History of Naval Ships Wireless Systems II
1914 – 1945

During the 1914-18 war, nomenclature began for Communications Equipment as we know it today. Transmitters were Types and went from Type 1 to 31. Type 1 covered 150-1000 kHz range 800km and power output was 1.5kW. This transmitter was fitted as the standard ship spark set. Another transmitter, the Type 15 covered 107 – 187.5 kHz with a range of 500km and had a power output of 3kW. This was an arc transmitter fitted onboard Destroyers. Capital ships had the Type 18 arc transmitter which covered 66.67 – 100 kHz, range 1000km and had a power output of 25kW. The highest frequency in use at the time was 2632 kHz. Obviously sky wave propagation was not known at the time and the frequencies in use were ideally suited for ground wave communications, dependant upon height of aerials, frequency and power output.

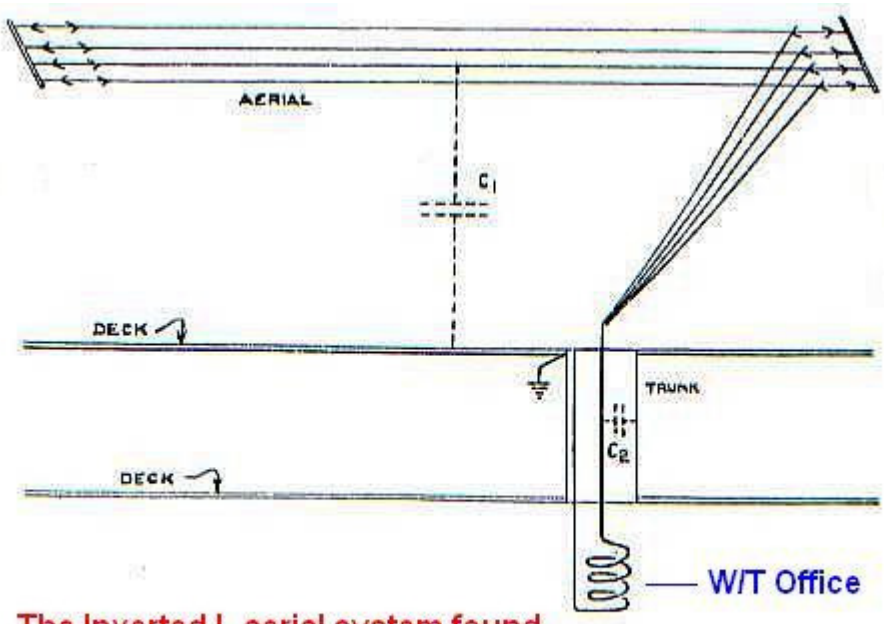
As previously mentioned in Part I, aerials became horizontal wires as evident in the picture of HMS Dreadnought, launched in 1906. It was thought that the more wire in the air, the better!

This picture (Courtesy Time Life Books) was produced for the launching ceremony. The aerial layout is not completely accurate but it gives an indication of the amount of wire used.

This type of configuration was in use until the 1920's when sky wave propagation was discovered and it was decided that the amount of horizontal wire need not be as great. This phenomenon was known as Atmospheric Effects using the Kennelly-Heaviside Layer. In 1925, HMS Yarmouth, on a 12 month cruise to Hong Kong and back, carried out tests on frequencies between 6 and 25 MHz to determine ground

wave ranges, skip distance, silent zones and the first overlapping zones. The ship's operators were also able to determine that frequencies changed due to the effects of day, night and season.

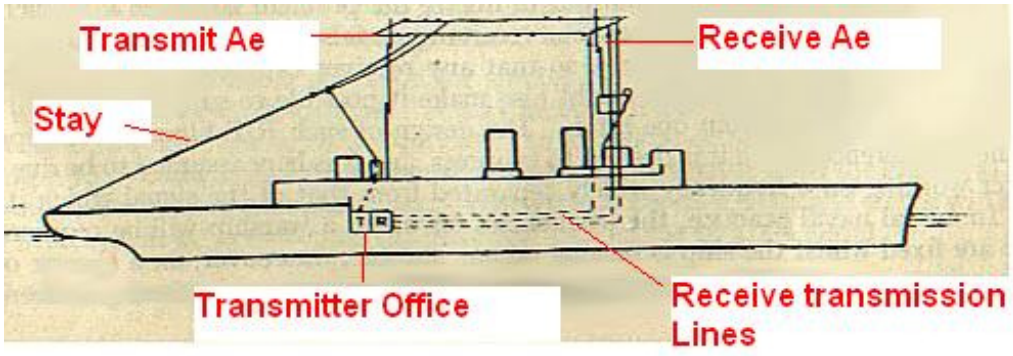
On cruisers and above, an inverted L using six wires was installed with smaller ships using a three, two or one wire configuration. The Admiralty Handbook of Wireless Telegraphy 1931 states that "in order to give a big 'radiating capacity,' the overhead, or roof system of wires should have the greatest possible area.
As regards to the number of wires used, two wires hoisted up parallel to and at a considerable distance from one another will have a capacity nearly twice that of a single wire, but as the wires approach one another the joint capacity becomes less. So that when they are within (say) a foot of each other, very little extra capacity is gained by the use of the second wire. A few wires spaced far apart are better than many wires near together, as far as total capacity is concerned."



The Inverted L aerial system found on naval ships upto the 1950's.

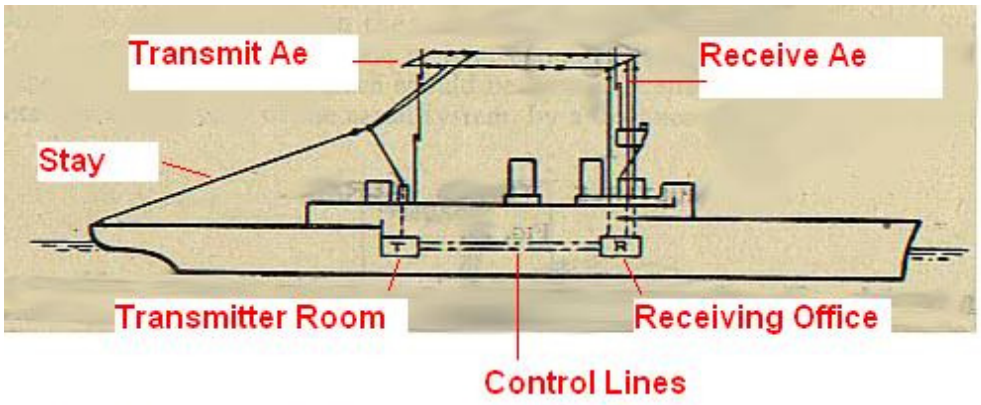
This type of aerial meant that the vertical part had to be at the highest end of the roof and as far away as possible from the receiving aerials. This was achieved by either the vertical section being at the opposite end to the receiving aerials or separated by insulators some distance away.

The initial system was known as the Spaced Aerial System. The main transmitting aerials were rigged between yards on the foremast and mainmast and the vertical part was fed down to the transmitters in the wireless office (T). The receiving aerials were simple vertical/sloping wires hung from the foremast and were connected by transmission lines to the receivers in the wireless office (R).



Spaced Aerial System

The newer system was known as the Central Control System. The aerial rigging is much the same as in the case of the first system, but the receiving aerials were directly connected to the receivers located in another compartment in the fore part of the ship. This office was initially known as the Main Signal Office and then the Bridge Wireless Office. The transmitters were controlled from the receiving office by control lines.



Central Control System

This system abolished interference between transmitters and receivers, but it was felt undesirable to separate operators from the transmitters. Before the advent of the Communications Control Exchange system (CCX), operators were still in transmitter rooms and instructions were relayed from the Receiving office by means of a Telephone Control system.

In 1930, more communications equipment is to be found in the nomenclature, including receivers. Interesting to note that they still refer to the ground wave ranges for most of the transmitters. The list is quite long and covers from Type 24 to 83. Listed are the five transmitters that were still in use at the outbreak of war in 1939:

36	67-500 kHz	1600 km	2kW	Ship's main office
37	100-1365 kHz	960 km	750 watts	Ship's 2nd office
	5700-26000 kHz		150 watts	
38	86-666 kHz	960 km	3kW	Flotilla Leader
43	1875-2308 kHz	80 km	400 watts	Ship's 3rd office
47	107-666 kHz	1280 km	2kW	Patrol submarine
	7500-16700 kHz			

Receivers:

B11	1500-23000 kHz	Capital ships
B12	150-1500 kHz	Capital ships
B13	15-2000 kHz	Standby receiver

1939-1945 saw the introduction of sets that some of us are more familiar with - Transmitters Type 36 through to the 605 and receivers B19 through to B50. The equipment associated with ships of the RNZN will be dealt with in more detail (where known).

Leander Class Cruisers – HMNZ Ships Achilles and Leander

Transmitters:

Type 37 Secondary MF/HF fitted in the Second Office.
Type 48 Main LF/MF/HF 60-16500 kHz 2kW fitted in the Main Office.
Type 52 Emergency/transportable 900 – 1350 kHz 15 watts.

Receivers:

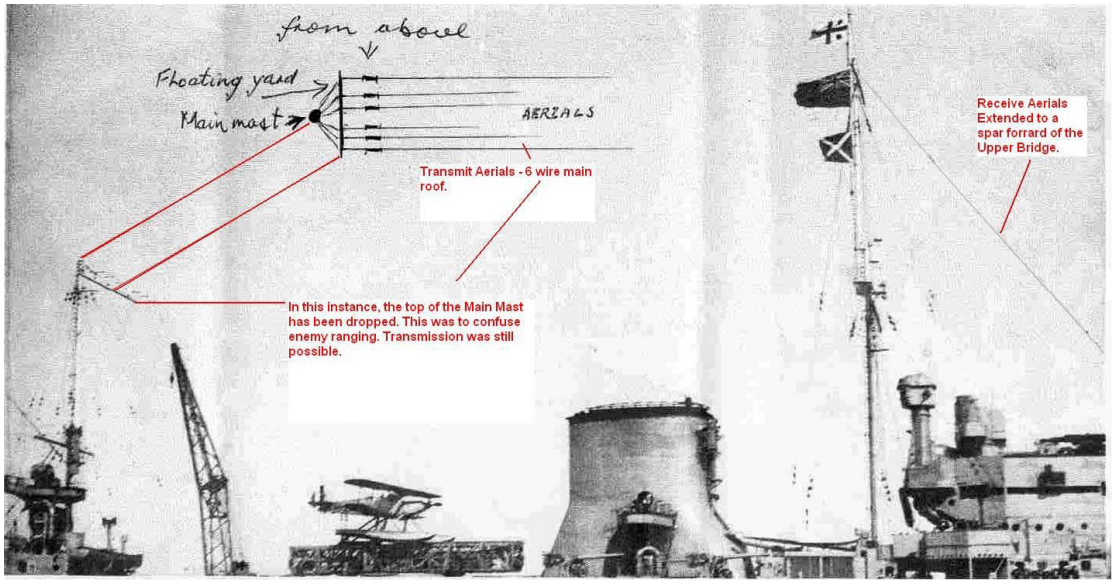
B11 1500-23000 kHz
C11 MF TRF (Tuned Radio Frequency)
C17 MF TRF
C19 LF/MF TRF

1942 USN provided a TBS8 – a VHF transmitter/receiver 60-80MHz 50 Watts CW/MCW/AM – TBS commonly known as Talk By Ship.

TBS-8

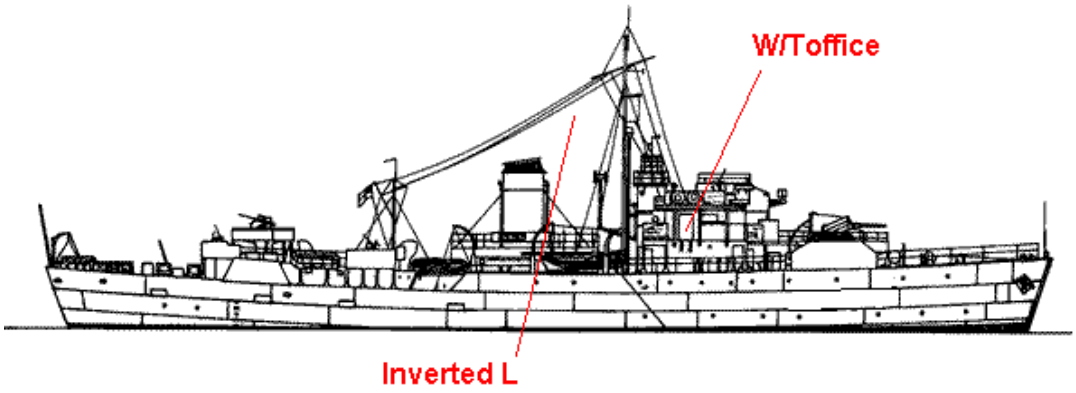
1943 Type 87 VHF set fitted. 100-156MHz 50 watts ship/ship, ship/air

Type 87 – made up of Receiver 1132 and Transmitter 1131



HMNZS Achilles (picture courtesy Ken Shankland, former POREL) showing main roof with the floating yard of the Mainmast dropped. Both masts were the same height which made it easy for enemy gunners to range in on. To help confuse ranging, the mainmast upper yard was able to be dropped slightly and in this position, transmission was still possible. Three receiving aerials went from the Foremast to spars forward of the Bridge and bridge wings.

Flower Class Corvettes – HMNZ Ships Arabis and Arbutus



No equipment details for this class of ship, Bird Class (Tui, Moa and Kiwi) or the Isles Class (Inchkeith, Killegray, Sanda and Scarba). However, small ships such as minesweeping trawler corvettes were known to have transmitter/receivers as follows:

TV5 500-3000 kHz 200 watts (another source states 15w) CW/MCW/AM transmitter/receiver

TW12 375-8570 kHz 50 watts CW/MCW transmitter – associated receiver 394A

Ships taken up from the Trade (STUFT) may well have been fitted with one or both of the above sets in addition to their merchant communications fit.