



# March 2024 Newsletter

## Seaway Valley Amateur Radio Club

The Seaway Valley Amateur Radio Club is a 'not for profit' organization incorporated in the Province of Ontario that promotes Amateur Radio and provides Auxiliary communication Services in Cornwall and surrounding area. The Club's mailing address is 4672 O'Keefe Road, St. Andrews West, ON. K0C 2A0.

The Seaway Valley Amateur Radio Club operates several repeaters in Cornwall and the surrounding area. For a detailed list of repeaters operated by the club please visit our website at [SVARC.ca](http://SVARC.ca)

### Next Club Meeting

**The next meeting** will be a hybrid Zoom / in-person session; 7:00 PM, Wednesday Mar 27, 2024.

**Location:** St. John Ambulance, 100 Second St. W., Cornwall, ON.  
Guest Speaker – Kevin McQuiggin, VE7ZD who has a lot of experience with digital radio and its modes and relationship to Software Defined Radios (SDR) (see "March Guest Speaker Topic" on page 7)

### Club Breakfast

(aka Coffee Klatch)

\*\*\* LOCATION CHANGE\*\*\*

Saturday Breakfasts—Best Western, Cornwall every 2nd and 4th Saturday of each month, 8:30 A.M. will be held at the Best Western restaurant at 1515 Vincent Massey Drive.

### Club Executive & Volunteer Positions

- President: John Grow (VE2EQL)
- Vice-President: Hunter Racine (VA3HWF)
- Secretary: Roger Bélanger (VA3GBV)
- Treasurer: Chris Lauzon (VA3CRR)
- Technical Director: Doug Pearson (VE3HTR)
- Net Manager: Earnest Vinson (VA3EWW)
- ACS Coordinator: Earle DePass (VE3IMP)
- **Newsletter:** Steve Harvey (VE3EZB)

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### Upcoming Events

Saturday, March 23rd—  
Coffee Klatch – Best Western

Wednesday, March 27th -  
SVARC Meeting – St. John Ambulance

Wednesday, April 10th. Youth  
Engagement Fair – Cornwall  
Civic Complex - Salons A, B, &  
C 4:00 PM to 9:00 PM



## President's Musings

John – VE2EQL

It's March, and the smell of solder, flux and working with wires or aluminum is in the air. Our warmer weather is inviting to fix or build new antennas or to plan a new layout for our ham shack. The last presentation, we had some issues with our Zoom connection, which we will resolve before the next meeting.

There is a lot going on behind the scenes and we are working on the following.

**March Presentation** Kevin McQuiggin, VE7ZD / KN7Q via Zoom Digital Radios & Software

**April Presentation** Dana Shtun VE3DS via Zoom What you need to operate on 6 meters.

**May Presentation** 1. ICOM Canada, New Products 2. Antennas for Field Day.

Our involvement with the [Youth Engagement Fair](#) April 10<sup>th</sup>

We will have a table, next to the 8AAT project. We will have some hands-on demos, handouts, fox hunt demonstrations and portable radio station. Hunter and I will be present for the event. If anyone wants to join in, please contact us.

SVARC / PRARC Ham Fest Update, September 28<sup>th</sup>. 2024. We confirmed the rental of the hall, contacted sponsors, and started selling tables. The committee is working very hard to make this a success. Check out the ham fest page at: <https://prarc.tech/hamfest/>

Last Month's Presentation on Patches, Jackets & Hats. Michel Berthiaume VE3LI was very informative. I never knew about the details that go into making patches.

**QUESTION TO THE MEMBERSHIP.** Do you think we should have uniform caps, with the SVARC logo on the front, with our callsign and on the back of the cap written "COMMUNICATIONS" or "ECOMM" For events, I believe that a uniform standard image promotes professionalism and community. How about Club Golf Shirts, What colour? Do you want your call sign below the SVARC logo? Do you want your first name on the right sleeve? A hand out will be given out with the questionnaire and emailed to the members.

RAISIN RIVER CANOE RACE, April 13<sup>th</sup> Saturday. We will need volunteers. We plan on having a portable station at the winner's location with an extending mast. Volunteers should have their Emergency Communications Vest, HT with charged batteries. Roger is our Lead contact person.

Raisin River Canoe Race Link

<https://raceroster.com/events/2024/86582/2024-raisin-river-canoe-race>

The Raisin River Canoe Race has a rich history that spans over half a century. Let's delve into its fascinating past:

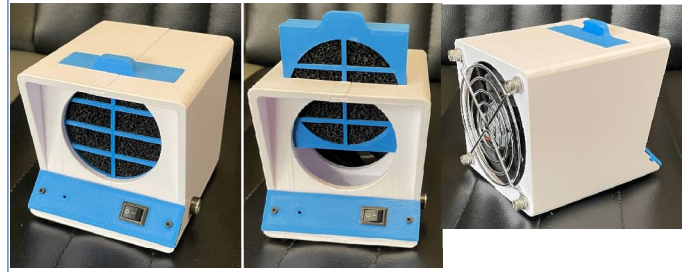
- ◆ The first Raisin River Canoe Race took place in 1973.
- ◆ The Raisin River Canoe Race is one of the longest canoe races in eastern Ontario.
- ◆ Participants embark on a thrilling 30-kilometer racecourse that stretches from St. Andrews West in South Stormont to Williamstown in South Glengarry.
- ◆ The 50th anniversary of the Raisin River Canoe Race was celebrated in 2023.





## Editor's Ramblings

Steve – VE3EZB



In the ever-evolving world of technology, amateur radio has remained a staple for communication enthusiasts worldwide. It's a hobby that transcends age, blending the allure of communication with the thrill of discovery and innovation. As we march into the future, a new technological ally has emerged for the amateur radio community: 3D printing. This convergence is not just about innovation; it's a testament to the boundless creativity and resourcefulness of ham radio enthusiasts.

### **A New Dimension of Customization**

3D printing has transformed our approach to creating and customizing objects, offering ham radio operators the ability to design and fabricate parts, enclosures, and even antennas with remarkable precision and customization. Armed with a 3D printer, hobbyists can now produce components tailored to their specific requirements and the distinctive setups of their stations.

### **Cost-Effective Solutions and Repairs**

One of the most significant advantages of integrating 3D printing into ham radio is the dramatic reduction in costs for repairs and upgrades. Rather than purchasing expensive replacements or scouring online for parts, operators can simply print what they need. This not only saves money but breathes new life into cherished equipment, reinforcing the ham radio tradition of DIY and experimentation.

### **Enhancing Antenna Design**

Antenna design and construction is an area where 3D printing shines. Amateurs are experimenting with 3D-printed parts for antennas, including custom mounts and insulators. The ability to rapidly prototype and test different configurations without significant investment is a game-changer.

### **Educational Opportunities**

The amalgamation of ham radio and 3D printing also serves as a fertile ground for educational ventures. Schools and clubs can harness these technologies to ignite a passion for STEM fields, offering students tangible learning experiences that bring theoretical concepts to life. This hands-on approach not only educates but also inspires the next wave of creators, engineers, and radio enthusiasts.

### **A Community of Innovators**

Historically, the ham radio community has led the charge in technological innovation. The adoption of 3D printing is merely the latest testament to this enduring spirit of curiosity and pioneering. Online platforms are teeming with enthusiasts eager to exchange 3D printing insights, projects, and tips, nurturing a worldwide network of knowledge sharing.

### **Looking Forward**

The fusion of ham radio and 3D printing promises endless possibilities, limited only by the imagination of the hobbyists themselves. Whether it's crafting the perfect knob for a vintage transceiver, designing a custom case for portable operations, or just creating some specialized tools the interaction between ham radio and 3D printing is propelling the hobby into new and exciting territories.

The intersection of ham radio and 3D printing is not just about the technology; it's about the community, the spirit of innovation, and the endless pursuit of knowledge. As we embrace these new tools and ideas, we continue the rich tradition of amateur radio, ensuring it remains a vibrant and dynamic hobby for generations to come.

Let's embrace the melding of tradition and innovation by sharing our stories, projects, and successes. Your stories and projects not only inspire but also drive the community forward. I invite all enthusiasts to contribute their experiences with 3D printing, offering insights, guidance, and inspiration to others. Together, we're not just keeping up with the march of technology; we're leading the parade.

'Til next time – Smile and Cruise.

73 – Steve – VE3EZB



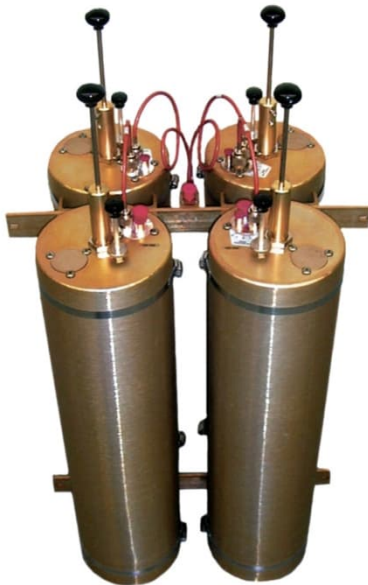


## Geeks Corner

This months geek

Roger—VA3BGV

## Duplexer 101 Part II



Comprod VHF Duplexer

### What is a duplexer?

Now that we know what a duplexer is and what it must do, let's see how to make one.

VHF and UHF duplexer, as shown above, almost exclusively use cavity filters and there is a reason for this.

Why are quarter-wavelength coaxial cavities the only real choice for duplexer filters?

To quote John E. Portune W6NBC in his book "THE CAVITY DUPLEXER":

*It's because there actually isn't much choice. The cavity continues, even in today's world of miniaturized solid-state electronics, to be the only practical filter type for a duplexer.*

*The 1/4 wavelength cavity has three essential properties for a duplexer all present in one filter type. The other main types, namely discrete coil-capacitors filters and active filters, lack one or more of the three essentials:*

*The ability to handle power;*

*High Q; and*

*Low loss.*

*It is this unique combination of all three in one filter type, that has long made the resonant cavity the only real choice as a duplexer filter. The cavities are not about to disappear from our repeater sites.*

*Of these three properties, perhaps the most significant is the first. Only a passive filter, that is, one without active electronic components, can handle the power of the repeater's transmitter.*

Remember, our duplexer must deal with 50 Watts (+47 dBm).

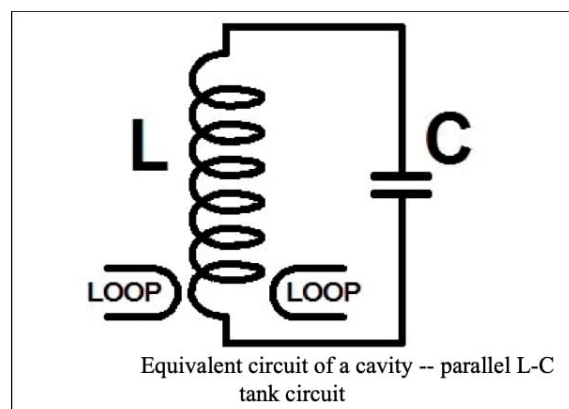
Some repeaters operate with hundreds of Watts.

*Active electronic filters can't handle this power.*

*Filters made from discrete coils and capacitors also can handle power, such as in an antenna tuner. But VHF and UHF frequencies, discrete coil-capacitor filters have poor Q and exhibit high losses.*

### Cavity equivalent circuit

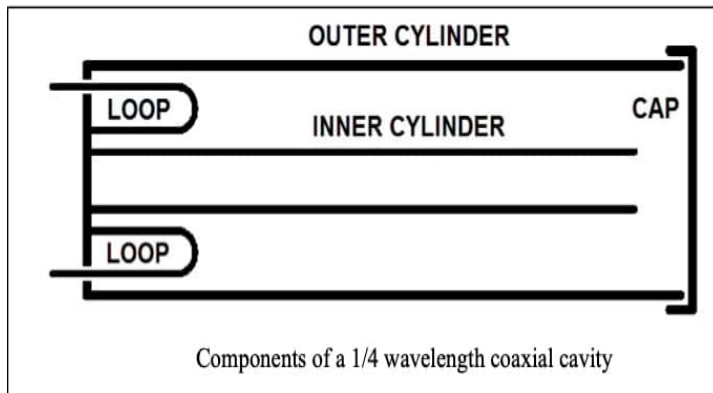
Electrically a quarter wave cavity is the equivalent of a parallel RLC circuit.



### Cavity physical configuration

Physically though, as opposed to electrically, a cavity resonator is just an open volume of space enclosed by highly conductive walls.



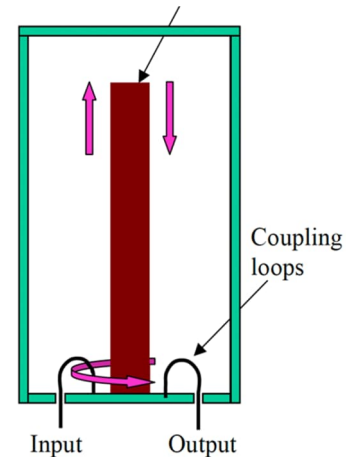


common method is a single turn coupling loop excited from a connector mounted through the cavity wall. It is most often placed in the shorted end. The far end of the loop is grounded to the cavity. You may recognize that loops are analogous to the link windings shown in the equivalent circuit.

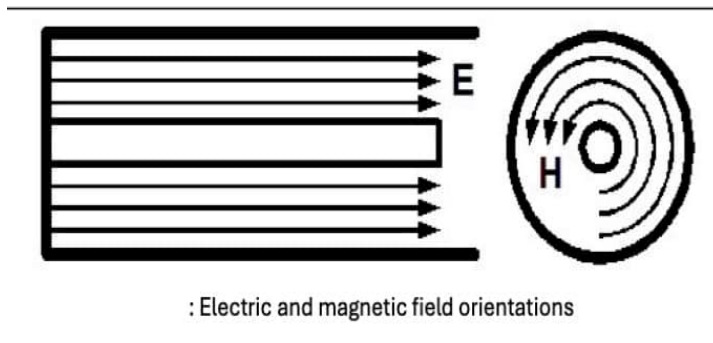
A loop couples to the magnetic field and does this best when it is perpendicular to the H field. Since the H field, as we learned, lies in concentric circles around the center conductor, the loop is normally placed parallel to the length of the cavity and on the cavity's radius.

It also consists of a smaller metal cylinder about 1/3 the diameter of the outer cylinder. This is the center conductor. See above. The center conductor is connected to the outer cylinder at one end of the cavity but not at the other.

The common duplexer cavity is a simply a 1/4 wavelength shorted coaxial stub. And simply by making it large we easily achieve the three basic desired filter characteristics.



## Cavity electrical properties



### Field configuration:

As we said above, our signal in the cavity is in the form of induce an electro-magnetic (E-H) field. The electric lines of force (E) lie parallel to the length of the cavity. The magnetic force lines lie at right angles, in concentric circles around the center conductor.

### Resonant Frequency:

To establish the operating frequency of a coaxial cavity, we merely make the length of the center conductor roughly 1/4 wavelength. At 146 MHz the cavity's center conductor it is roughly 50 cm long. The resonant frequency is determined almost exclusively by the length of the center conductor.

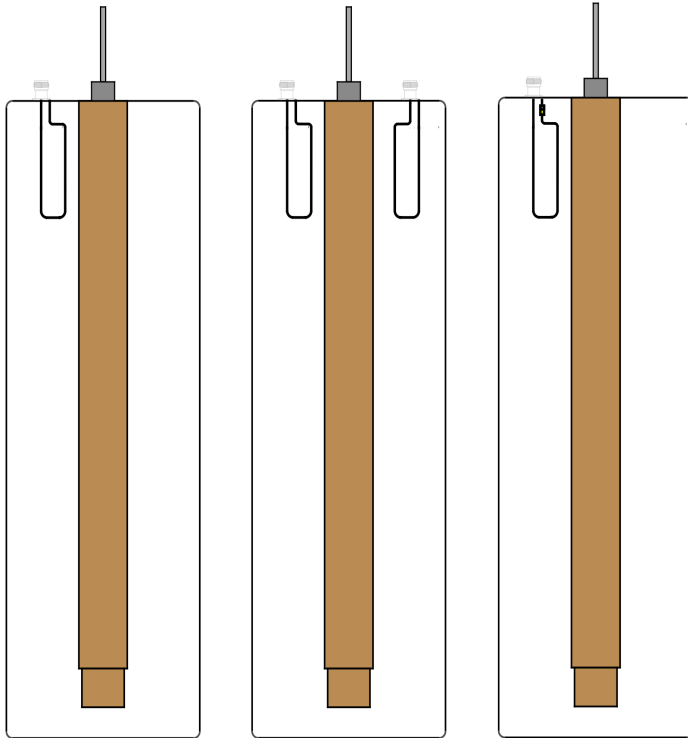
### Energy coupling

The next main concept has to do with how best to couple RF energy in and out of a cavity. The most



## Band-Stop, Band-Pass and a combination thereof.

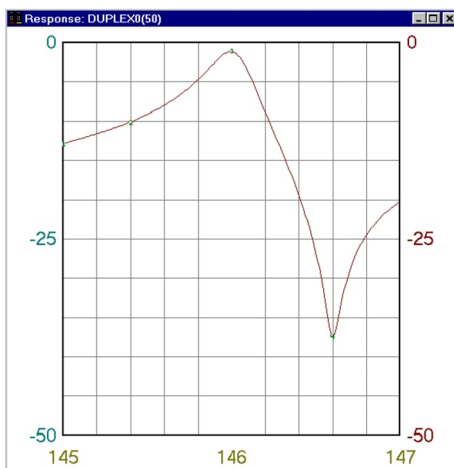
A cavity can be used as a Band-Stop, Band-Pass and a combination thereof.



Band-Stop (left) - Band-Pass (center) - Band-Pass Band-Reject. (right)

The Band-Pass Band-Reject has a small variable capacitor in series with the coupling loop as shown above. There are many ways to configure a cavity for Band-Pass Band-Reject response, but the one shown above is very convenient as the variable capacitor is tunable from the outside of the cavity.

This Band-Pass Band-Reject has a frequency response shown below:



In this example a Passband at 146.000 MHz and a notch at 146.600 MHz

In duplexers used for our repeaters, the most common configuration is a combination of 2 Band-Pass Band-Reject cavities in cascade between the antenna and the receiver and 2 Band-Pass Band-Reject cavities in cascade between the antenna and the transmitter.

The cavities are interconnected with  $\lambda/4$  cables. Why quarter-wavelength? Well, this is a whole subject in itself. Let's just say it make the rejection of the combined cavities greater than the sum of the two rejections.

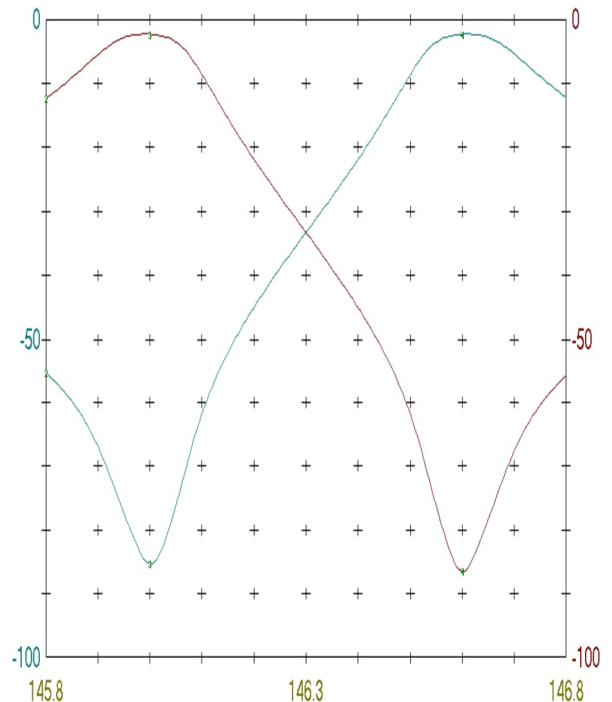
## The whole duplexer

Let's consider a repeater with a frequency of 146.600MHz (-)

This means the repeater is transmitting at 146.600 MHz and receiving at 146.000MHz

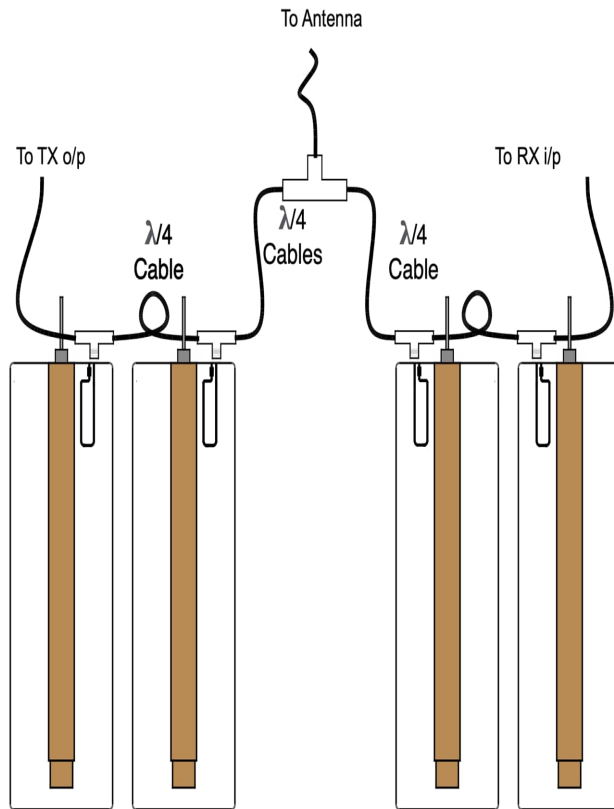
### Electrically:

The full duplexer response, using the cavity described above would look like this:



The Rx side pass the receive signal from antenna at 146.000 and filter out the transmitter frequency, while the TX side does the reverse, passing the Tx signal to the antenna while filtering any energy at the receive frequency.

## Mechanically:



**The Complete Duplexer**

### **Credits:**

Many thanks to the following for helping me writing this article:

**Doug Pearson VE3HTR**, for introducing me to the world of duplexers.

**John E. Portune W6NBC**: "*THE CAVITY DUPLEXER*" from which I got a better knowledge of duplexers and used some illustrations,

**Jacques Audet**: "*Theory and Testing of Duplexers*" providing in depth analysis of duplexer performances.

### March Guest Speaker Topic—SDR Radio with GNURADIO

Amateur radio, innovation, and how the open source software package "GNURADIO" can help hams learn about DSP (digital signal processing) techniques and develop their SDRs (software-defined radios) on their personal computers. An investment of \$20—\$50 in a basic SDR "dongle" can open the door to all sorts of interesting activity. If users don't want to invest the time to learn about DSP then they can download freely available receivers like GQRX. I'm a user and big fan of GNURADIO because it can allow hams to continue to innovate and develop new modes and techniques that will let amateur radio continue to contribute to the advancement of "the radio art", as the ITU (International Telecom Union) puts it.

New users have to put some quality time into reading and thinking about radio systems to become solid users of GNURADIO, but learning (in my opinion) is a cornerstone of ham radio. Those hams who aren't tinkering and trying new modes or techniques get stagnant, which is bad for the hobby as our bands are always under pressure from private interests who want our frequencies for commercial services. GNURADIO is free, and there are tons of tutorials, free books and free courses (for example, on YouTube) about it. The learning curve takes some work but users learn an awful lot about how radio and radio systems work.

Kevin has been an Amateur radio since 1977 and has experience in DX, contesting, satellite work, meteor scatter, EME and experimental packet radio systems. He has a BSc in Computing Science and an MA in Communications from Simon Fraser University. Kevin lives on Vancouver Island, BC.



## ACS Report

Earle – VE3IMP

### The SD&G RAC Auxiliary Communications Service (ACS) Group [Formerly ARES]

#### EmComm Monthly Report For Feb. 2024

**Seaway Valley Amateur Radio Club (SVARC) Inc.:** The SD&G RAC Auxiliary Communications Service (ACS) Group, a subset of the Amateur Radio Emergency Services (ARES), is associated with the SVARC.

This club continues to hold its monthly “hybrid” (in-person and virtual) meetings, featuring interesting Guest Speakers. The SVARC held its most recent “hybrid” meeting on February 28, 2024, at the *St. John Ambulance* Headquarters in Cornwall. The next meeting is planned for March 27, 2024 at the same location. The Guest Speaker will be Kevin McQuiggin (VE7ZD) who will speak on Software Defined Radios.

Coffee Klatches where members can socialize with each other are held on the 2<sup>nd</sup> and 4<sup>th</sup> Saturdays of each month, starting at 08:30AM. Following the initial test on February 20, 2024, the SVARC has confirmed that future Coffee Klatches will take place at the *Best Western Parkway Inn* (formerly Spinners), Cornwall.

The SVARC last held a Fox Hunt on November 26, 2023.

#### **Repeater Checks: (Ongoing):**

Our 8 repeater systems continue to function very well. The SVARC weekly Net is conducted on each Monday at 7:00PM (Local). The Net first starts on VE3SVC (147.180MHz.+). Checks are then made by switching the Net to the VE3PGC (UHF) repeater where an EchoLink check is performed. A check is also performed on VE3VSW, VA3FHA then DMR. This process confirms the serviceability of nearby *Seaway Valley Amateur Radio Club* (SVARC) repeater systems at least once a week, should they be required by the RAC Auxiliary Communications Service (ACS). On average there are 20 total check-ins. The weekly reporting system has been enhanced to show the names and callsigns as those who check in. This as opposed to just recording the number of weekly check-ins.

The VA3SDG-UHF repeater is now powered by a Yaesu DR-2X Fusion repeater recently purchased by the Club. This allows VA3SCG UHF to be used in FM mode and digital mode C4FM. VE3SVC- 220 MHz is temporarily off-the-air after failing recently. The cause is being investigated.

**Communications for The Raisin River Canoe Race 2024:** As is customary, several members of SD&G ARES are planning to support this year’s race planned for Saturday, April 13, 2024.

#### **Our AECs are:**

Hal Green (VE3HWG), South Glengarry,  
Ed Halliwell (VE3EAH), South Stormont,  
Doug Pearson (VE3HTR), City of Cornwall, and,  
Richard (Rick) Palmer (VA3EV), City of Cornwall.

#### **City Of Cornwall:**

Discussions with Leighton Woods (Deputy Fire Chief, Fire Services for the City of Cornwall) have not continued. While we had hoped to meet with the City of Cornwall in early 2023 this has not taken place.

#### **South Glengarry ARES Projects:**

The VA3FHA repeater (installed on Aug. 29, 2022) at the Beaver Brook landfill site, continues to function well.

Earle DePass, (VE3IMP)

Group Coordinator (GC), SD&G ARES

RAC Auxiliary Communications Service (ACS) Group.





# SVARC Calendar

Saturday, March 23rd. Coffee Klatch – Best Western

Wednesday, March 27th. SVARC Meeting – St. John Ambulance—Kevin McQuiggin, VE7ZD—digital radio modes and the relationship to SDR. (Software Defined Radios)

Wednesday, April 10th. Youth Engagement Fair – Cornwall Civic Complex - Salons A, B, & C 4:00 PM to 9:00 PM

Saturday, April 13th. Raisin River Canoe Race

Saturday, April 13th. Coffee Klatch – To be Announced.

Wednesday, April 24th. SVARC Meeting – St. John Ambulance—ICOM Canada Presents the Twins IC-705 & IC-905

Saturday, April 27th. Coffee Klatch – To be Announced.

Saturday, May 11th, Rideau Lakes Amateur Radio Club, Smith Falls, Ontario ([Details here](#))

Saturday, May 11th. Coffee Klatch – To be Announced.

Saturday, May 25th. Coffee Klatch – To be Announced.

Wednesday, May 29th. SVARC Meeting – St. John Ambulance—[XIEGU X6200 Transceiver](#) and FIELD DAY ANTENNAS

Saturday, June 8th. Coffee Klatch – To be Announced.

Friday, June 21st. Drop off / Set up of Field Day Equipment – Location TBD

Saturday, June 22nd. Field Day – Location TBD

Saturday, June 22nd. Coffee Klatch – Field Day Location

Sunday, June 23rd. Field Day – Location TBD

Wednesday, June 26th. SVARC Meeting – St. John Ambulance