

Speaking notes for a presentation to WARA (Westcoast Amateur Radio Association)

Operating of 630 metres: Why and How?

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SLIDE OF THE TITLE DURING INTRO

Good evening. Thanks Glenn for inviting me to speak tonite.

SLIDE OF THE OUTLINE

The title of my talk is "Operating on 630 metres, Why and How?"

I will begin by giving a little history of the 600m band. This is fascinating because it is also the story of the beginning of radio. It is also the beginning of amateur radio as the very first hams operated on 600m, at least those in BC since there was a complaint of QRM from them in 1910⁹.

I will try to show **why** 600m was used and a little of the **how** - what equipment was used.

Next, I talk about what hams can do on 630m - the **why** it might be interesting for you.

Then I will show the equipment used by some of the local 630m stations - the **how** we do it, which is typical of what most stations use.

Finally I will show photos of my station and then, hopefully, run a live demonstration by operating on 630m from here by remote control. As you can see, I put two ?? because we shall see whether this will actually work.

SLIDE OF RAPID ADOPTION 1898 - WIRELESS MARITIME MARCONI

Radio, or **wireless** as it was first called, began as something to use for communicating with **ships at sea**. It was not needed on land because telegraph wires provided reliable communication throughout Europe and North America.

Marconi realized the potential commercial value of being able to send telegrams, for pay, to and from ships at sea and beginning in 1898 he began to build coast stations along the English Channel and to install small stations on ships.

The first practical use, however, was for communication between a station on one of the Goodwin Sands lightships and a coast station 12 miles away.

SLIDE OF SHIPS

Here is a photo of the first ocean going ship to be fitted with wireless, in 1901. It was the SS Lake Champlain which sailed between Liverpool and Montreal. It became property of the Canadian Pacific Line in 1903.

The other ship is the SS Philadelphia. The caption says that in 1902 it was able to **receive** readable messages at a distance of 1551 miles from the big Marconi station at Poldhu Cornwall England station. This shows that they had discovered the possibility of long distance skywave propagation at night in which radio waves bounce off the ionosphere. However, the dependable 2-way communication distance was only about 100 km, using ground-wave, which was available 24 hours a day.

SLIDE OF EARLY SHIP WIRELESS STATION

This photo shows what these early ship wireless stations looked like. The receiver is on the left. There was a tuned circuit, a crude detector and headphones, no amplifier. The morse code keys are on the bench. The 1.5 kW spark transmitter is in the soundproof box on the right. In operation the door would be closed as the noise was horrific.

SLIDE RAPID ADOPTION 1901 -

In 1901 the first US coast station was in operation on Nantucket Island off Cape Cod.

SLIDE SIASCONSET

They apparently used a simple vertical antenna, 240 ft high. I have not found any information about the ground radial systems used in these early stations, but the article about this station mentions that the mast spars were brought along with 25,000 feet of wire. Most of that must have been for a radial system.

For 600m a full size quarter wave vertical would have be 500 ft high, but a 1/8 wave vertical with a good ground system next to the ocean would be very effective.

SLIDE OF "RAPID ADOPTION OF MARITIME WIRELESS - 1911

In 1902 the first coast station in Canada was built by Marconi at Glace Bay, NS. This was made possible by a subsidy of \$84,000 from the Canadian Government. It had the most powerful transmitter in the world at the time, estimated to have been between 100 and 300 kW. With this station Marconi succeeded in transmitting actual messages between Glace Bay and Poldhu England, although not reliably.^{13,14}

By 1903 the usefulness of wireless communication between ships and ship to shore was established even if the reliable range was only 100 km. 75 coastal land stations were built or under construction world wide and many ocean going ships were already fitted with wireless.

In 1904 the first Canadian Government station began operating at Fame Point Quebec. This was at the lighthouse on the NE point of the Gaspé peninsula at the entrance to the St. Lawrence seaway. This was also a Marconi station, but contracted to Canada for Canadian communications, primarily to assist shipping in the St. Lawrence seaway.

By 1906 there were 13 stations operating in Eastern Canada, all under contract with Marconi.

There were 105 stations now operating worldwide.

In December 1907 the first westcoast government station began operating at Gonzales Bay in Victoria. By February 1908 there were four other stations operating. These were communicating with large ships but only 1 of the smaller coastal steamers on the BC coastal route was fitted with wireless. The land stations only operated during daytime hours.

By the end of 1911, there were 35 coast stations operating, covering the west coast from San Diego to Alaska. There were now 9 BC stations, all were now operating 24/7. Most commercial ships, both large and small now had wireless stations.

SLIDE OF MAP

Here are the locations of the first BC coastal stations. **Point out.**

SLIDE OF GONZALES BAY

The first BC government wireless station was on the hill above Gonzales Bay, where the observatory is today. It remained in operation until 1945. The antenna masts at all the stations were made of tall tree trunks lashed together to make a mast of up to 228 ft.

The coast stations built on the BC coast used a “Marconi” or “T” antenna, or sometimes what we call an “Inverted L” with a vertical wire of about 200 ft with 300 or so feet of top loading, making them close to resonant on 600m and very efficient.

SLIDE OF ESTEVAN STATION

This shows the station at Estevan Point as it looked in 1912 after being upgraded with a new 2 kW transmitter. Originally they were 1 kW. All wireless until the 1920's used spark transmitters.

THREE SLIDES OF TRIANGLE ISLAND STATION

All of the original stations except the one in Victoria were in difficult to reach locations, but the Triangle Island one was the worst. The current Wikipedia entry says “A lighthouse existed on the island from 1909 to 1919 but was abandoned due to severe fog, regular hurricane-force winds, and conditions utterly repellent to human habitation.” They not only built the lighthouse but also a wireless station.

The lantern room from the lighthouse was moved to the [Sooke](#) Region Museum.

SLIDE OF “RAPID ADOPTION OF MARITIME WIRELESS - 1911

As you can see, in a very short time, just 13 years, maritime wireless went from few stations on land and very few on ships, to many coast stations covering the coasts of Europe and North America and with **most** large ships having wireless stations.

SLIDE WHY did this happen so quickly? Get audience to answer.

(Right, it was useful for emergency communications.)

**SLIDE WIRELESS FOR EMERGENCY COMMUNICATION
1899 - 1906 Valencia**

Marconi's interest in developing maritime wireless was commercial, his companies made a lot of money on contracts to build and staff stations and then to charge for telegrams, or "Marconigrams". Governments, ship owners, and insurance companies supported this development to save costs and lives from collisions and wrecks. Especially after several high profile disasters.

As we heard earlier, the first ship wireless installation was in 1898, for the East Goodwin Sands lightship. This led to the first use of radio to request aid. In its first year of operation the ship requested aid three times, for itself when battered by high seas and then when another ship collided with it, and once when another ship became grounded on the sands. In all cases help arrived and the ships and crew were saved. The ship reported reliable 24 hour communication, over the 12 mile link.

This success was influential in the decision in 1900 for England to contract with Marconi to build 6 coast and 26 ship stations.

In BC the Valencia disaster provided the incentive to establish wireless stations.

SLIDE VALENCIA PHOTOS

In January 1906 the Valencia was on route from San Francisco to Seattle when it became lost in fog in a gale, missed the turn into Juan de Fuca Strait and ran aground on rocks at Pachena Point. 117 died and only 33 were saved. In BC this was seen as a major disaster and within the year led to starting construction of the westcoast trail, building a lighthouse at Pachena Point and planning for wireless stations. Only 2 years later five wireless stations became operational, including one at Pachena Point.

**SLIDE WIRELESS FOR EMERGENCY COMMUNICATION
1899 - 1909 Republic**

After the April 1906 San Francisco earthquake the city was cut off from the outside world since the telegraph lines were down. However, fortunately the USN Chicago was anchored in the bay and was able to provide the communication, helping to obtain aid and supply news.

In 1909 the White Star liner *Republic* was rammed amidships by the Italian steamer *Florida* in fog 250 miles out from NYC. The *Republic* was known as "The Millionaires' Ship" and was one of the most luxurious of the time. The first wireless distress message using the CQD code was sent from the *Republic* and several ships responded.

When the *Baltic*, another White Star liner, arrived she took on all the passengers from both the sinking *Republic* and the damaged *Florida*. All passengers and crew except for a few that died in the initial collision were saved. ^{13,21}

"This was the first important marine rescue made possible by [radio](#), and brought worldwide attention to this new technology."²¹

Within a year most large ships were fitted with wireless

SLIDE OF REPUBLIC, FLORIDA, BALTIC PHOTOS

SLIDE WIRELESS FOR EMERGENCY COMMUNICATION 1912 - Titanic

In 1912 the Titanic sunk with a loss of 1503 lives. However, 705 were saved as a result of rescue summoned by wireless.

SLIDE TITANIC PHOTOS

The antenna used on the Titanic was the same as used on all the large ships beginning in 1901, a Marconi T. This variation was basically 4 T's in parallel, which provided more top loading. The hull of these large ships in salt water would have provided an excellent ground path making for an efficient antenna on 600m.

SLIDE 600 METRES/500 kHz MARITIME STANDARD

600m or 500 kHz quickly became the standard frequency for ship wireless. Monitoring and being able to operate on this frequency became mandatory in 1906.

It remained in regular use for morse code ship communications until 1960.

This frequency, and bands above and below, were restricted to the maritime service until 2012 when the World Radiocommunication Conference of 2012 allocated 472-479 kHz, which is 630m, to Amateurs.

Canada authorized use of 630m in April 2014 and the US followed in Oct 2017 with a power limit specified of 5W EIRP.²²

There are 10 Canadian and about 100 US operators now active on 630m.

Explain slides from now on.

DEMO OF OPERATION ON 630m

(Following the presentation I operated my station, VE7VV, remotely from the club meeting site using Teamviewer. The station used the FSQCall software and established communication with VA7MM and VE7CNF in Vancouver, over a distance of approximately 110 km.

My station used 30W total power output for about 0.5W EIRP.

Communication used text exchanges at 4.5 baud, about 40 wpm, and SSTV transmission of images. Text exchanges were 100% correct copy and the images were received at good quality. Communication at this distance on 630m is via ground-wave which was shown in previous tests to be reliable 24/7 over this path, showing the potential for 630m to be useful for emergency communications.)

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