



70th Anniversary of Amateur Radio at Eureka Part 2: The VY0ERC Club Station

Pierre Fogal, VE3KTB, John Gilbert, VE3CXL and Alexey Tikhomirov, VE1RUS

Part 1 of this article in the May-June 2017 issue of TCA told of how the weather station at Eureka, then the most northerly post office in the world was established in 1947. From the beginning, Amateur Radio provided a vital link for the eight-person station staff and, under the station call sign VE8MA, Amateur operations continued for many years. The year 2017 marks the 70th anniversary of the establishment of the station. VE8MB was established at Resolute Bay in Nunavut three months after Eureka and is also celebrating its 70th anniversary. Eureka is located in the Canadian Arctic on Ellesmere Island at approximately 80°N, 86°W. **Note:** All photos are from the collections of Pierre Fogal and Alexey Tikhomirov.

2017 marks a year-long celebration of Canada's 150th birthday, highlighting significant nation building milestones and celebrating our many diverse regions including the Canadian North. The 70th Anniversary of the establishment of the Eureka Weather Station, with its long service in meteorology and other scientific observations and research, is an important and visible example of such a milestone. Its meteorological services continue today along with the Polar Environment Atmospheric Research Laboratory (PEARL), recognized worldwide for its scientific contributions. Amateur Radio has played its part in this history and is being acknowledged here as part of the 70th anniversary of Eureka.

Amateur Radio contacts with Eureka and Ellesmere Island are much sought after today by Amateurs worldwide. Contacts from both are rare. On-the-air casual operation and contests routinely generate statements of appreciation, providing a needed contact for one Amateur Radio award or another.

Two of the co-authors of the current article, Alexey (Alex) Tikhomirov, VE1RUS and Pierre Fogal, VE3KTB, have been operating from Eureka for the last few years using their own call signs with the prefix VY0.

The third co-author, John Gilbert, VE3CXL, operated from Eureka from 1956-58 using the VE8MA call sign. All three have enjoyed contesting and DXing from this unique location.

The return of NA-008 to the airwaves from Eureka in recent years has been closely tied to the research conducted at PEARL operated by the Canadian Network for Detection of Atmospheric Change (CANDAC; <http://www.candac.ca>). CANDAC-related activations began with Robert Albee, AG0DX (formerly KC0VEU) in 2012 using a Yaesu FT-897 transceiver and wire antennas.

The return of Amateur Radio to Eureka on a consistent, albeit intermittent, basis began in 2014 when Pierre carried his Kenwood TS-570 in for a three-week period in mid-March. He and the rig would return again in June and then October. It was during that October trip when Alex was first active from Eureka. Both Alex and Pierre are atmospheric scientists working as a part of the CANDAC and often travel to Eureka where they perform their regular duties and, when time permits, operate an Amateur Radio station. Their work shifts typically span two weeks to three months

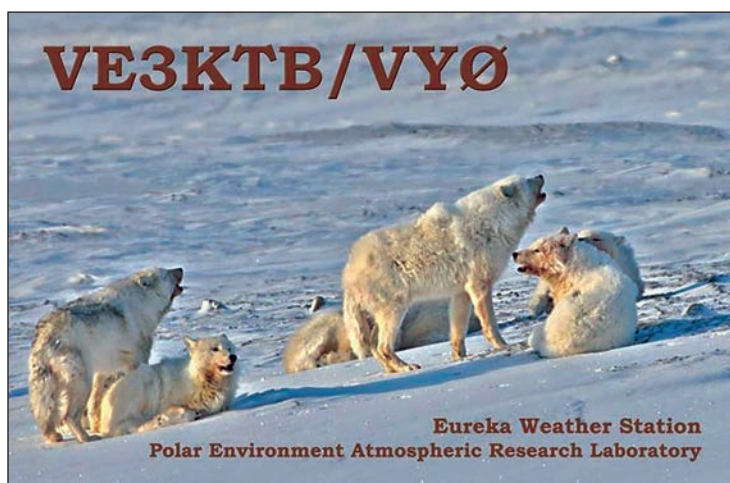


Figure 2: Eureka Weather Station QSL cards and occur several times per year. During these periods they reside at the Eureka Weather Station in Eureka, Nunavut, X0A 0G0 (see Figure 1). In accordance with the regulations governing Amateur Radio in Canada they have signed portable VY0 with their personal call signs (see Figure 2).

In February 2015, the station attained a more permanent basis with the acquisition and transport of a used Kenwood TS-480HX transceiver acquired from Ronnie Smith, VE3NLS and a Cushcraft R5 vertical from

Figure 3:
The PEARL Ridge Lab, current home for VY0ERC.

Jim Flowers, VE1JIM (currently VA7JSF). The TS-480HX, the R5 as well as the MFJ-941e tuner, an Astron power supply, and a lot of useful bits and pieces brought by Pierre earlier, became the main



components of the shack. In addition to the R5, antennas have been constructed mainly of wire. They have included a multiband loop, multiband dipoles, 40m dipole, 40m sloper, a 40m half-square and 160-40m Beverage antenna. The other notable antenna is a homebrew 20m Moxon built from a combination of telescoping aluminum tubing and PVC conduit.

In early 2016, Alex became the trustee for VY0ERC and with that the Eureka Amateur Radio Club (EARC) was formed with Alex, Pierre and John as the club's initial members and Executive. The establishment of a radio club at Eureka was inspired by the commemoration of Canada 150 and the 70th anniversary of the weather station. The establishment of a radio club so far north was not undertaken lightly. The reasons for the station, accepted by the licensing authorities, are as follows:

- 1) It promotes Canadian Amateur Radio, bringing attention to Nunavut and to a remote place such as Ellesmere Island.
- 2) The use of a consistent call sign with VY0 prefix clearly identifies operations from Nunavut and provides a Northern voice consistent with the Canada 150 aims.
- 3) It re-establishes the long tradition of an ongoing Amateur Radio presence at Eureka. The first radio contact from Eureka took place in 1947 as VE8MA when the Eureka Weather Station was established as a part of the Joint Arctic Weather Stations program (see Part 1 of this article in the May-June 2017 TCA). Eureka and the other High Arctic Weather Stations had Amateur stations for many years. Amateur Radio has been an integral part of the history of these remote stations.
- 4) It restores an HF communications capability to the Eureka Weather Station's environs providing the possibility of HF emergency communications for the station and region in a manner consistent with the best traditions of the Amateur Radio Service.

5) It allows the further exploration of HF propagation to and from the High Arctic through the operation of beacons and related equipment in support of 21st century Amateur Radio activities which encourage young people to explore new ideas and innovation.

6) It provides visiting Radio Amateurs with the opportunity to operate from a unique and unusual location.

The Eureka Amateur Radio Club is located in the environs of the Eureka Weather Station which is itself located at 79° 59' N, 85° 56' W on Ellesmere Island IOTA NA-008. VY0ERC operates from the CANDAC facility, known as the Ridge Laboratory (Ridge Lab; see Figure 3) approximately 11 kilometres as the crow flies from the weather station. The Ridge Lab was built in 1992 specifically for the study of stratospheric ozone by the Meteorological Service of Canada (currently Environment and Climate Change Canada). It is located on a ridge that runs approximately North-South at an altitude of 610 metres. The observatory includes four large laboratories (total area of approximately 120 square metres) and a rooftop observing platform (total floor area of approximately 350 square metres) for instrumentation. It is in all respects a self-contained state-of-the-art scientific laboratory.

It is located at 80° 3' N, 86° 25' W. The separation is significant as the weather station is in grid square EQ79ax and the Ridge Lab is in grid square ER60tb, and since the Ridge Lab is above 80° N, it is in ITU zone 75 rather than ITU zone 4. Both are located in CQ zone 2. The Club Station VY0ERC took to the air, with Alex at the controls, on January 26, 2016. The first QSO was on 40 metres between Eureka and Sable Island (CY0/VA1AXC, op. Aaron).

Unlike stations in the more populated parts of Canada, VY0ERC faces conditions not generally encountered in southern Canada. In particular, Eureka is a base for scientific activities and has no permanent residents. Given the remote

location of Eureka, there is not likely to ever be a "resident" Amateur population. Eureka has a permanent complement of eight weather station staff to which CANDAC adds anywhere from one to 12 people from time to time. Conditions at the station, from an Amateur Radio viewpoint, offer both challenges and opportunities:

- 1) The station will operate as long as CANDAC staff, such as Alex and Pierre, are involved in some kind of program in Eureka.
- 2) As with Amateur Radio at the station from the earliest days, Amateur operations must not interfere with the measurements being carried out by the scientific programs. This limits antenna locations as well as their uptime.
- 3) The costs associated with the club station are the responsibility of the club members. However, contributions to defray the costs may be sought in the same way that Amateur Radio operations in remote and out-of-the-way locations have always been funded. These might be



Figure 4: Pierre (left) and Alex (right) after R5 Cushcraft installation at the PEARL Ridge Lab roof before the 2015 CQ WW SSB.

traditional mechanisms or modern methods such as crowdsourcing. Any such approaches will be properly documented and open to scrutiny.

4) Club membership is open to all interested Amateurs. Those who might actually visit Eureka are particularly welcome. Radio Amateurs with an interest in encouraging Amateur Radio in Nunavut and the Northwest Territories are invited to join. Visitors, such as those on cruise ships, might welcome the opportunity to operate at such an interesting location.

Perhaps the most significant challenge faced at VY0ERC is keeping antennas in the air. In the 1950s, John operated effectively from Eureka using fixed Vee Beams and the logic of being “on top of the world”, where all directions are south, was employed. For the most part, current antennas are not rotated either and are fixed with the preferred directions being either south, to cover the Americas, or northeast to cover Europe, Asia and Africa.

While the lack of a rotator does likely impact ultimate signal strength, the few times we have attempted to use one with the 20m Moxon antenna have not gone well, with the rotator seizing in the extreme cold. It has shown us that the uptime for it is fairly low from October to May when temperatures are typically ranging from the mid-20s °C to the mid-40s °C. Winds can reach 100 knots several times a year and, perhaps more importantly, they can be consistently in the 40 to 60 knot range for several days at a time.

The boom of the Moxon antenna is constructed of 1.25-inch in diameter thick-wall aluminum tubing and it is now noticeably S-shaped. The Cushcraft R5 vertical is mounted on a steel pole which is fastened to the roof of the PEARL Ridge Lab approximately three metres above the roof deck, and therefore approximately 10 metres above the ridge itself (see Figure 4 on the previous page). It also has suffered significant wind damage on multiple occasions, requiring it to be rebuilt.

Typically, the Moxon is removed and lashed to the roof structures whereas the R5 and dipoles may be left in position to operate for as long as they survive. In 2016, the R5, together with the 40m dipole and sloper, were left in position at the end of March. They survived until a storm in mid-June at which point all three were destroyed, in part due to a relatively recent weather phenomenon, icing. Prior to 2015, the Ridge Lab had not been subject to the formation of hard ice, although it could be subjected to the growth of a considerable amount of frost. During September and October, as much as 15 centimetres of frost can accumulate overnight on any surfaces on the Ridge Lab roof due to the combination of colder temperatures and open water in Eureka Sound and Slidre Fjord. However, the summers of 2015 and 2016 have both had events in which hard water ice has formed with disastrous implications for antennas.

Once all the antenna challenges are dealt with we are still left with the challenges presented by propagation. Due to its extreme northern location, any Amateur Radio activity in the vicinity of Eureka must deal with the impact of the auroral oval. As readers are likely aware, the North Magnetic Pole moves around and recently has been located some few hundred kilometres more or less due west of Eureka.

Of even greater importance, is the geomagnetic pole and this is located just east of Eureka, also on Ellesmere Island (see <https://spaceweatherlive.com/>). As can be seen in Figure 5, this means that Eureka and its environs are pretty much dead centre of the auroral oval and its related impacts on HF propagation. When this is coupled with the extreme diurnal solar position – which gives us a “typical” night and day for only a few weeks per year – we find that there are severe restrictions on which bands are available to us. Far and away, the most consistent band is 20m. The higher bands (15m, 12m, 10m) are generally

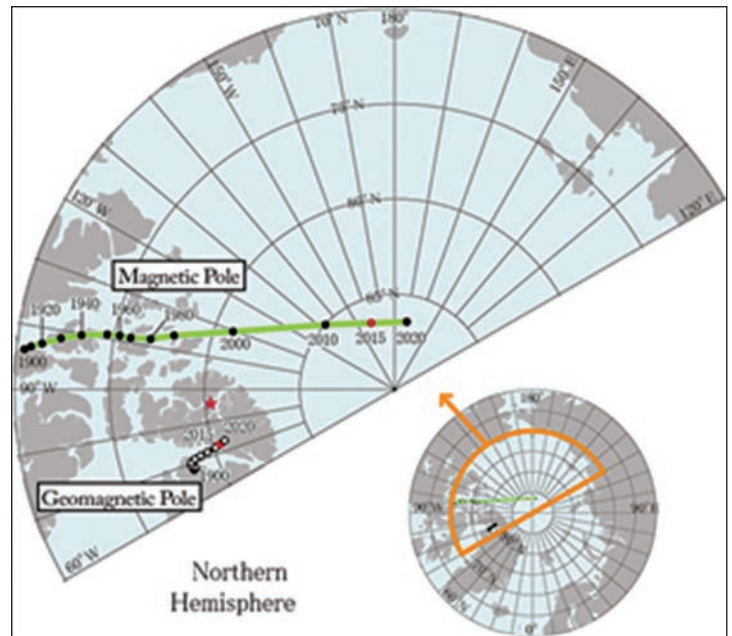


Figure 5: Position of the magnetic and geomagnetic pole relative to Eureka, NU.

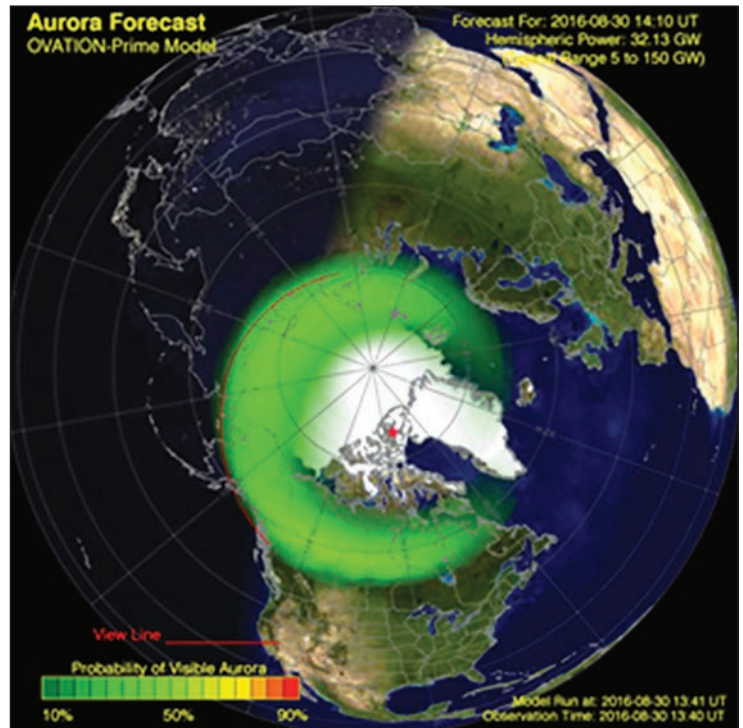


Figure 6: Auroral forecast indicating position of auroral oval with respect to Eureka, NU.

not available from late October to early March unless we are near the peak of the 11-year sunspot cycle. 40m and 80m are generally not available during the period from April to September when the Sun is above the horizon for 24 hours a day. The auroral oval position computed for late August is shown in Figure 6 (see <http://wdc.kugi.kyoto-u.ac.jp/poles/polesexp.html>), with the approximate position of Eureka indicated by the red star. It is clear from the Figures that signals to and from Eureka will be significantly impacted by the auroral oval.

VY0ERC activities include the usual Amateur modes. Thus far, most activity has been on SSB, with some digital in the form of RTTY, PSK31, JT65 and WSPR. As yet we have not undertaken much CW, but we are working on improving our skills there.



Figure 7: Alex checking equipment after antenna installation.

Given that we are heavily involved in various flavours of atmospheric and physics research, VY0ERC is very interested in participating in experimental undertakings. We are also interested in participating in outreach should any southern stations wish to arrange for a contact for public or school events.

VY0ERC is on the air for multiple weeks three to six times per year as Pierre and Alex visit PEARL in support of the atmospheric measurements program. Operations are as the work schedule permits. Local network connections are excellent and provide the capability to operate the TS-480 from the weather station, where the operators eat and sleep. The operators are avid contesters and place VY0ERC on the air for any major contests that occur while they are on site and have spare time. VY0ERC was in operation for part of 2016 and part of 2017. Statistics for the VY0ERC are shown in Table 1 at the top right.

Propagation conditions have not been ideal but results in the ARRL DX Contest (SSB) on March 5-6, 2016 justified interest in the station. Pierre had 442 contacts and 71 countries during the contest. Each day produces different conditions and, for example, the third day produced only 100 contacts but gleaned a good number of multipliers. 15m, not expected to be open, produced a few contacts to the West Pacific even after it had closed to Europe. Sunday, March 6



Figure 8: Pierre getting ready for a QSO using his Kenwood TS-570D.

TABLE 1: VY0ERC STATION'S CONTEST STATISTICS

Contest	# of QSOs	Time on the air in hours
2016 WAE RTTY	30	~4
2016 ARRL DX SSB	442	~20
2016 IOTA SSB	497	12
2016 CQ WW SSB	98	15
2016 CQ WPX SSB	509	~23
2017 CQ WPX RTTY	216*	~16
2017 ARRL DX SSB	128*	~9
2017 CQ WPX SSB	279*	~18

Note: in the above Table an * indicates claimed scores

produced a number of contacts to the Caribbean. The lesson seems to be that there is always propagation to somewhere, but maybe not where anyone expects to hear a VY0.

John's stories of hearing South African stations at noon, during the dark period, show that there remains much to be learned about operating from the top of the world.

As we described earlier, the sun is not above the horizon from October 20 to February 20 and this greatly affects propagation. In the 2016 CQ WW SSB contest, Pierre and Alex struggled to make 104 QSOs in 48 hours while back in 2015, using the VE3KTB/VY0 call sign, they conducted 529 QSOs from the same location. Quite often we observe situations when other stations report that our signal is strong, but we cannot hear other stations calling us. Details of our more significant contest efforts can be found in Table 1.

We are also grateful for the opportunities offered in special events such as the North Country DX Association (NCDXA) sponsored "RST" event to promote Amateur Radio activity in the far north (February-March 2016: 441 QSOs) and the VE100VIMY/VY0 special event celebrating the 100th anniversary of the Battle of Vimy Ridge (February 19-25, 2017: 302 QSOs).

A useful resource that can be consulted to gauge propagation are the RBN reports for the VE8AT beacon located at the weather station. VE8AT is a part of the NCDXF/IARU International Beacon Project and has been sponsored by the Northern Alberta Radio Club (<https://www.narc.net/>) for many years.

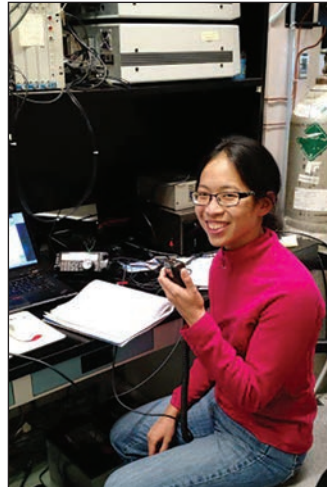


Figure 9: Rachel, VA3CYW, an atmospheric scientist and Assistant Professor from Dalhousie University is introduced to the pileup from the "DX" side.

Another resource to observe current propagation conditions is the WSPR project. The club's radio is set as a WSPR beacon from time to time. The VY0ERC WSPR is being tracked by stations around the world. The enthusiastic reception of the Eureka WSPR, and the clear evidence that there are propagation paths from the High Arctic still to be explored, has been instrumental in generating

enthusiasm to install a WSPR beacon on the ship *Polar Prince* in the Canada C3 Expedition (<https://canadac3.ca/>), a key event of the celebrations of Canada's 150th birthday

Pierre, Alex and John encourage all interested Amateurs to join them as members of the Eureka Amateur Radio Club. Amateur Radio activity is expected to continue and hopefully increase at VY0ERC.

Alex and Pierre would like to acknowledge the support received from friends at the Eureka weather station and CANADC colleagues, specifically James Drummond of Dalhousie University. Without the forbearance of all of the above, it would be very difficult to operate from Eureka.

We sincerely appreciate help from Charles Wilmott, M0OXO, who provides QSL service for us (<http://www.m0oxo.com>).

Our contact information is as follows:
 Email: vy0erc@gmail.com
 Web: <https://www.qrz.com/db/vy0erc>
 Twitter: <https://twitter.com/vy0erc>

Note: Short bios of each of the authors can be found on page 18 of the May-June 2017 TCA.