An Introduction To

Amateur Radio Onboard SS Keewatin

ITU Zone: 04 CQ Zone:04

VA3VGC

Grid: FN14sf

Maritime Radio Call Sign - VGMC

Donated by: Pieter Kooiman VE3NXE

A Proven Pedigree in Performance
The TS-590SG

HF/50MHz TRANSCEIVER
TS-590SG

QSL via: Ron Walsh VE3GO

S.S Keewatin (kee-wey-tin)
Built 1907 in Glascow, Scotland
Owned and operated by CP Rail

Great Lakes Museum
55 Ontario Street, Kingston ON K7L 2Y2

Guest Operators - Please Do Not alter Operating System or Program settings. Please contact admin (VE3ORY) for assistance.

Rick Reeve VE3ORY / CIW622

What is Amateur Radio?

The Amateur Radio hobby (often referred to ‘Ham’ Radio) is enjoyed world-wide by more than 3 million licensed radio operators.

The Amateur Radio license offers radio operator’s access to designated portions of the entire radio frequency spectrum for the purpose of conducting non-commercial communications.

‘Ham’ operators are also able to provide emergency or remote communications completely independent of internet or other commercially based infrastructure.

Within the regulations, licensed ’Ham’ operators are also allowed to build and experiment with their own equipment and methods of transmission.

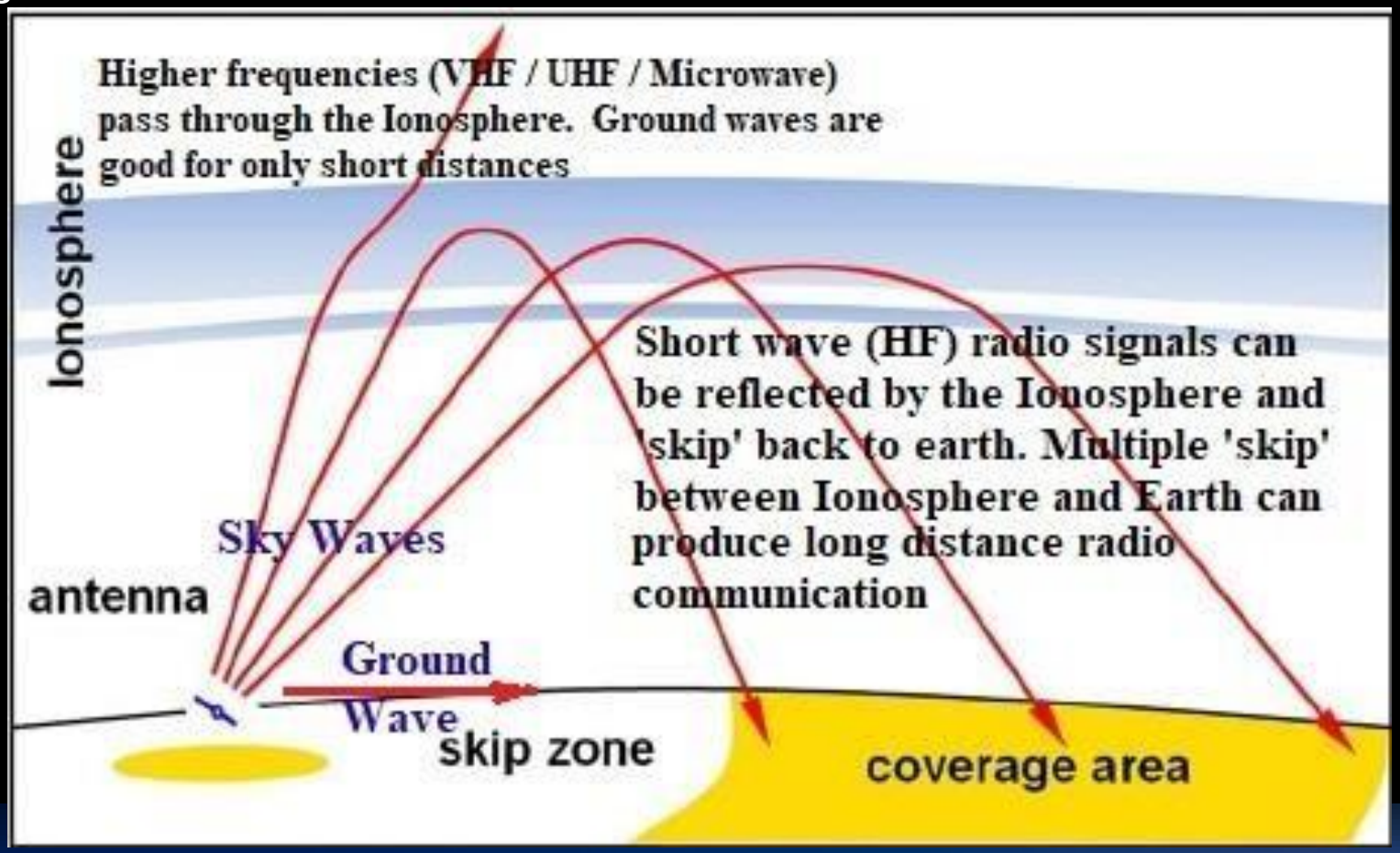
Although not strictly necessary, computer technology also plays a large part in today’s Amateur Radio hobby.

This fascinating hobby is constantly evolving with changes in radio technology...there is always something new and exciting to experiment with.

Radio Signal Propagation

Radio signals can be propagated by different means , and are influenced by many different factors…frequency / solar activity / time of day / time of year / atmospheric conditions / electrical noise/ Doppler effect / absorption / refraction.

Determining a reliable radio communication path involves having to understand some of the science of radio propagation.



Examples of Radio Propagation Methods

VHF / UHF Ground Waves – (Very High and Ultra High Frequency) ground wave signals are generally only good for 'line of sight' transmission between the antenna and the horizon. Ground based repeater stations, can receive and re-transmit to extend the range of these transmissions. Keewatin's radio station includes a separate radio for amateur VHF use. The Kingston Amateur Radio club operates a local VHF repeater that we can access to extend coverage of these transmissions.

Very High Frequency (VHF / UHF/ Microwave) Sky Waves - Sky waves at VHF / UHF frequencies tend to pass through earth's Ionosphere with little refraction or absorption, and are therefore most effective for communication via satellites. Some of the more exotic forms of propagation involve reflecting VHF and UHF signal off of the Moon or Meteor Trails. These forms of transmission require some rather elaborate antenna arrays.

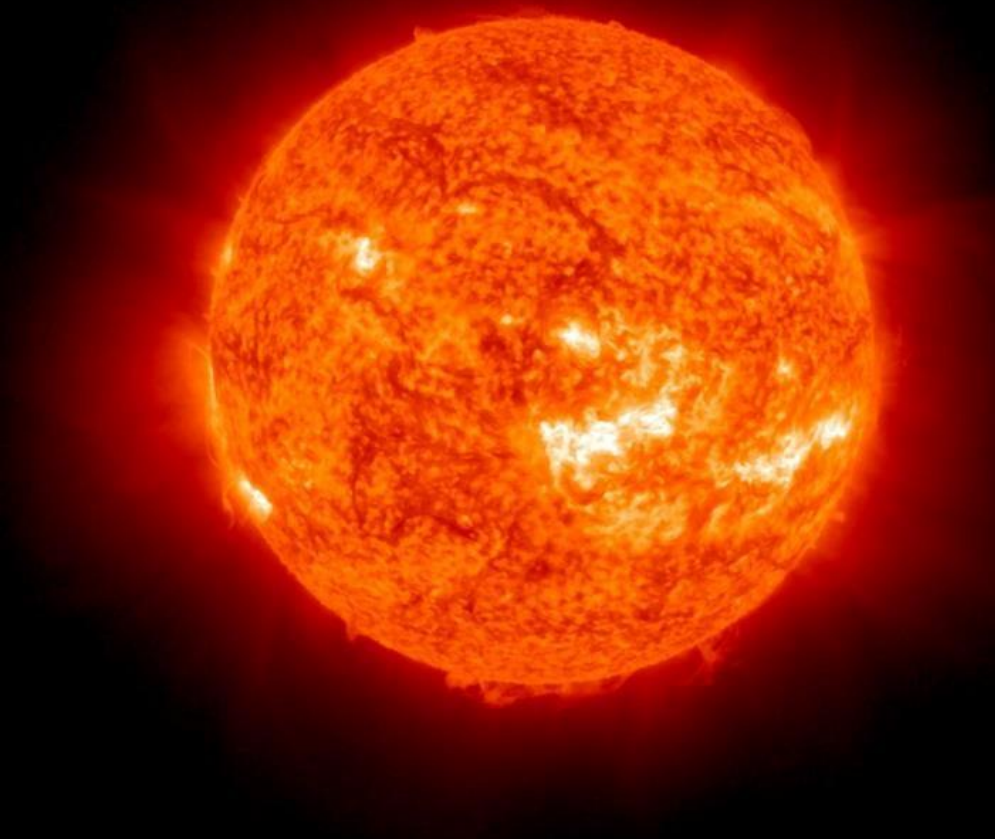
HF Sky Wave Propagation – depends largely on frequency of the transmitted signal and degree of ionization of the Earth's Ionosphere (which is a function of Solar Activity). Signals in the frequency range below VHF are technically referred to as HF (High Frequency), sometimes referred to as the 'Short Wave' bands and generally considered to be frequencies between 3 MHz and 30 MHz.

HF sky wave signals suffer more absorption as they travel through the Earths atmosphere, however they are also refracted by the Earth's ionosphere, which is ionized to varying degrees by our sun's activity. As a result, HF signals can be reflected from the Ionosphere back to earth, and received by stations at great distances. Depending on many factors, signals can be skipped multiple times between the Earth's surface and the Ionosphere, making world-wide radio communication possible under the right conditions.

Our Sun's activity has a major and constantly changing effect on this type of communication.

SolarHam

by Amateur Radio Station **VE3EN**



GOES-16 SUVI Composite 304 Angstroms 2024-07-30 09:32:

Because HF radio propagation is so significantly determined by the sun's affect on Earth's Ionosphere, radio Amateurs monitor solar activity pretty closely.

Sunspots as shown here, are one of the major factors that influence the degree of ionization occurring in our Ionosphere, and the resulting impact on HF radio communication.

Sunspot activity is constantly changing but generally follows an 11 year cycle. We are currently at the upswing (increasing sunspots) of Solar Cycle #25, which is predicted to peak within the next 2 years, making for exciting opportunities in long distance HF radio communication

More information on the latest solar activity at →

SolarHam by Amateur Radio Station VE3EN

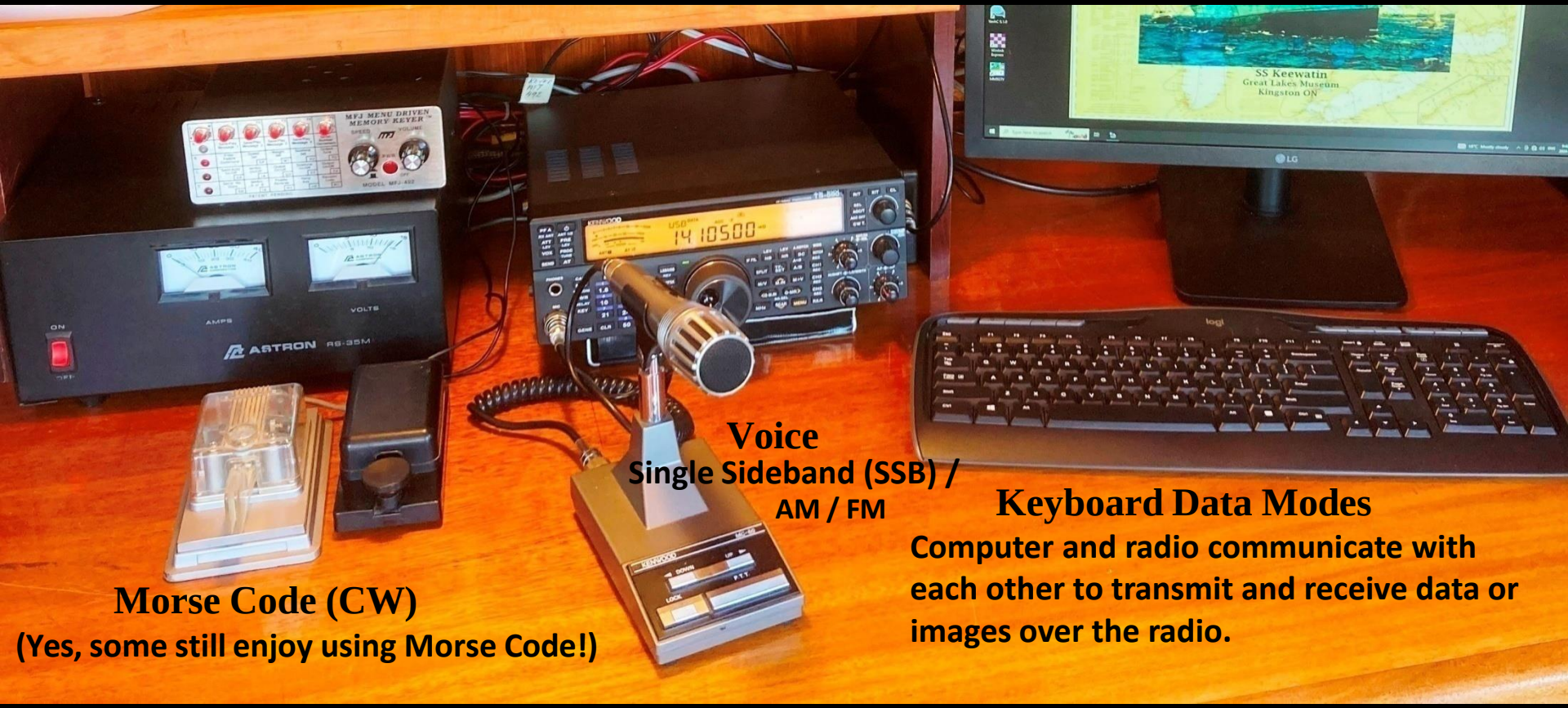
What's with these Antennas?

Radio antennas are most efficient when they are resonant on the frequency for which they are to be used. Antenna size is based generally on multiples of ½ wavelength. The HF antenna that we have installed on 'Keewatin' is resonant on multiple radio bands, the lowest of which is the 80 meter band. The electrical half wavelength of a wire antenna for 80 meters is roughly 132 feet. . . the distance between the end insulators on this antenna.

The Amateur Radio Station Onboard SS Keewatin

The radio shown here provides both transmit and receive capability…able to supply 100 watts of radio frequency energy to an appropriate antenna and covering designated amateur radio portions of the radio frequency spectrum between 1.8 MHz and 50 MHz

Numerous methods of transmission are available today. VA3VGC will be capable of using most of them.



Voice

Single Sideband (SSB) / AM / FM

Keyboard Data Modes

Computer and radio communicate with each other to transmit and receive data or images over the radio.

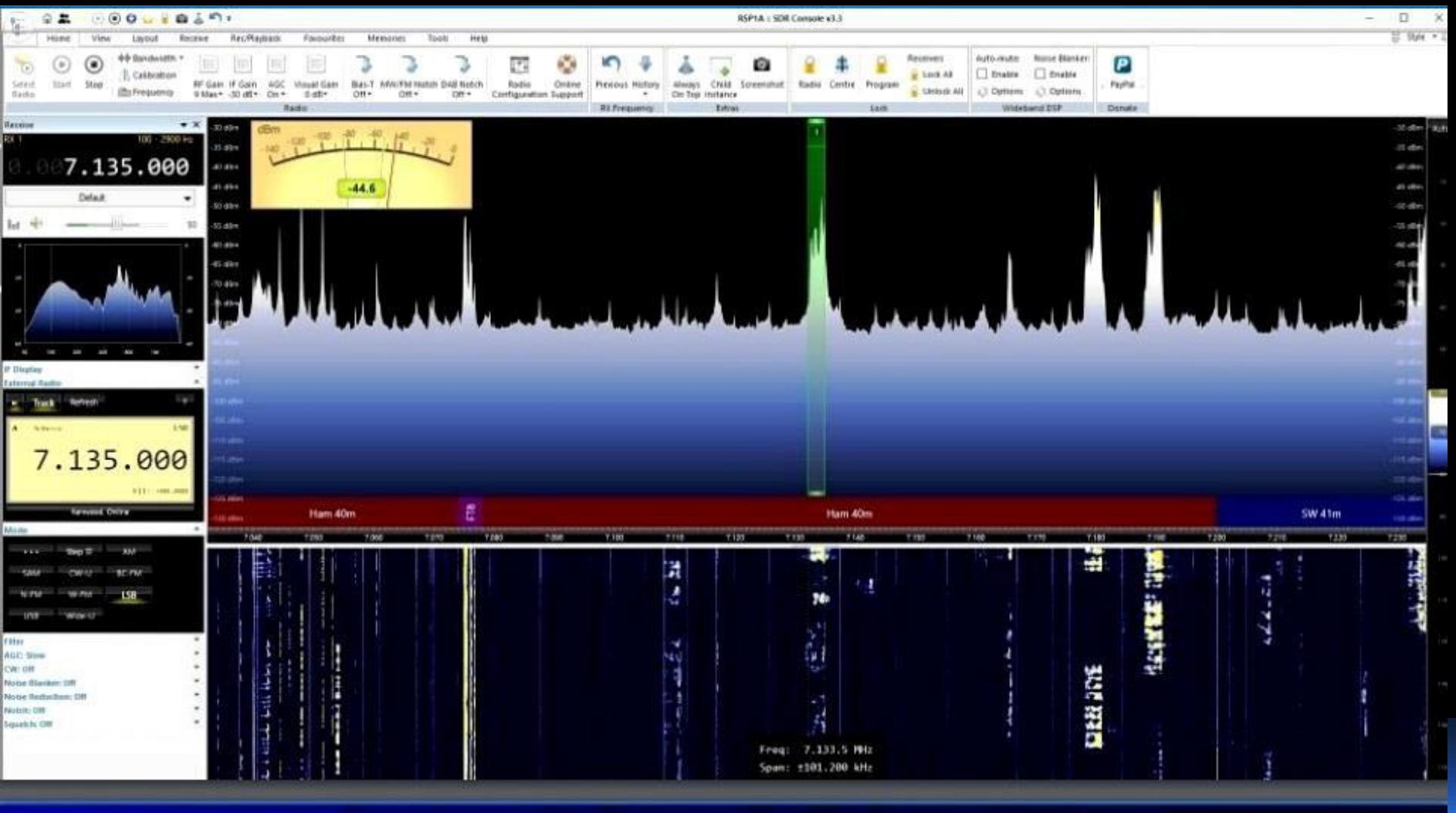
Morse Code (CW)

(Yes, some still enjoy using Morse Code!)

Computers and Amateur Radio

Since its' inception, computer technology has played an integral role in enhancement of Amateur Radio. The combined evolution of radio and computer technology offers amazing possibilities in modern communication. Radio amateur experimenters continue to have a cutting edge role in these developments.

Here, a software defined radio (SDR) is being used in conjunction with the VA3VGC radio transceiver to provide, in real time, a visual display of all the signals being received on the band to which the radio is tuned. Called a Pan-adapter Display, the radio's tuning and adjustment can also be controlled from this computer screen.



What is a Radio Station Call Sign?

Global radio communications are governed by the International Telecommunications Union (ITU) . Amateur Radio is represented by the International Amateur Radio Union (IARU) , which is made up of more than 160 member countries and recognized by ITU.

The governing body of each member country issues radio station call signs based upon an internationally agreed upon system. In Canada, radio station call signs are issued to licensed operators by the federal government's 'Innovation, Science and Economic Development' (ISED)

Each radio station's assigned call is globally unique. The call sign issued by ISED for SS Keewatin is VA3VGC. This call sign is not used anywhere else in the world for other than this radio station.

Because the issuance of call signs follows a globally recognized scheme, radio operators are able to determine the country of origin for any radio station being monitored. The prefix portion of the call sign indicates the country for which the call sign has been issued. And, the suffix portion of the call sign will be unique to a particular station.

Take for example Keewatin's call sign… **VA3VGC**

VA – denotes Canada / 3 – denotes Ontario / VGC - is unique to SS Keewatin

History of the VA3VGC Call Sign

You might be interested in knowing that in the early days of Maritime Radio, the call signs issued to vessels consisted of only 3 letters.

Titanic's original call sign was MUC , later changed to MGY

Some time later, 4-letter call signs were issued . Keewatin was issued the call sign VGMC

And Keewatin's sister ship SS Assiniboia was assigned VGKX

When amateur operators in Port McNicoll applied for an Amateur Radio Call Sign for operation of an amateur station onboard the ship the Government of Canada issued the call sign VA3VGC…a unique call sign not used anywhere else in the world.

So what do Amateur Radio Operators do with their hobby these days?

One of the most enjoyable aspects of our hobby has always been that the Amateur Radio License grants extensive privileges for experimentation.

The hobby is constantly evolving with changes in technology

The next few slides show just a few examples of the possibilities…

Morse Code (CW)

These days, proficiency in Morse Code is no longer required, in order to obtain an Amateur Operator's License. In spite of that, many Amateur Operators still use CW as an enjoyable means of communication dating back to the very earliest days radio.

CW (short for Continuous Wave) becomes a language of it's own… with many formal, as well some informal abbreviations , which help to speed the exchange of information.

The Morse keys have changed a little but the language of Morse Code is still essentially the same

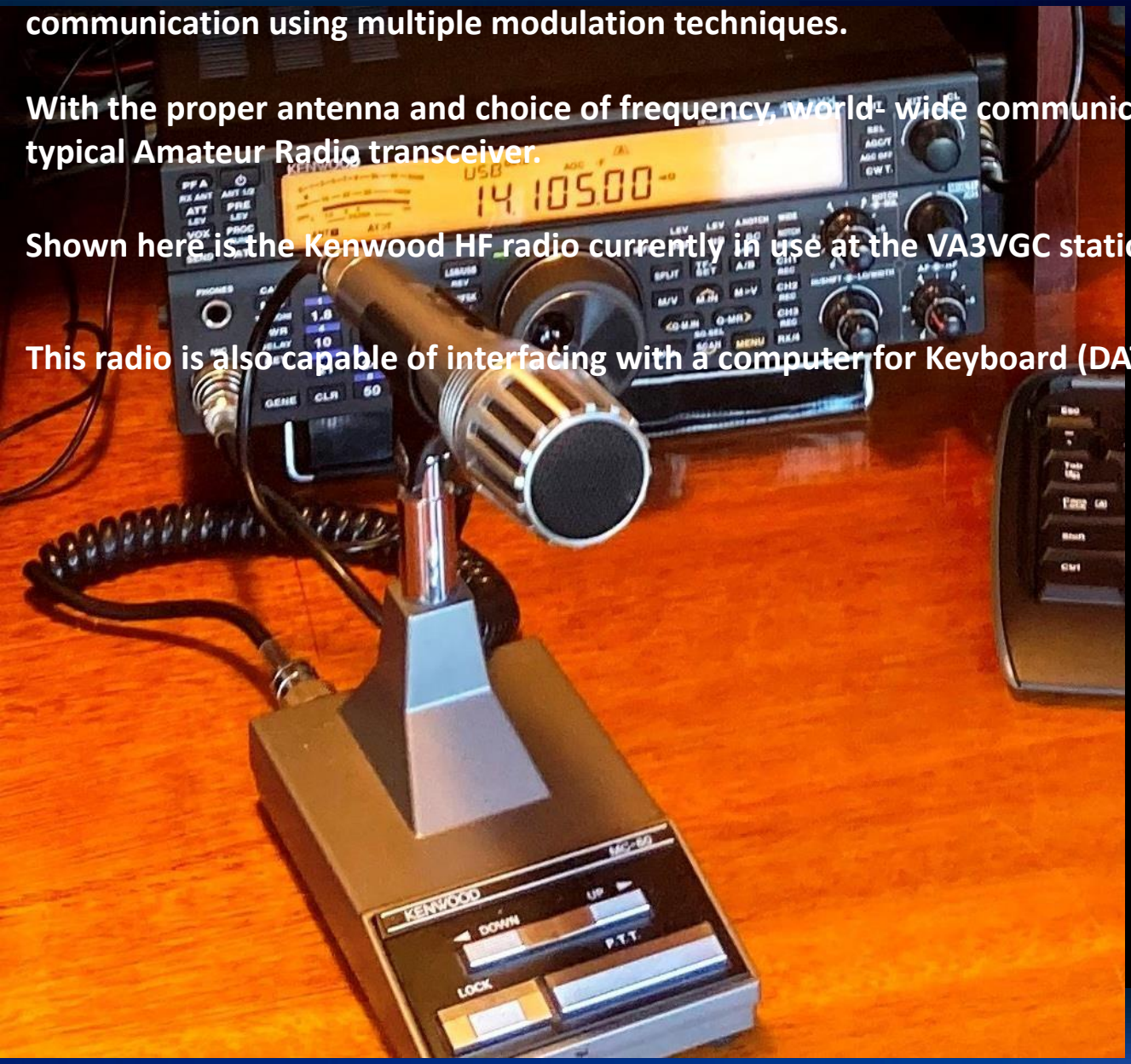
Phone (Voice) Communication

Today's communication radios provide very efficient means of transmitting and receiving voice communication using multiple modulation techniques.

With the proper antenna and choice of frequency, world- wide communication is possible, using a typical Amateur Radio transceiver.

Shown here is the Kenwood HF radio currently in use at the VA3VGC station onboard SS Keewatin.

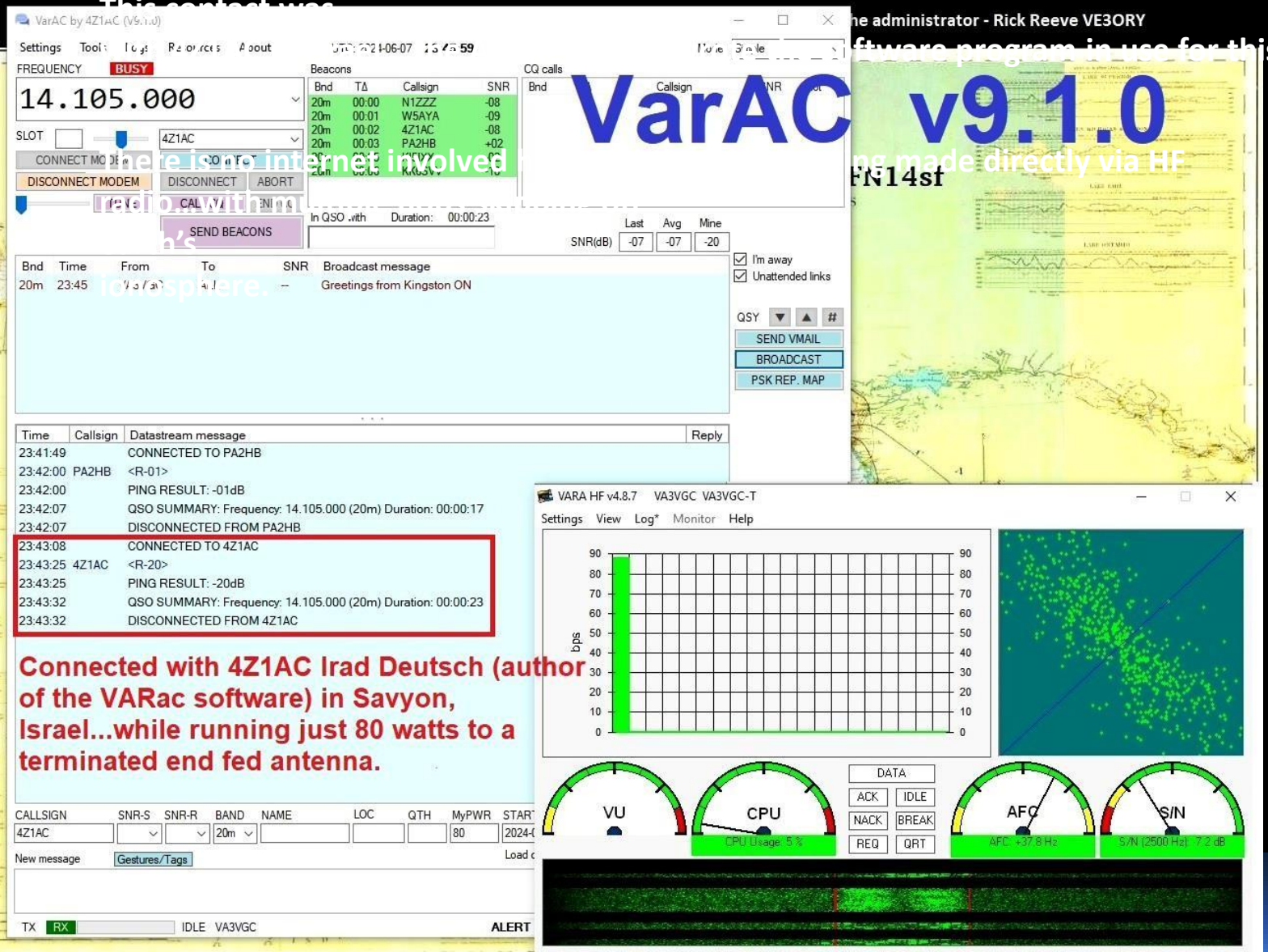
This radio is also capable of interfacing with a computer for Keyboard (DATA mode) communications .



Keyboard (DATA modes)

This image shows the computer screen display, while operating one the latest keyboard Data modes in use today. This contact was made while configuring and testing the radio and PC equipment to be installed onboard SS Keewatin.

This contact was



Satellite Communication

Many Amateurs experiment with space communications via Orbiting Satellites Carrying Amateur Radio (OSCAR) . Licensed astronauts onboard the International Space Station (ISS) also operate Amateur Radio as scheduling permits.

The image shown here was received from the NA1SS Amateur radio station onboard the space station, on 27 June 2021.

The image was transmitted directly from the ISS, and then received and decoded using a free data mode software program called Slow Scan Television (SSTV)

The transmission is using the 144 MHz Amateur band and received with a home-built antenna, designed specifically for reception of these signals.

Once again, no internet involved in this exercise. The radio signal is being received and decoded directly from the space station.

During these campaigns, the Amateur radio onboard the ISS is automatically transmitting 12 different space related images, at 2 minute intervals. The challenge is in trying to receive all 12 images, during the event.

Meteor Scatter

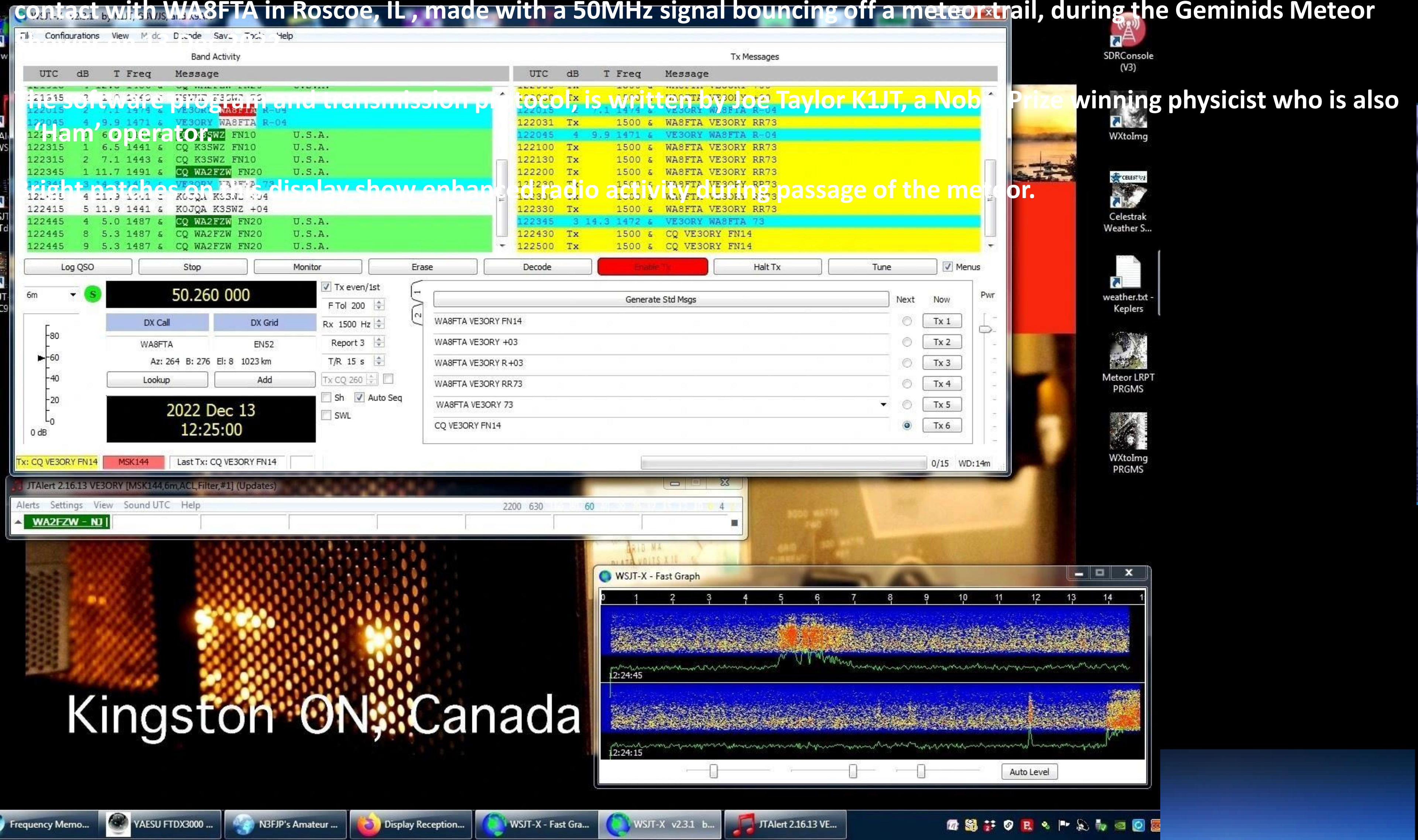
Amateurs experiment with many other somewhat exotic forms of contact such as bouncing signals off of the ionized trails of meteors travelling through earth's Ionosphere (Meteor Scatter), or bouncing signals off the moons surface back to earth (EME ,or Earth-Moon-Earth)

This two-way

contact with WA8FTA in Roscoe, IL , made with a 50MHz signal bouncing off a meteor trail, during the Geminids Meteor

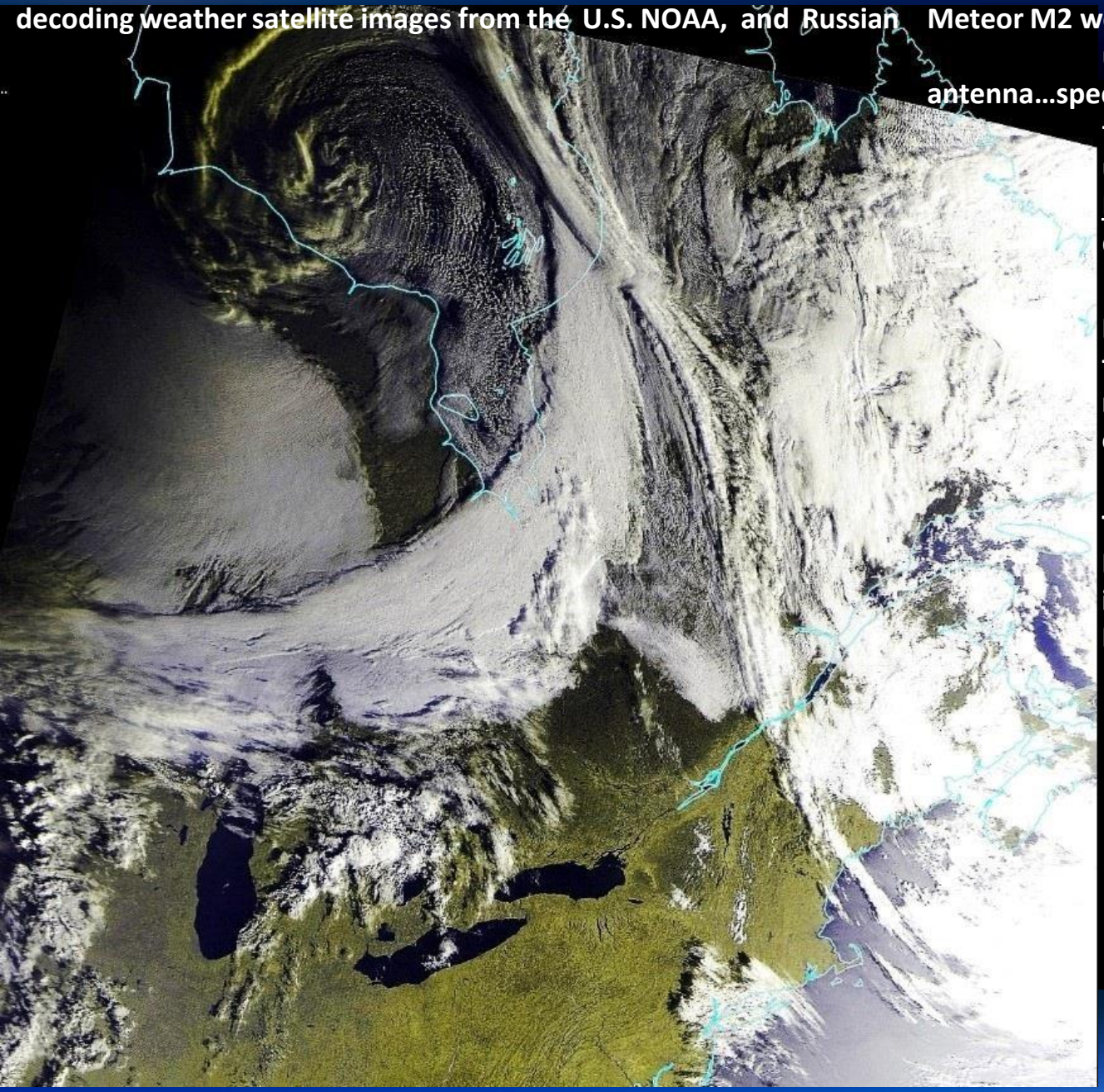
The software program and transmission protocol, is written by Joe Taylor K1JT, a Nobel Prize winning physicist who is also 'Ham' operator.

Bright patches on the display show enhanced radio activity during passage of the meteor.



Weather Satellite Decoding

Another spin-off of the radio hobby that does not even require an Amateur license. I've spent hours tracking and decoding weather satellite images from the U.S. NOAA, and Russian Meteor M2 weather satellites in low polar orbits, using another home-built antenna…specifically designed to receive these transmissions. The radio receiver used is an inexpensive 'Software Defined Radio' (SDR) and the decoding software is free.



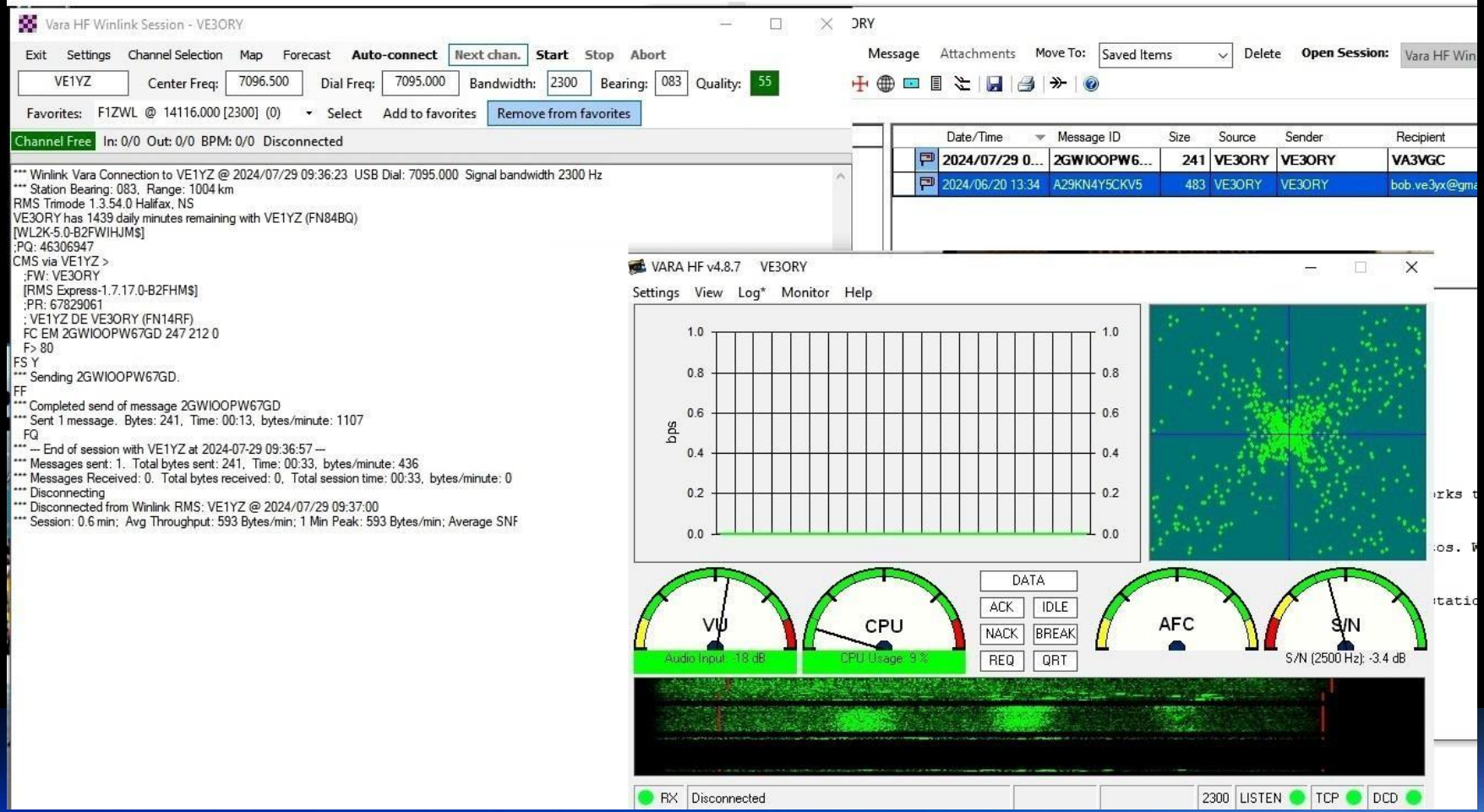
Fascinating to watch these image transmissions decoding line by line in real time as the satellite passes overhead.

This image decoded from the Russian Meteor MN2 weather satellite with its' downlink radio signal at 137.1 MHz

Email via Winlink Radio Messaging Service

'Winlink' Global Email provides capability of sending messages via a global network of Radio Messaging Stations (RMS). Messages can be sent entirely via radio links. RMS stations can also transfer messages destined for internet email addresses between the internet and the Radio Messaging Service.

One of the first contacts that I made from our VA3VGC radio station onboard SS Keewatin, was to send a messag the ship to our Museum staff via a radio connection to the VE1YZ Winlink RMS station in St.Margaret 's Bay Scotia.



QSL (Confirmation) Exchange

The Royal Research Ship JAMES CLARK ROSS was launched on 1 December 1990 by Her Majesty Queen Elizabeth II and entered service with the British Antarctic Survey in September 1991, on her first cruise to Antarctica.

The ship is built to Lloyds 100 A1 Ice Class 1A Super, has a length of 99.04m, breadth of 18.85m and maximum draught of 6.30m. Passage speed is 12 knots with an endurance of 55 days. There is accommodation for 11 Officers, 15 crew and up to 50 scientific personnel. The ship has a fully equipped hospital, some 400 square metres of Laboratory space and can carry 1500 cubic metres of general cargo, 250 tonnes of bulk aviation fuel and 300 tonnes of diesel fuel.

The Radio Room is fitted with two 800w H.F. Transceivers, two MF transmitters and a Standard A satellite terminal, all being made by Marconi Marine. The ship is registered in the Falkland Islands and it's callsign is ZDLP.

73's

GM0HCQ / MARITIME MOBILE
CONFIRMS 2X CW / ~~SSB/FM~~ QSO

WITH VE3ORY

DATE	TIME	MHz	RST
15-01-98	2214	14	439

QTH 50° South 50° West

RIG Skanti TRP8757, 90W

ANT Vertical

RNARS 3455

PLEASE QSL VIA BUREAU

RRS James Clark Ross at Stonnington Island

Amateur operators often request confirmation to validate two-way contacts with other stations…especially for contact with stations in exotic or rarely inhabited locations.

'QSL' is one of the internationally recognized radio Q-Signal abbreviations, indicating 'I have received your transmission'.

Today, online/ electronic methods are often used for exchanging QSL confirmation. However, many still prefer to exchange paper 'QSL Cards' especially for rare opportunities such as the QSL confirmation shown here.

This card, one of my all time favorites confirming a two-way Morse (CW) contact that I made in 1998 with an Amateur radio station onboard the British research vessel 'James Clark Ross' while she was in Antarctica.

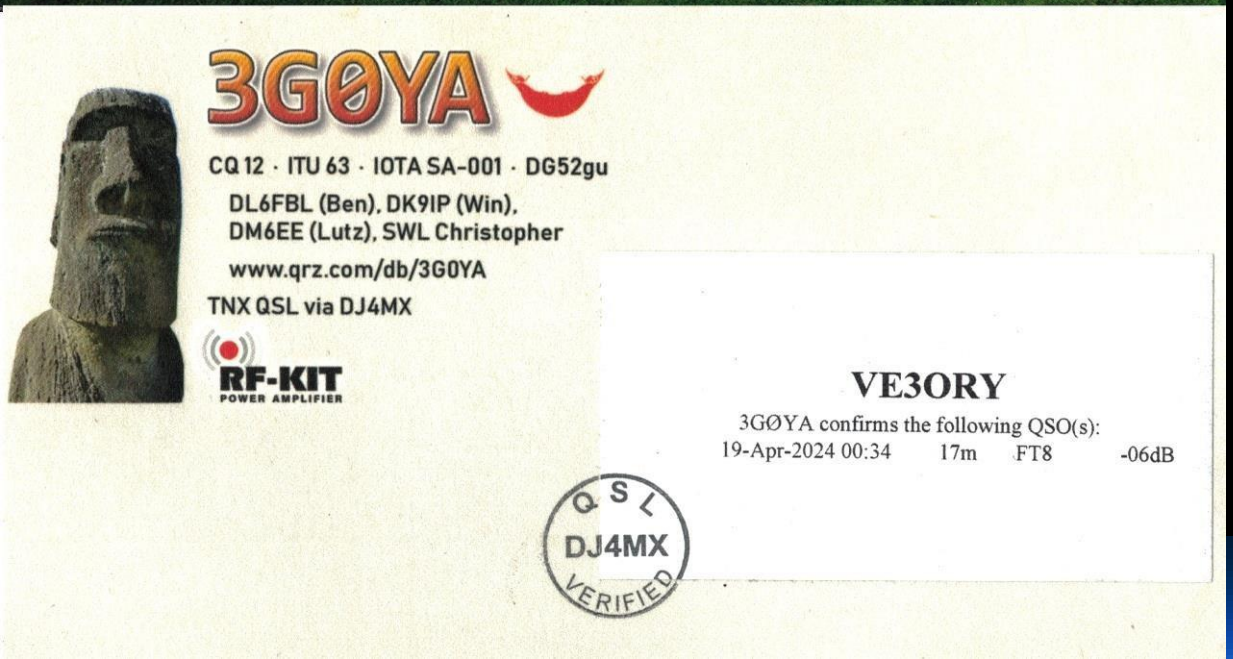
DXpeditions

Long – distance radio contacts are referred to as ‘DX’. World-wide there are currently 340 listed ‘DX Entities’. Many of these are remote / uninhabited locations that do not have any regular Amateur radio activity.

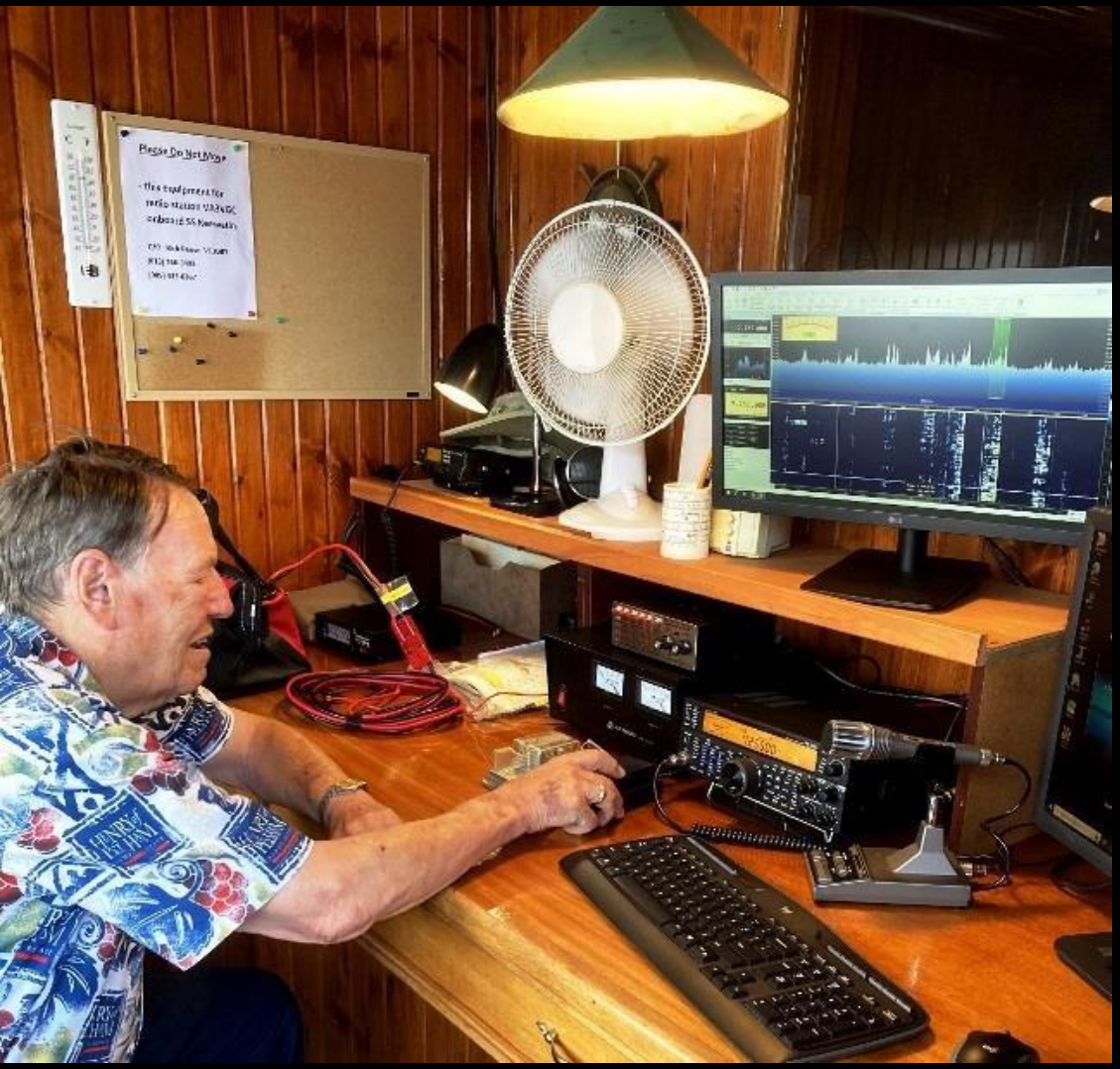
Groups of Amateur operators will often undertake pre-arranged expeditions to these remote locations and will set up temporary antennas and equipment, to give Amateur operators around the world an opportunity to work a new DX entity. These expeditions will always create an attractive QSL card to provide confirmation of contacts.

A team expedition to Easter Island last spring worked 140,000 contacts from April 18 until May 6, 2024 with the call sign 3G0YA

This QSL card confirming an FT8 ‘Data Mode’ contact with them on April 19



More information and latest news on VA3VGC available at →



Join us for a visit at VA3VGC, onboard SS Keewatin

73 (Best Wishes),
Rick Reeve VE3ORY