



Colorado Military Historians

Newsletter

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Princess Elizabeth and her sister Princess Margaret at the microphone for Elizabeth's first radio broadcast on October 13, 1940. She broadcast to the children of the Commonwealth.

News and Views

*Message from CMH Secretary
Eric Elder*

Thank you, Larry, for your article this month on the history of radios.

We closed out 2020 with no in person meeting in December. We are now nine months with no in person meetings. To my knowledge this is a record for the club. We had all sorts of online games put on by members usually on a Friday night. No word yet on a contract with Hyland Hills for the Baker Community Center.



What have you been painting and gaming at home? Recently I decided to go through my box of unpainted random miniatures. I plan to game with them, but nothing in the near future is planned for them. Currently I have Union ACW 28mm Perry Miniatures assembled and some paint on them. I also started up some 10mm Vietnam Brown Water Navy ships. Soon you may see some pictures of a 10mm Korean War, Canadians vs Chinese game.

Happy New Year!

The Early History of Radio for Commercial and Military Purposes

Article by CMH Member

Larry Irons, KØLAI

Introduction

In 1874 Maxwell published his two-volume set, “A Treatise on Electricity and Magnetism”. His work followed in the research of Oersted, Ampere, Henry, and Faraday. Heinrich Rudolph Hertz experimented and proved the existence and transmission of electromagnetic waves and published papers in 1887 and 1890, Hertz considered these results to be of little practical value, because they traveled in straight lines. However, the velocity of electromagnetic waves was calculated from Maxwell’s equations and it was very close to the value known today.

After Hertz’s work many people were involved in further development of the electronic components and methods to improve the transmission and detection of electromagnetic waves. Around the turn of the 20th century, Guglielmo Marconi developed the first apparatus for long distance radio communications. By 1910 these various wireless systems had come to be referred to by the common name “radio”.

Marconi’s Invention

Marconi traveled to Great Britain in 1896 to seek funding for his invention, the wireless telegraph, and to patent it. The British Post Office and the Admiralty became interested immediately in Marconi’s invention. He made various demonstrations for those offices.



Guglielmo Marconi

On 27 March 1899 he successfully sent a transmission across the English Channel from France to England. In the autumn of 1899 Marconi traveled to the United States to make demonstrations of his device. On the trip back to England, he and his assistants installed wireless equipment aboard the voyage. The first radio transmission from ship to shore was made 66 nautical miles off the English coast from the *SS Saint Paul* to the Royal Needles Hotel.

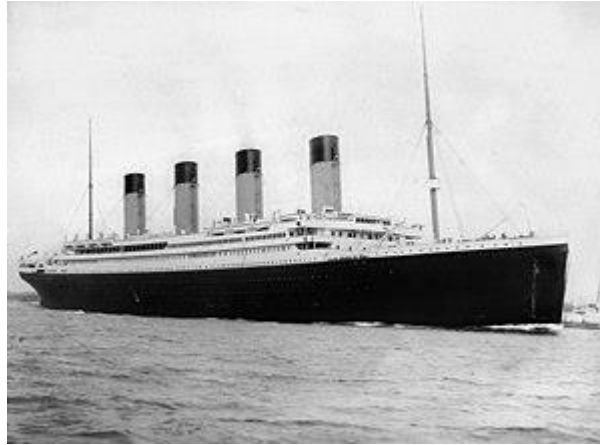
On 17 December 1902, a transmission from Glace Bay, Nova Scotia, Canada to Ireland became the first confirmed Transatlantic radio transmission. Up to this time it became apparent that transmissions were more reliable at night using medium and long wave frequencies.

The Marconi International Marine Communication Company, founded by Marconi, began to build high-powered stations on both sides of the Atlantic to communicate with ships at sea. In 1904 he established a commercial service to transmit nightly news summaries to subscribing ships, which could incorporate them into their on-board newspapers. These transmissions were done using International Morse Code.

Titanic

The role played by Marconi's company raised public awareness of the value of radio and brought fame to Marconi with the sinking of the *RMS Titanic* on 15 April 1912 and the *RMS Lusitania* on 7 May 1915.

The *RMS Titanic* radio operators, Jack Phillips and Harold Bride, were not employed by the White Star Line, but by the Marconi International Marine Communication Company. After the sinking of the ocean liner, survivors were rescued by the *RMS Carpathia* of the Cunard Line.



RMS Titanic 1912

Vacuum Tube

Marconi's transmitter was a spark-transmitter. Others were starting to employ continuous -wave transmitters and could be used for audio transmissions. The first entertainment radio broadcasts commenced in 1920 employing a vacuum tube transmitter. The vacuum tube was a major electronic milestone that would dominate electronics for 40 years. Vacuum tubes are still employed today in high-powered commercial and military radio transmitters, as well as in audio amplifiers.



Vacuum tubes

AM Radio

Reginald Fessenden and Lee de Forest invented the amplitude-modulated (AM) radio. The first AM radio broadcast was on 24 December 1906, Fessenden played the violin and read a passage from the bible. The first radio news program was broadcast 31 August 1920 by station 8MK in Detroit Michigan. That station survives today as WWJ under the ownership of the CBS network. Sports broadcasting began at this time as well, including college football. The advantage of AM over the spark-transmitter is that AM signals are narrow-band allowing for multiple signals to simultaneously transmit on different frequencies.



1938 Zenith Model 12-S vacuum tube console AM radio

In the early 1930s, single sideband (SSB) and frequency modulation (FM) were invented by amateur radio operators. These modes became commercial operating modes. SSB was adopted by the U.S. Air Force in the late 1950s for communications with its strategic bomber fleet.

Radio was used to transmit pictures visible as television in the 1920s. Commercial television transmissions started in North America and Europe in the 1940s.

In 1947 AT&T commercialized the Mobile Telephone Service. AT&T introduced this service to one hundred towns and highway corridors by 1948.

Telex on Radio

Telex was a long-distance service using teletypewriters over land lines. Telex systems were adapted to short-wave radio by sending tones over SSB. For many years telex-on-radio (TOR) this was the only reliable way to reach third-world countries.

Documents including maps and photographs went by radio fax, or wireless photo radiogram, invented in 1924 by Richard H. Ranger of Radio Corporation of America (RCA).



A Teletype Model 32 used for Telex service

Radio Navigation

Another development of AM radio was to transmit a navigation signal for aircraft. Frontier Airlines of Denver, Colorado placed beacons at various mountain passes to allow aircraft to fly safely through inclement weather over the mountains. The use of radio for navigation continued into the 1960s in the form of VOR systems.



Aircraft on-board VOR display

Radio navigation played an important role during World War 2. The Germans used radio navigation to guide its bombers to England during the Blitz in 1940 for night bombing. The system was known as Knickebein, named after magical raven in German mythology. The Germans would transmit from more than one beacon with a narrow beam. When two beams intersected the bombardier would drop his bomb load on the target. British Intelligence fought back using jamming and distortion of the radio waves.

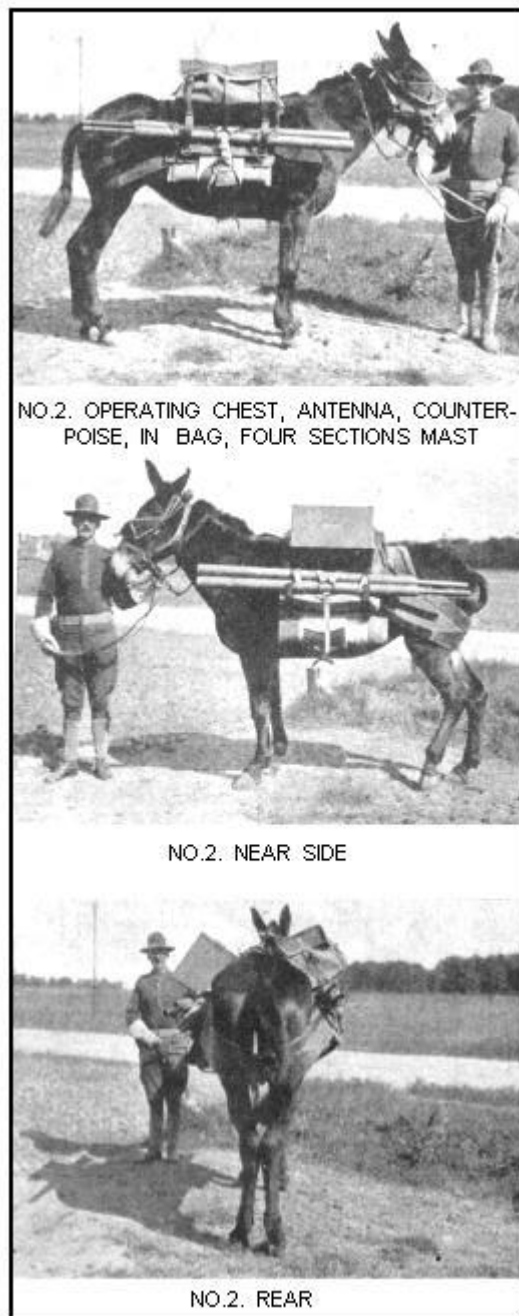
Great Britain used radio detection and ranging (RADAR) to guide its fighter interceptors against the German air raids. The Germans would bomb the radar antennas to disable the radar.

Allied convoy escort warships used radar to detect enemy surfaced submarines. Radar was also used by Allied and German ships for detecting and engaging enemy surface ships with surface guns.

Military Communications Equipment

The infant radio systems were used during World War 1 with every major power adapting radio for military use. The British Royal Flying Corps began to use wireless to direct artillery fire. The transmitter was fitted into an aircraft and the observer sent a Morse signal to the artillery crew on the ground.

The U.S. Army adapted a mule train to carry the radio transmitter, receiver, and antenna mast.



**U.S. Army Mule Team for Radio Deployment
1916**



Bundesarchiv, Bild 146-1987-019-27
Foto: o. Ang. | 1914/1918 ca.

German Army Signalers with light army field wagon in the First World War

The German military used a wagon to carry the transmitter, receiver, and antenna mast. All major powers started using radio transmitters in observer aircraft when real-time information was needed.

German Zeppelins carried a full radio kit for communications. The Zeppelins used an end-fed wire antenna (known as a Zep antenna) that was extended during flight.



German officers and troops manning a wireless field telegraph station during World War 1



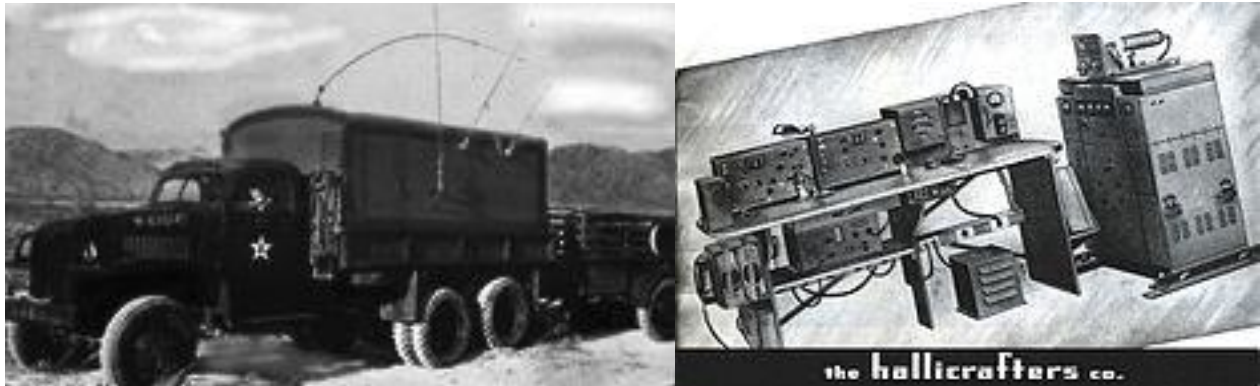
Bundesarchiv, Bild 10111-MW-5875-24
Foto: Engelmeier | 1940 Herbst

German Officer using Radio, 1940



SCR-536 "handie talkie"

During World War 2, amateur radio manufacturers in the United States, such as Hallicrafters, mobilized to design and manufacture field radios for the use of the United States armed forces, from walkie-talkies to ship radio rooms. The handie-talkies and backpack radios had limited range of a few miles at best. The batteries were bulky and had limited service, but they were better than nothing.



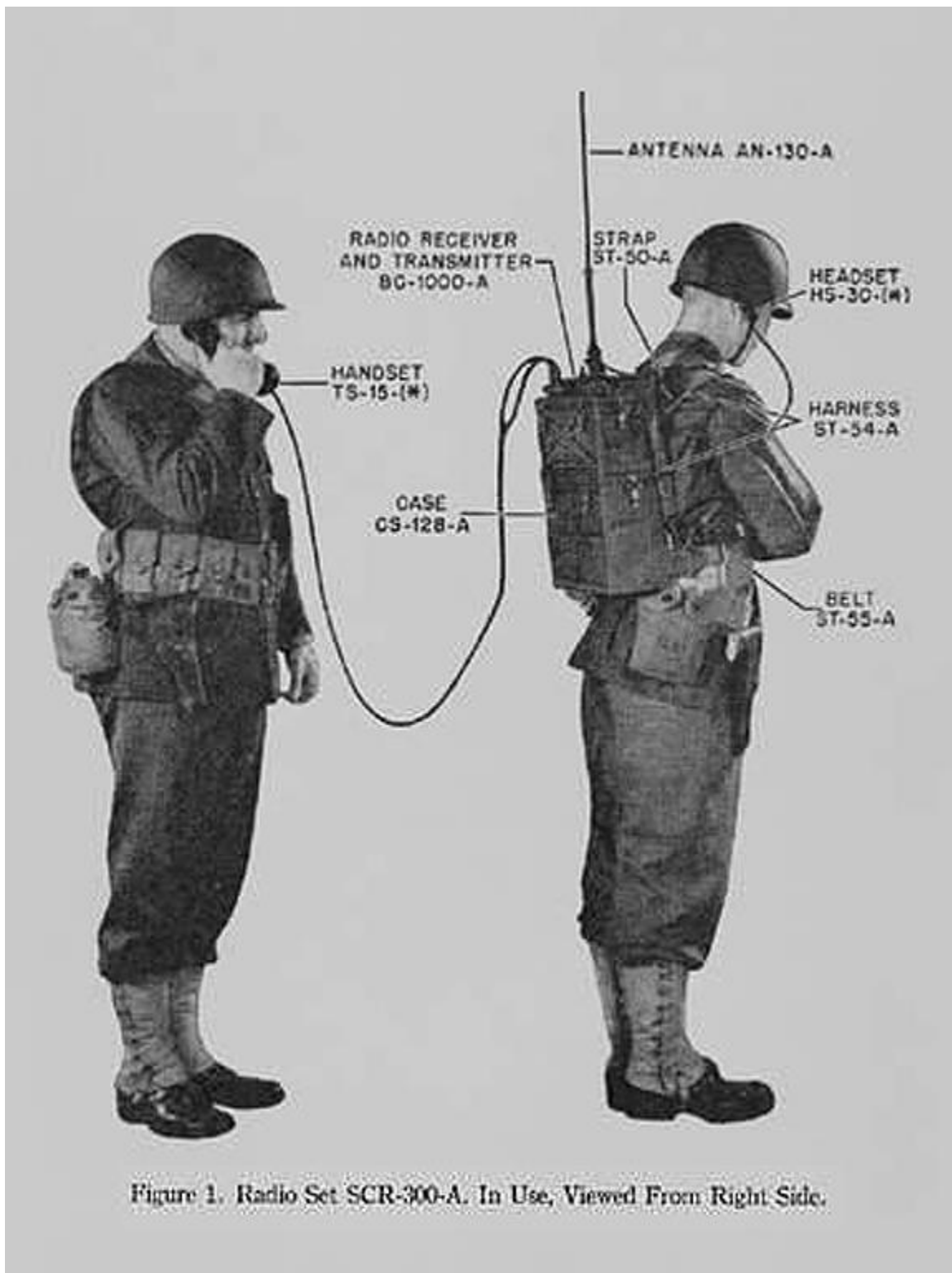
Left, SCR-299 interior operators' desk and gear, from Hallicrafters ad, 1942. Right, SCR-399 CCKW truck shelter mounted version of the SCR-299.

Encryption

Since radio transmissions were unencrypted, the various nations began developing encryption techniques. A message was encrypted first and then transmitted. The receiving station would then copy the message verbatim and then unencrypted. The famous Enigma Machine was used by the Germans before and during World War 2 to encrypt and unencrypt messages. An encrypted message consists of what appear to be random characters and numbers. For the Enigma users, both the sending and the receiving stations must have the analog wheels set the same exact way to ensure the correct decryption of the message.



Enigma cypher machine of the 7th Panzer Division, Eastern Front, 1941



U.S Army SCR-300-A back pack transceiver World War 2

Morse Code

Beginning in the 1930s, both civilian and military pilots were required to be able to use Morse Code, both for use with early communications systems and for identification of navigational beacons which transmitted continuous two- or three-letter identifiers in Morse Code. Aeronautical charts show the identifier of each navigational aid next to its location on the map.

Radio telegraphy using Morse Code was vital during World War 2, especially in carrying messages between the warships and the naval bases of the belligerents. Long range ship-to-ship communication was by radiotelegraphy, using encrypted messages because the voice radio systems on ships then were quite limited in both their range and their security. Radiotelegraphy was also extensively used by warplanes, especially by long-range patrol planes that were sent out by those navies to scout for enemy warships, cargo ships, and troop ships.

In addition, rapidly moving armies in the field could not have fought effectively without radiotelegraphy because they moved more rapidly than telegraph and telephone lines could be erected. This was seen especially in the blitzkrieg offensives of the Nazi German Wehrmacht in Poland, Belgium, and France in 1940, the Soviet Union and in North Africa in 1941; by the British Army in North Africa, Italy, and the Netherlands; and by the U.S. Army in France and Belgium in 1944, and in southern Germany in 1945.



WW2 U.S. Ship Radio Room



A US Army Signal Corps radio operator in 1943 in New Guinea transmitting by radiotelegraphy

International Morse Code

1. The length of a dot is one unit.
2. A dash is three units.
3. The space between parts of the same letter is one unit.
4. The space between letters is three units.
5. The space between words is seven units.

A • —
 B — • • •
 C — • — •
 D — • •
 E •
 F • • — •
 G — — •
 H • • • •
 I • •
 J • — — —
 K — • —
 L • — • •
 M — —
 N — •
 O — — —
 P • — — •
 Q — — • —
 R • — •
 S • • •
 T —

U • • —
 V • • • —
 W • — —
 X — • • —
 Y — • — —
 Z — — • •

1 • — — —
 2 • • — —
 3 • • • —
 4 • • • •
 5 • • • • •
 6 — • • • •
 7 — — • • •
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 9 — — — — •
 0 — — — — —



Military radio exhibit at Dragonmans Museum, Colorado Springs, Colorado

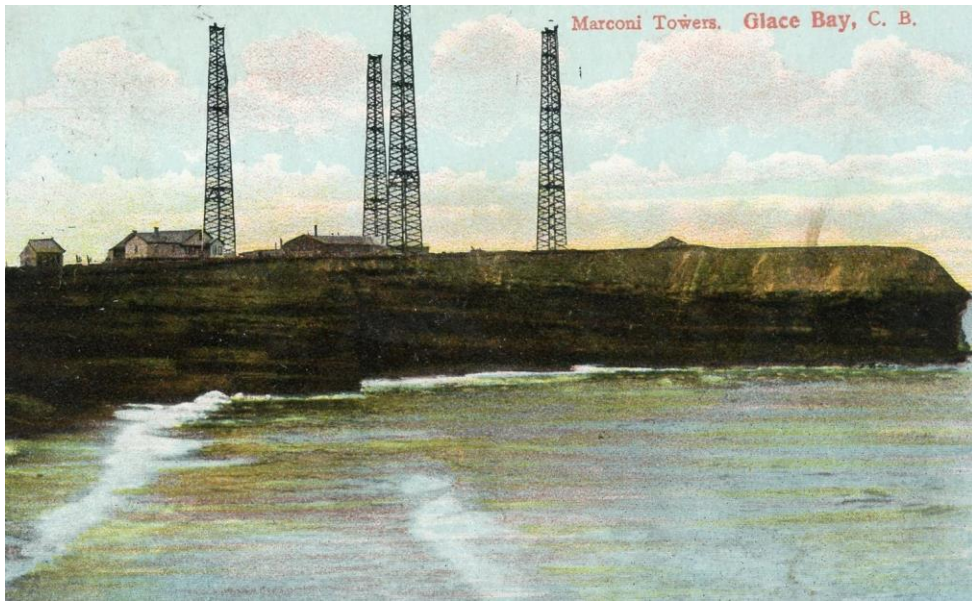
Dragonmans Museum

The Dragonmans Museum in Colorado Springs, Colorado has a large collection of military exhibits from the history of the Armed Forces of the United States. The radio exhibit is very extensive.

Historic Location of the Month

Glace Bay, Nova Scotia, Canada

At the Marconi site at Glace Bay in December 1902, a wire antenna suspended from four giant wooden towers beamed an official wireless message across the Atlantic. This was the world's first radio message to cross the Atlantic from North America.



Colorado Military Historians, Inc.

Colorado Military Historians (CMH) is a non-profit organization whose purpose is to promote historical wargaming and the study of military history. Founded in 1965, CMH meets monthly on the second Sunday of the month, except in May when the meeting is deferred to the third Sunday. The meeting starts at noon at the Baker Recreation Center, 6751 Irving Street (just a few blocks west of Federal Blvd), Denver, Colorado. The club also hosts gaming at least one Friday night a month, called “Friday Night Fights” (FNF) at 7:00 p.m. Friday meetings will be held at a future determined location. See website for latest information.

CMH maintains ties with numerous local, regional, and national groups to help promote the hobby. CMH is governed by member-elected officers serving on the Board of Directors (executive board). Terms of office are one year, with elections held at the May meeting. New members are accepted after attending three CMH functions and a vote of the membership. Dues are \$50.00 per year, payable in January. Members wishing to receive a snail-mailed newsletter subscription must pay an additional fee of \$15.00 per year. Authors retain ownership of articles and graphics published. CMH reserves the right to edit or reject submissions to the newsletter.

One year Adult Membership: \$50.00

Half year Adult Membership: \$25.00

(For NEW members who join after June 30)

Family Membership: \$50.00 (one Adult and any number of offspring)

Student Membership: \$25.00 (16 to 22 years old)

Children: free (younger than 16 accompanied by member)

Club Links:

Web Site: <https://cmhweb.org/>

Facebook: <https://www.facebook.com/groups/cmhgamers/>

Groups.io Group: <https://groups.io/g/cmhweb>

Discord: <https://discord.gg/DAP2Gn>

CMH Newsletter

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