler shift as the satellite passes overhead.

As an example of what SUNSAT is capable of, I have worked SUNSAT from within a moving tram, using a pair of handheld transceivers! However, replacing the standard rubber duck antennas with high performance whips is strongly recommended. Home operators will most likely use their existing omnidirectional or beam antennas. Modern omnis tend to have a very low angle of radiation and therefore may not give good results when used to work

satellites. However, as most modern rigs put out 35-50 watts on 70cm, the extra power should largely compensate for the antenna's radiation pattern. If you can use a ¼ wave or turnstile though, then you'll enjoy better satellite performance. If you have a beam, you will need to track the satellite as it passes, especially at low angles, where the beam's gain will be useful. And finally, don't forget an earpiece or headphones. You will be operating full duplex (i.e. being able to transmit and receive simultaneously) and without headphones, feedback can be a problem. With them, you'll be able to hear what you sound like while you transmit, which will be helpful for correcting for Doppler shift.

During your preparation, log onto the Internet and check the SUNSAT page at <http://esl.ee.sun.ac.za/projects/sunsat> to find out when the transponder is scheduled to be active over Australia and the frequencies that will be used. (usually 436.291 MHz up and 145.825 MHz down) The times given on the SUNSAT page are the actual switch on and switch off times for the transponder. The satellite may not be visible in your area for all of this time. If you have tracking software, download the latest Keps while you're online and run a simulation of the pass. The software will allow you to know where the satellite will be at any given point in time, the maximum elevation of the pass and the exact times it will be visible, and often, the amount of Doppler shift that will be present. If you're using minimum equipment (e.g. a handheld with a rubber duck), are in difficult terrain or are going to be working the satellite from a difficult situation (e.g. while on a train or tram), this information can be crucial to your success.

Also important to know is the amount of Doppler shift that will be present on the uplink and downlink frequency. Doppler shift is a phenomenon that all of us will recognise in a different situation. Imagine you're waiting at a railway crossing. A train passes at high speed, blowing its horn. As the train passes you, the pitch of the horn appears lower than when it was approaching. That apparent shift in frequency is Doppler shifting caused by the relative speed of the train to you shortening, then later lengthening the wavelength of the sound as seen by the observer. On board the train, the pitch of the horn does not alter, but the pitch of the bells at the crossing does. When a satellite passes overhead, the transmitted and received signals are affected in a similar way. With the satellite passing at 27,000 km/h or more, a signal at 436 MHz can be shifted by up to 10 kHz from its actual transmitted frequency. Some satellites are designed with this in mind, and have AFC (Automatic Frequency Control) circuits to partially compensate for Doppler shift. Doppler shift is only significant for FM satellites on 70cm or higher bands. On 2m, the 3 kHz

Doppler shift can usually be accommodated by an ordinary FM receiver, provided it's on the correct frequency.

As the satellite approaches, you should be listening to the downlink frequency, with the uplink ready to transmit when needed. Remember to allow for any Doppler shift (for FM, it will only be significant on 70cm – around 5-10 kHz). If the uplink is on 70cm (usually the case for SUNSAT), tune 5-10 kHz below the nominal uplink frequency (the Doppler shift will make it arrive at the satellite on the correct frequency). If the downlink is on 70cm, you'll have to tune the 70cm receiver 5-10 kHz above the nominal frequency. SUNSAT's transponder usually sends over a minute of data or a voice preamble before it's available for use. While this may be a waste of time, this minute is also useful for signal checks and fine tuning your position if you're portable. When the data ceases, you'll hear FM receiver noise from the satellite. At this time, the satellite is ready for use, and you can put out a call. While calling, pay attention to your signal as heard on the downlink. Too much noise may indicate a need to move the uplink antenna, increase power or adjust frequency to compensate for Doppler shift. If you can't hear the downlink at all, don't attempt to transmit, as you may interfere with someone else. Also, keep things short while using the satellite. Only one person can use the transponder at a time and the satellite is usually only accessible for about 10 minutes. Others will appreciate your efficiency and courtesy. Most FM satellite contacts are usually an exchange of callsigns, signal reports and occasionally a comment about the weather.

As the satellite passes, you will need to make occasional adjustments to the 70cm frequency as the Doppler shift changes, so that by the end of the pass, you'll be transmitting 5-10 kHz above (or receiving 5-10 kHz below, if 70cm is the downlink) the nominal frequency. From experience, the distortion caused by being off frequency isn't so noticeable, but it is much more difficult to access the transponder when more than 5 kHz off the correct frequency (SUNSAT is capable of correctly receiving signals up to 9 kHz off the uplink frequency, so the tolerance is pretty broad). Some tracking software is capable of telling you the exact amount of Doppler shift present at any given time as the satellite passes, provided you tell the software the uplink frequency (read the manual on how to do this). Once the satellite has passed, you can relax and plan your next attempt. A quick run down on the results that are possible with SUNSAT. I have only ever used handheld transceivers to work this 'bird'. The typical station is:

- Uplink - Icom IC-T81A handheld running 3.5 watts into a 70cm 1/2 wave ground independent handheld whip.
- Downlink - Alinco DJ-500T handheld or Standard C58 all mode portable with a "ScanDucky" scanning antenna (roughly equivalent to a 1/4 wave on 2m).
- Station monitor (for recording the passes) - Icom IC-R1 handheld scanner or Standard C58 with a Diamond V2000 triband vertical or a 2m 1/2 wave aligned to the satellite pass. This sits in the shack and feeds audio to a PC running audio recording software.

As you can see, this isn't a particularly sophisticated setup and is very portable. However, it is also capable of very good results with SUNSAT. With the above gear, I am able to work SUNSAT from a good outdoor location at up to 3000 km range (which is practically on the horizon). The above station is also capable of working SUNSAT from a train at up to 2000 km range or up to 1500km from

a tram (the tram range is limited by downlink noise, not uplink power). Due to the flexibility of antenna alignment possible with a portable station, this setup often equals the performance of base or mobile stations running up to 10 times the power into a vertical antenna. The most exciting part of satellite operation is the anticipation of the pass as the time approaches and the fast pace of operation, not unlike during a contest but with more order. It's a bit like a brief band opening on VHF/UHF, except that unlike ducting or sporadic E, satellite openings can be predicted to the second. With the advent of orbiting FM repeaters, it is now possible to enjoy the excitement of satellite operation without paying the earth in hardware (Almost any VHF/UHF operator already owns the necessary gear). However, a word of warning: For some people, the thrill of satellite operation can be addictive! You may find yourself trying unusual situations, or decide to invest in multimode gear and work some of the linear 'birds' that are up there. You have been warned! (and I have the audio clips and 2m all mode box to prove this theory!)

The Roving Reporter

The Roving Reporter recently interviewed David Malar, VA3MLR. Dave is an avid sailor and lives on a boat full time!

RR: How did you become interested in amateur radio?

VA3MLR: I have been interested in ham radio for a long time, although I haven't done anything about it until recently.

My uncle is a long time ham (VE3CFM), now in his 51st year of being licensed, and it was through him that I first became aware of the hobby.

He is a boater, and as a kid I had seen him use an HT radio to make a phone call from Beausoleil Island via a repeater and autopatch in Penetanguishene. I thought that was pretty neat, and the idea of becoming a ham had been in the back of my mind ever since.

I am a sailor, and what finally spurred me into action was that when I bought my current boat it had an old, non-functioning marine band HF radio in it. I figured it would be nice to eventually put a ham radio with marine capability on board in its place, and to do that, I needed to get licensed.

I work in IT, and the hobby also fits in well with that interest.

RR: When did you get your licence?

VA3MLR: I got my licence in 2007. I started out with the basic and Morse code qualifications and then got my

advanced a year later. I ended up getting the basic and cw from the Hamilton club, more as a matter of timing than anything else. I took the advanced course through the Mississauga club. I found out about the club through the web site.

RR: What equipment do you have?

VA3MLR: Well I have a hand held - a VX-6R. It has an advantage for a sailor in that it is water proof, and therefore ok on a boat. Also I find it's great for the walks the club does.

RR: Do you have plans to go further in acquiring other equipment?

VA3MLR: I would like to put an external VHF/UHF antenna of some sort on the boat. I would also like to get a mobile radio at some point, and eventually get into HF. The boat has an insulated backstay which I should be able to use as a long-wire antenna.

RR: What interests have you developed in ham radio?

VA3MLR: I'm particularly interested in the ARES side, and I like helping out on the walks and similar events that the club does.

RR: What other non-radio-related interests do you have?

VA3MLR: I'm a long-time sailor. I have owned four boats, and I am currently living aboard full time, year 'round, in Port Credit. I'm also a scuba diver, and Judo

instructor – I run the Kakure Judo club out of the Hamilton School of Martial Arts. If you're interested in reading about what it's like to live aboard a boat, please check out my website at www.selfmadesailor.com.

MARC's new ham...

John VE3DRZ is the Club's repeater sponsor, so he is the Industry Canada contact for any licensing issues. On Saturday September 27, someone called John to congratulate him on getting newly licensed and to welcome him to the hobby. As John has been licensed since 1954 he was somewhat bemused at this turn of events. It transpired that the caller thought John had just been issued with the new call VA3AOC. In fact the Mississauga ARES group has just received this call for assignment to the Region of Peel's ARES yellow case radio, which is to be installed at the Region's alternate emergency operations centre on Wolfdale Rd. The explanation for the phone call was that the message of congratulations had been passed through the National Traffic System to John as part of an ARES traffic handling exercise during the Ontario simulated emergency test which took place on September 27. The last step in the NTS message handling chain is for someone to phone the recipient and pass on the message.

QSL cards - What are they and how do you exchange them? By Dean - G0RIF

http://www.dean-barnes.com/G0RIF/qs1_info.htm

QSL cards are written confirmations of either a two-way radio communication between two amateur radio stations or a one-way reception of a signal from a broadcasting radio (or television) station. They can also confirm the reception of a two-way radio communication (usually between amateur radio operators) by a third party (usually a short wave listener, or SWL for short).

QSL cards are about the same size as a typical postcard and they are usually printed on paper or card. The cards themselves are usually exchanged via bureaux (often abbreviated to buro) run by respective national organisations or by direct mail within envelopes, some are still sent through the mail as a standard postcard. A QSL card sent from one amateur radio operator to another contains details about the contact and his/her station. At a minimum this includes the call sign of both stations participating in the communications, the time and date of the contact (usually specified in UTC), the radio frequency (or band) used, the mode of transmission and a signal report.



QSL cards are an amateur radio operator's calling card - designs vary from simple tabular layouts recording little more than details of the contact, to slick graphic designs showing pictures of the operator, his equipment or home town, original artwork, in fact

pretty much anything at all! Consequently, the collecting of QSL cards of especially unique designs has become an add-on hobby to the simple gathering of printed documentation of a radio amateur's communications over the course of his or her radio operations.

Sending and receiving QSL cards - bureau or direct?

QSL cards are sent either direct, using the ordinary postal system, or via each country's centralised amateur radio association QSL bureau, which saves considerable postage fees by sending large numbers of cards to other bureaux using parcel services, although with a considerable delay (cards can take several years to be replied to via some of the smaller/slower bureaux).

For rare countries, places with no reliable (or even existing) postal systems, and for expeditions to remote areas, a volunteer manager may handle the mailing of cards. (For expeditions this may amount to thousands of cards, and payment for at least postage is appreciated.)

Hints and tips to maximise your returns

It is a fact that you will never have a 100% response rate for QSL cards you send - some will get lost en-route, some will just be ignored by the recipient, some amateurs, sad to say, are just interested in collecting "green stamps" (dollar bills) that they will request to offset the return postage...for a card they never intend to send.

Knowing and accepting these few simple facts of life, and given the options available, I recommend the following:-

- If a radio amateur says he will QSL via the bureau then use the bureau - it may take a while but it is the most cost effective over the long run.
- If you're going to use the bureau for incoming cards make sure you know how it works and try to send out a good number of your own cards (even for bread & butter local contacts) that will be replied to by that route - that way you'll get regular deliveries from the bureau instead of waiting for an age to fill each of your envelopes.
- If a radio amateur prefers direct QSL, read, understand and obey his QSL instructions - if he has taken time to detail how he expects you to QSL then he likely expects you to follow those instructions.
- When QSLing direct, if possible send "green stamps" (dollar bills) outside the EU - within the EU I find IRCs work just fine but they seem less popular further afield.
- Never...NEVER...send good money after bad. If a direct QSL is not responded to, even if it's a rare one you really

REALLY need, don't send another card with more \$\$\$.
He is likely just collecting the "green stamps".

- Most QSL managers do a great job - I find this is a very reliable way of getting good returns.
- Some QSL managers aren't so good - learn who they are and avoid them.
- Keep accurate records of what you have sent when and by what means - this avoids duplicate requests and the associated additional expense and effort on your part.

Using these guidelines I get a pretty good rate of return. To be fair I do have some cards that have not been replied to some 2 or 3 years after I sent my card (for both bureau or direct QSL), but on the other hand I am still receiving cards in response to cards I sent out over 2 years ago.



It's important to remember that things take time - it can be hard work sending out all those cards while receiving none in return, but, you have to prime the system and once you've got things moving and are sending out cards regularly there should be a steady trickle of QSL cards in the other direction.

As in many aspects of life, knowledge is power, so I recommend reading all you can find on this topic. There are some good sites out there with lots more detail than I have included here - some sites I have found useful are:-

- [QSL'ing tips and advice](http://www.ac6v.com/qsltips.htm) (<http://www.ac6v.com/qsltips.htm>) - compiled from The DX Reflector
- [Getting QSL's](http://home.alltel.net/johnshan/dx_ss_qsling.html) (http://home.alltel.net/johnshan/dx_ss_qsling.html) - Tips by John Shannon, K3WWP
- [Improving your QSL return rate](http://w5ue.com/qs-slide1.html) (<http://w5ue.com/qs-slide1.html>) - by Randy, W5UE
- [QSL'ing tips](http://www.magiclink.com/web/shurst/Page3.html) (<http://www.magiclink.com/web/shurst/Page3.html>) - by Steven R. Hurst, KA7NOC

Good luck and many happy returns!
73 de Dean - GORIF

RAC MEMBERSHIP APPLICATION/SUBSCRIPTION TO TCA MAGAZINE

Please enter applicable choice(s) →

COMBINATION PACKAGE: 1 year RAC membership; (includes \$44.95 subscription for TCA) @ \$49.95 *	
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Family membership; price per extra family member @ \$20.00 per year (one TCA per family) * (Does not apply to simple subscriptions.) (\$20.00 x)	
GST: 5%	
*Taxes applicable: 5% GST, 15% HST (NB,NS,NL) not included in the above amounts + Ontario PST of 8% applicable to TCA subscription without membership. PST (if applicable): 8%	

CONTACT INFORMATION

Name: Call sign:	
Address:	
City/Town:	
Province:	Postal Code:
Family Member Name	Family Member Call sign:
If you enter something on line above, a charge of \$20.00 will be added to your membership	
Email:	Phone #:

DONATION OPTIONS

Donation to the RAC Foundation enclosed	\$
Donation to the Defence of Amateur Radio Fund enclosed	\$
Donation to the Youth Education Programme enclosed	\$
Grand Total:	\$

PAYMENT OPTIONS (Cheque or)

Visa/MasterCard No:
Card Expiry Date (MM/YY):
Name on credit card:

Mail to:
 Radio Amateurs of Canada Inc.
 720 Belfast Road, Suite 217
 Ottawa, ON K1G 0Z5

