

Toronto FM Communications Society

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August 2012

Welcome

This is the first bulletin after an absence of several years. We hope to publish more regularly, and we will need your help to accomplish this. If you have any articles or items that would be of interest to fellow TFMCS members, please send them to info at tfmcs.com.

Committee News

Graham Gillespie VA3GJG has resigned from the board of TFMCS for personal reasons, effective June 23. We thank him for his many years of service to TFMCS and wish him well.

Until the annual general meeting in September, Ralph Muecke VE3VXY will serve as interim President, and Ray Chow VE3ZXC as interim Secretary. Luc Seguin VA3LMS has joined the board, filling one of the vacant positions. Anne Jones VE3KWI continues to serve as Treasurer and Membership Coordinator. Neil Macklem VE3SST and Jim McCullough VE3CSO are directors who are also part of our technical committee.

Our technical committee consists of Neil, Jim, and Bob Jones VE3ADJ. Nigel Johnson VE3ID and Michael Walker VA3MW have returned as technical advisors.

Ham Participation in the Development of the Search and Rescue Satellite System

Clive Oakes, VE3YB

The Search and Rescue Satellite (SARSAT) program, later to be known as the COSPAS SARSAT program, was a program conceived in the early seventies to make use of polar orbiting satellites to pinpoint the location of an emergency beacon transmitter. I had the privilege to participate in some of the early trials of this system both as an amateur radio operator and an engineer.

I was licenced as a ham in 1948 at the age of 14 and as an engineer I had designed the AN/PRC 502 portable HF 2 Watt transceiver used by the RCAF for search and rescue and also the RESCUE 99 EPIRB emergency location beacon carried by about 90 per cent of the world's commercial airplanes that flew over water. This device transmitted simultaneously at 121.5 MHz and 243 MHz when it fell into the ocean from the life raft after a forced landing at sea. The search was made by aircraft. Thus with this experience behind me it was natural that I would that would twig onto an opportunity to participate in a satellite location system with enthusiasm.

In 1973 I was working for SPAR AEROSPACE LTD and among my responsibilities I was to keep abreast of what was going on in the polar orbiting satellite area. I did studies on such applications as putting a side looking radar in a satellite (later to become RADARSAT) and did

link budget analyses for a geostationary communications satellite (MSAT). One day on a trip to the Communications Research Centre (CRC) in Ottawa I talked to a Dr. Winter and Harvey Werstiuk and found out that they were looking into a system of radio location using Doppler techniques.

Today any ham who has listened to a satellite signal will know what Doppler shift is. The location system using Doppler accurately measures the frequency shift due to the relative velocity of the orbiting satellite with respect to the terrestrial transmitter. From this information the computer could make a preliminary estimate of the transmitter location. It then calculated the exact Doppler curve that this estimated position would give and compared it with the actual measured Doppler curve. From the resulting error curve the the computer could make a better estimate of the location and after repeating this process several times the error curve was reduced to a minimum and the exact location of the transmitter is found.

CRC was planning to make a trial run of the system using the amateur OSCAR 6 satellite on two metres. They were planning to outfit a Land-rover type vehicle with a 144MHz transmitter to simulate an emergency beacon transmitter. The vehicle would then be situated in various locations and transmissions made when the OSCAR 6 satellite was in view. Being the government they figured it would take six months to get this approach up and running. I immediately volunteered that I could provide an uplink signal in a week and a half. They accepted my offer and said their computers were ready to process the information any time I was ready.

I was so keen to go that I went out and purchased with my own money a KLM Multi 2000 transceiver from a vendor in Vancouver. This unit was the first frequency synthesized 2 metre unit available. As an extra it also had SSB capability. In any event it seemed much more suitable for the trials than the Heathkit 202 I was using at the time to work through VE3RPT. I had already recently purchased a Gonset 200 Watt amplifier from Terry Usher VE3AWE. I punched a 1 inch hole in the roof of my 1964 Chevy Supersport and mounted a quarter wave monopole bent at 45 degrees to give even hemispheric coverage with circular polarization and I was ready to go.

My technique was to drive to a location, find a gas station or a general store and offer them \$5.00 to let me plug into their 115 Volt socket..We used the amplifier as we wanted a good solid signal to test the Doppler technique and a 10 Watt signal did not give a sufficient signal near the horizon using the crude antenna on the OSCAR 6.

On the appointed day I found myself in south-western Ontario and every time the satellite came over I did my thing and transmitted up a signal. In quiet periods I chatted with hams along the way on the local repeaters, just about all of which used the 34/94 frequency combination. That evening after a final transmission I stayed in the town of Kincardine on the shores of Lake Huron. The next morning I phoned CRC back in Ottawa to see how things were going and was immediately asked how well I had slept in Kincardine last night! The system had worked, the computer had located me within a few miles so that in a real situation a helicopter or Hercules aircraft could have completed the final search.

During the following weeks we did further trials to optimize the system mostly with me located at the SPAR plant on Castlefield in Toronto where, in addition to a fixed 2 metre antenna for the uplink, I had constructed a ten metre antenna so that I could monitor the downlink as well and listen to the Doppler shifted signal. The routine was that when CRC wanted to do a trial I would phone Larry Kayser VE3LK who had the codes to turn on the satellite, get him to activate the bird and then I would fire up the uplink.

It should be remembered that SPAR Aerospace Ltd was an offshoot of DeHavilland and was basically a mechanical engineering outfit. I kept them informed of what I was doing with the satellite but there was no great understanding or enthusiasm for my activities. Their main

interest at the time was the Canadarm project for the space shuttle. As the trials progressed and the results looked more and more promising I put together a proposal for the company to present to the government to get funding for a program that would eventually lead to a dedicated search and rescue satellite (to be built by SPAR, of course). While I was presenting the proposal to a meeting of SPAR management for approval to submit it to the government, a representative from the vice president, engineering, came in halfway through the meeting and announced that no further work should be done on the proposal and that it should not be submitted. The reason given was that there was only so much money available for space activities in Canada and he wanted it all for the Canadarm.

As was my way I went into a corner and sulked. Eventually I was informed politely that SPAR could get along nicely without a smart-ass RF engineer and that I should hit the road. However, some days later while I was sitting at home wondering what I should do next, the phone rang and it was a representative of SPAR management. What had happened was the following. It appears that the successful results we had been getting had greatly enthused the military which has the primary responsibility for search and rescue. They had requested CRC to put on a demonstration of the system for the Military Brass. CRC had phoned SPAR and found they had no capability to provide the uplink system as I had left with all my equipment. Ergo, SPAR had to call me, offer me my job back, and request that I return pronto and provide the uplink signal.

I declined the job offer but I did return temporarily with my Multi 2000 and Gonset amplifier. On the appointed day the big black limousines proceeded from National Defence Headquarters to CRC which is located just west of Ottawa and I called Larry who turned OSCAR on and I provided the uplink signal. I am told the demonstration went flawlessly.

As a result of the demonstration and our successful measurement data the government people then proceeded to form an international consortium called COSPAS-SARSAT, which was composed of several countries, including Russia, and soon the first of the SARSAT transponders was piggy-backed onto a NOAA weather satellite. At least three satellites are in orbit at any given time. Most of the satellites in use at present are Russian I believe.

The latest statistics I have heard, which are now several years old, are that 12,000 rescues have taken place under circumstances that without SARSAT would probably have resulted in loss of life or a low chance of survival. If these numbers seem high, remember that there are 250,000 private aircraft operating in the US alone, all carrying ELTs (Emergency Location Transmitters) in addition to the commercial aircraft. One gruesome instance of operation of the system was the Air India disaster where the RESCUE 99 EPIRB carried by the the plane floated to the surface after the bombing and was located by the SARSAT satellite.

What did I do after the Military demonstration? I went into the Consulting or Contract Engineer role for a few years. One project I undertook for Leigh Instruments was to design a solid state receiver to do the final search for the ELT. Actually I believe its main use has been to search for ELTs that go off accidentally at airports. One interesting job I did for Hermes in Dartmouth was to help solve some problems they were having with their 20KW HF path finding transmitters. I was surprised that there did not seem to anybody around who had a detailed knowledge of the unit and it was only later that I heard that the former project engineer had tried to change a 4CX300 tube while the interlocks were defeated and had electrocuted himself some days before I arrived.

After some years in the itinerant mode of engineering it began to pall on me so when I got a call from the Department of Communications in Ottawa indicating they were holding examinations for a position of Program Officer in their Space Directorate I decided to give it a try. When I saw that the examining officers were all known to me from my days at SPAR I thought that I might have a chance. However I got a letter saying someone else had won the

competition but that I had placed second. Then I got a second letter stating that the winner had not accepted the position and that it was now open for me to take. Needless to say I took it.

One of the first things in the new job that I did was to find funding to develop a new version of the ELT that would have very much less frequency drift due to temperature than a ordinary ELT that had been designed before the Doppler technique had been envisioned. This new ELT greatly increased the location accuracy of the system which has difficulty in distinguishing temperature drift from Doppler shift.

I spent the remaining 15 years of my working career with the government spending considerable time in Brazil administering a training program which would allow the Brazilians to develop the skills necessary to maintain in operation the three communications satellites they had purchased from SPAR Aerospace Ltd. Also, as part of the deal we provided the Brazilians with a ground terminal that would allow them to access SARSAT for their own search and rescue purposes.

As an interesting footnote, as far as I can tell the man who first conceived the Doppler system of location was named J.C. Maxwell(sic). He wanted a system for tracking animals or birds.

Nets @ TFMCS

Name:	OLN (Open Line Net)
Day/Time:	18:30 EDT (daily)
Repeater:	VE3RPT 147.060+
Purpose:	OLN is the local division of the NTS (National Traffic System). NTS is the principal facility for medium to long range traffic. It is organized on the basis of daily operation, in consonance with the operating habits of the average radio amateur. In emergencies, NTS is geared to go into continuous operation in accordance with the needs and the extent of the particular emergency.
How to join:	Everyone is welcome to check in. Listen to the opening preamble for instructions.
More info:	Ted Grocott, VE3SHM (Net Manager) ve3shm at rogers.com_ Website: http://hfradio.net/oln/
Name:	Toronto ARES RPT Network (linked to 6&2 metres and 220)
Day/Time:	Saturday, 20:30 EDT (weekly)
Repeater:	VE3SIX 53.030 (VE3RPT 147.060+ & VE3RPT 224.860-linked)
Purpose:	This net gives 6 metre operators an opportunity to test out their 6 metre FM radios and antennas and to meet other 6

metre operators within the range of the repeater. Operators without 6 metre radios can experience 6 metre activity by joining on 2M and 220).

How to join: Check into the net as instructed by the net control station (VE3NCS). All Amateur Radio Operators are invited to participate in the net. In the event of a major emergency situation occurring anywhere within the coverage of the repeaters, this net will convene to pass traffic to and from Emergency Operation Center (EOC) ARES stations that are equipped with 6 metre FM equipment. The net will have priority over routine repeater activity.

More info: Joe Cusimano, VE3OV ve3ov at rac.ca_Website: <http://ares.meskes.ca/>

Name: **Scarborough Amateur Radio Club**

Day/Time: Tuesday evening at 7:30 p.m. local

Repeater: VE3RPT 147.060

Purpose: General discussion - all amateurs welcome; you do not have to be a SARC member to participate.

How to join: Open net; insert your call when net control offers an opportunity.

More info: Gordon Hogarth, VE3CNA, ghogarth at sympatico.ca_Website: <http://ve3we.org/>

Name: **The Senators**

Day/Time: Tuesday, 7:00 p.m. local time

Repeater: VE3RPT 147.060

Purpose:

1. "The Senators" meet to see if there will be a quorum of 4 to ensure that the meeting of Senators the next morning, Wednesday, will take place.
2. All check-ins are welcome once net control asks for them. Usually Senators first, then others. Please come in and say hello.

How to join: All are welcome. This is a net of short duration and is usually over before 7:30 p.m, to make way for the Scarborough ARC net at 7:30.

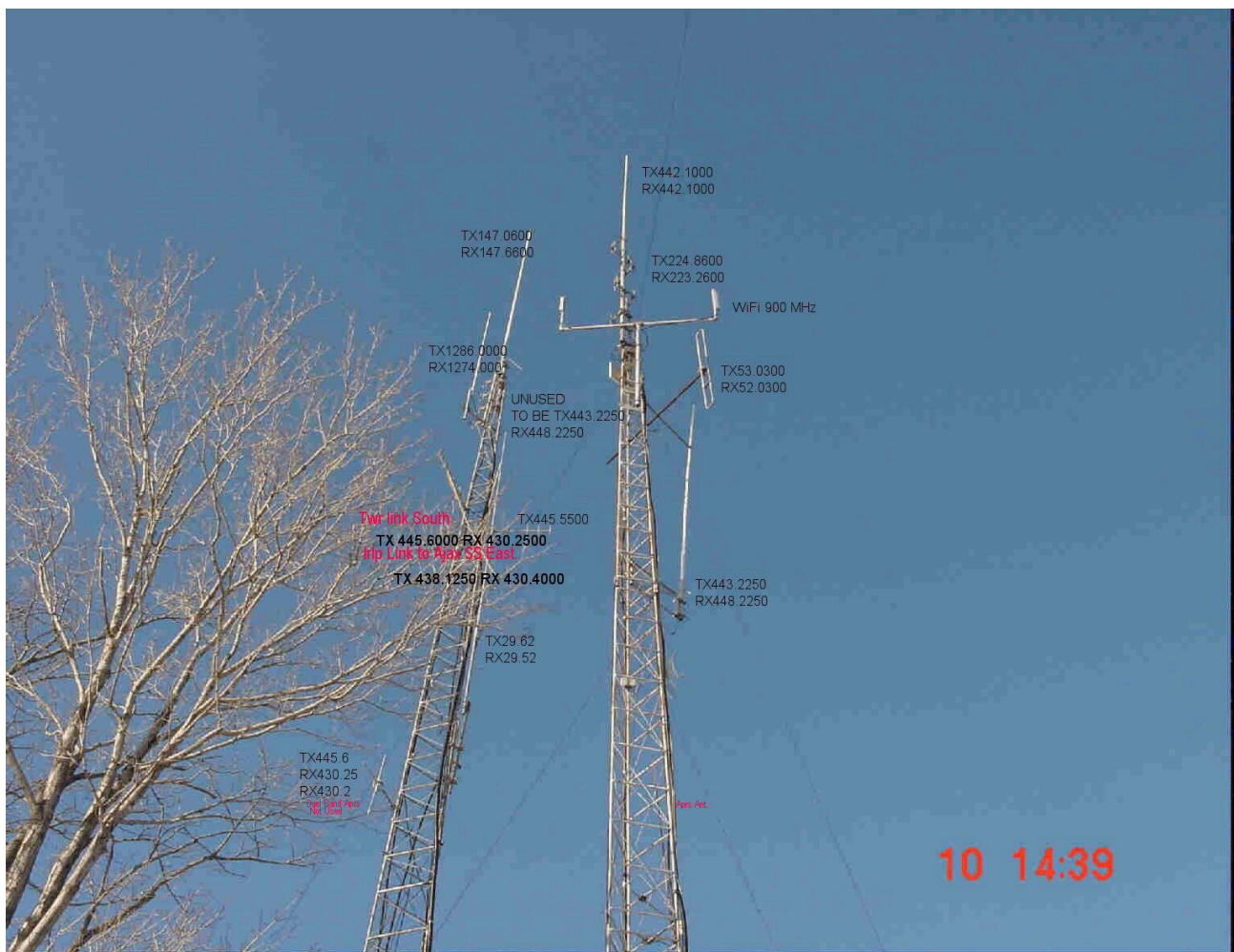
More info: Gordon Hogarth, VE3CNA, ghogarth at sympatico.ca

Help Wanted

We need your help as members of the TFMCS to keep things running smoothly. Please let us know if you can assist with any or all of the following:

- General site maintenance
- Acquisition of a 240V 1 single phase 1:1 isolation transformer
- Tower maintenance
- Writing and editing articles for the newsletter
- Backdrop for club banner for use at hamfests

Here is a recent photo of the VE3RPT towers with frequencies. I don't know who took it, so if this is your photo, please let us know so we can give proper credit.



CLARA

We are grateful to the members of CLARA (Canadian Ladies Amateur Radio Association) for their continued support of TFMCS. Established in 1967, CLARA is a national association created by women for women, with the goal of promoting on-air activity, especially for newly-licensed YLs. More information is available at www.claranet.ca



From left: CLARA and TFMCS members Ann Nutter VE3HAI and Roberta Williams VA3RMW at the Milton Hamfest, July 2012. Photo by Ralph Muecke VE3VXY

Notice of Annual General Meeting & Picnic

Where: VE3RPT Repeater Site, Skyloft Ski Resort (Beside the green building)
722 Chalk Lake Road
Uxbridge, Ontario

When: Sunday, September 16th 11:00 am (sharp)

Agenda:

1. Registration and refreshments (10:30 – 11:00 am)
2. AGM begins (11:00 am)
 - a. Review of the 2011 financial statement
 - b. General reports
 - c. Election of directors
3. Open discussion (ending in time for the annual picnic at 12 noon)

We need your help!

Directors sit on the board for a 2 year term. We elect 4 each year so that we have some continuity in the group.

This year, while directors are running for the open positions, please consider running for an open position. Nominations can be made any time up until and during the meeting (make advance nominations known by emailing info at [tfmcs.com](mailto:info@tfmcs.com)).

Note: Your membership must be current as of the date of the AGM. Renewals may be made at the meeting and renew reminders will be sent out prior to the meeting date. If you are unsure of your renewal date, please email membership at [tfmcs.com](mailto:membership@tfmcs.com) or call 705-324-0638.

We would like to see you at the meeting, however if you are unable to attend we would appreciate your vote. Proxies may be returned by online form, mail or telephone by calling 705-324-0638 and leaving a message with your name, callsign, validation code and stating that you give your voting rights to the directors of TFMCS as stated in the proxy form.

If you have any questions, concerns or comments that you would like addressed either personally or at the meeting, please do not hesitate to email or call.

Best regards,

Your Board of Directors

VE3CSO	Jim McCullough
VE3EBC	Nick Blacklock
VE3KWI	Anne Jones
VA3LMS	Luc Seguin
VE3SST	Neil Macklem
VE3VXY	Ralph Muecke
VE3ZXC	Ray Chow
Open	

Membership renewals will be accepted before the meeting starts. See you there!

If you are unable to attend, please complete the proxy form attached below and return to TFMCS.

Proxy

GENERAL MEETING OF THE MEMBERS OF Toronto FM Communications Society

TO BE HELD AT:

Skyloft Ski Resort (green building), 722 Chalk Lake Road, Uxbridge, Sunday, September 16, 2012 at 11:00 am

The undersigned "Registered Member" of Toronto FM Communications Society "TFMCS" hereby appoints Anne Jones, a Director of TFMCS, or failing this person any other current director of TFMCS present, or in the place of the foregoing, _____, as proxyholder for and on behalf of the Registered Member with the power of substitution to attend, act and vote for and on behalf of the Registered Member in respect of all matters that may properly come before the aforesaid meeting of the Registered Members of TFMCS and at every adjournment thereof, to the same extent and with the same powers as if the undersigned Registered Member were present at the said Meeting, or any adjournment thereof. The Registered Member hereby directs the proxyholder to vote recorded in the name of the Registered Member as specified herein.

The undersigned hereby revokes any proxy previously given to attend and vote at said Meeting.

NAME: _____ CALLSIGN: _____

SIGN HERE: _____ DATE SIGNED: _____

THIS FORM MUST BE SIGNED AND DATED.

TFMCS Annual Picnic

You're invited!

Sunday, September 16, 2012

BBQ starts at 12 noon

(Following the AGM at 11 am)

Shack Tours *50/50 Draw*

Free Tailgating *Great Food*

Location: Skyloft Ski Resort

Home of VE3RPT Beside the Green Building

This is the perfect opportunity to bring a friend to see the benefits of being a member of TFMCS!

Admission is free for anyone interested in enjoying tours of the shack and having a good time meeting TFMCS members. Please bring two chairs each.

The food and refreshments are free to TFMCS members in good standing.

Membership renewals and new memberships will be accepted.

Weather cancellation will be made no later than 12 noon, Saturday Sept. 15th and will be emailed as well as posted on the website

Talk-in on VE3RPT 147.060+

Directions to TFMCS Picnic

Skyloft Ski Resort is located 9 km south of highway 47, and 18 km north of Kingston Rd. and just west of Lakeridge Road on Chalk Lake Road.



From Toronto

- Take Highway 401 East
- Exit 404 Salem Rd (Ajax)
- North on Salem Rd for 1 km
- Right (east) on Kingston Rd (Durham Highway 2) for 2.5 km
- Left (north) on Lakeridge Rd (Durham 23) for 18 km
- Left (west) on Chalk Lake Rd. for 3 km
- Right (north) into the driveway for Skyloft Ski Resort

From Bowmanville

- Take Highway 401 West
- Exit 412 Thickson Rd (Whitby)
- North on Thickson Rd for 6km
- Left (west) on Taunton Rd for 6km
- Right (north) on Lakeridge Rd. for 18km
- Left (west) on Chalk Lake Rd. for 3km
- Right (north) into the driveway for Skyloft Ski Resort