ALL HANDS SPECIAL SUPPLEMENT

NAVY'S ROLE IN RADIO

The Navy's vital part in the development of radio communications dates back to the late 19th century. Navymen, ships and units ashore played a role. This is the story.

The following special report is excerpted from "The Navy's Role in the Development of Radio," appearing in the publication Signal, *Vol. XI, No. 1, September-October 1956. The article was written by Captain Gordon L. Caswell,* USN, *Assistant Director of Naval Communications.*

LAST SUMMER a nostalgic ceremony, which marked the closing of "Radio Arlington," took place. Known to old-time radio amateurs and operators throughout the world as NAA, this station had been in continuous operation for 43 years, and was the Navy's—and the world's—first modern, high-power radio station.

RADIO controlled *USS Iowa* was test ship. *Above: USS Northampton* (CLC 1) modern communications ship.

"Radio" is now so universal in its application that its youth is nearly forgotten and, although it is generally recognized that the U. S. Navy had a dominant part in the development of radio in the United States, it is probably not realized to what extent this nation is indebted to the Navy's pioneering and continuing efforts in the development of radio. The history of radio development in the Navy is also the history of radio development throughout the world.

The Navy's role in the development of radio communications equipment and techniques, bracketing voice broadcasting; remote control of ships, as targets, which led to the guidance of missiles; the pioneering of radio-controlled aircraft known as "drones;" the conduct of radio communications within the United States and throughout the world; the allocation of radio frequencies among nations; the Navy's assistance to what is now known as the Federal Communications Commission; the elimination of foreign radio operations from United States soil—was once big news now largely forgotten.

THE NAVY'S MOTIVATION is obvious. For centuries the navies of the world depended upon communications within visual range. The Navy reasoned: If radio would only work, its signals could penetrate darkness or fog, and bridge great distances, and its adaption and development would accomplish a new era in sea power, through coordination in the movement and action of widely dispersed units.

The Navy got its start so early that Navy interest in radio at least coincided with, if it did not precede, Marconi. Guglielmo Marconi was issued his first patent for a wireless communications device on 2 Jun 1896. A document in the possession of Tufts College attests to

the successful experiments in shipboard radio of Lieutenant Bradley A. Fiske, USN, (later Rear Admiral) before 31 Aug 1888. According to that evidence, RADM Fiske, as a lieutenant, "wound a number of turns of insulated cable around USS *Newark* lying at the New York Navy Yard, and likewise around the Navy Yard tug." He sent interrupted current to *Newark's* coil and listened on the tug with a telephone receiver in series with the coil system. Said this Navy officer: "I could get signals a short distance away . . ."

In 1888, the year of the Fiske document, Marconi was a teen-age boy 14 years old. Marconi's patent was issued eight years later.

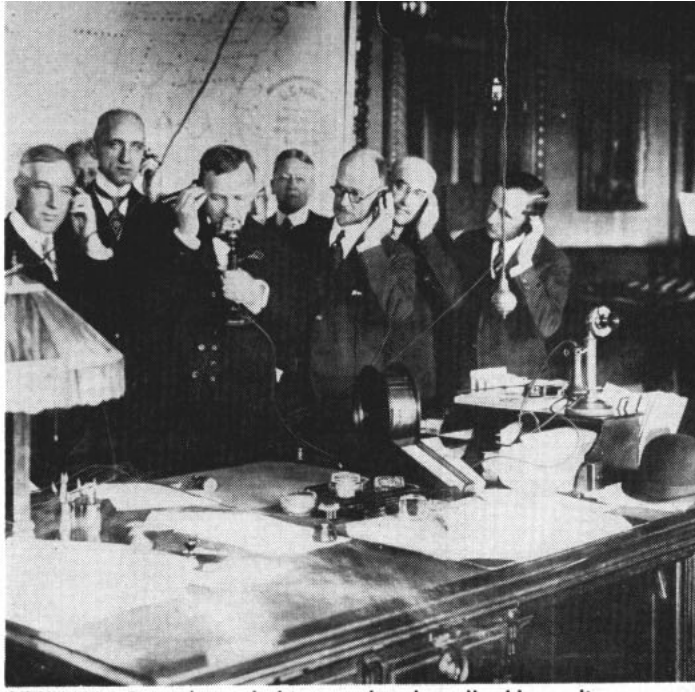
IT WAS ON 30 Sep 1899 that the first official Navy message was sent via telegraph.

The transmission was accomplished during a naval parade in honor of Admiral Dewey who had just returned from his memorable victory in Manila Bay. The message was sent from *Conce* to the Highland Station on the Jersey Coast.

From that experience with radiotelegraphy, it was evident to a Navy observer present that the Marines who had recently fought at Guantanamo Bay, Cuba, the previous year, could have directed the fire of Navy guns on the enemy, lessening the danger to American forces and increasing the effectiveness of Navy fire, if the Navy and Marines had been able to use radiotelegraphy at Guantanamo. Fighting in Cuba was now over, but two great wars were in America's future, the first to come only 20 years later. The Navy recognized radio as a new weapons system and applied it to ships of war.

Before the turn of the century, the Navy invited Dr. Marconi to apply his new wireless telegraph system to USS *New York, Massachusetts,* and *Porter.* By 1916, the Secretary of the Navy, Josephus Daniels, was talking from his desk in Washington, D. C., with a moving offshore ship of the Fleet by telephone. But already, in 1901, the United States Navy had outfitted all of its major ships with communications equipment.

THE NAVY KNEW that the Age of Radio had arrived; that radio was a formidable new weapon which should be developed to its maximum utility; that future wars would be fought differently from past wars; that if nothing else would make them different, radio alone would.

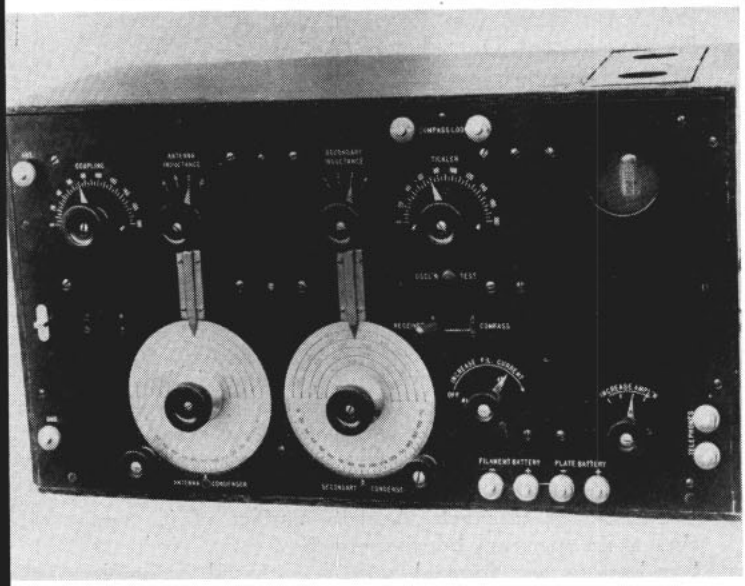


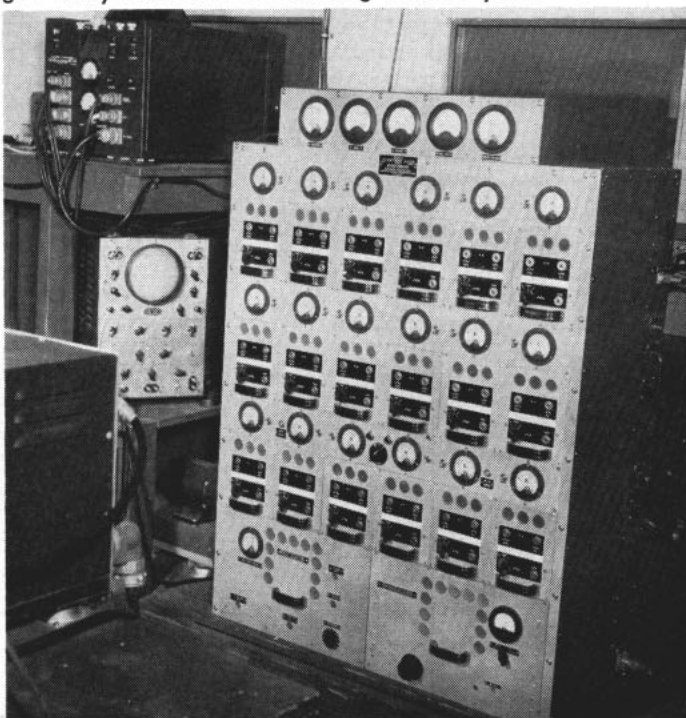
SECNAV J. Daniels made history when he talked by radiotelephone from office to *USS Nebraska* off Virginia Capes.

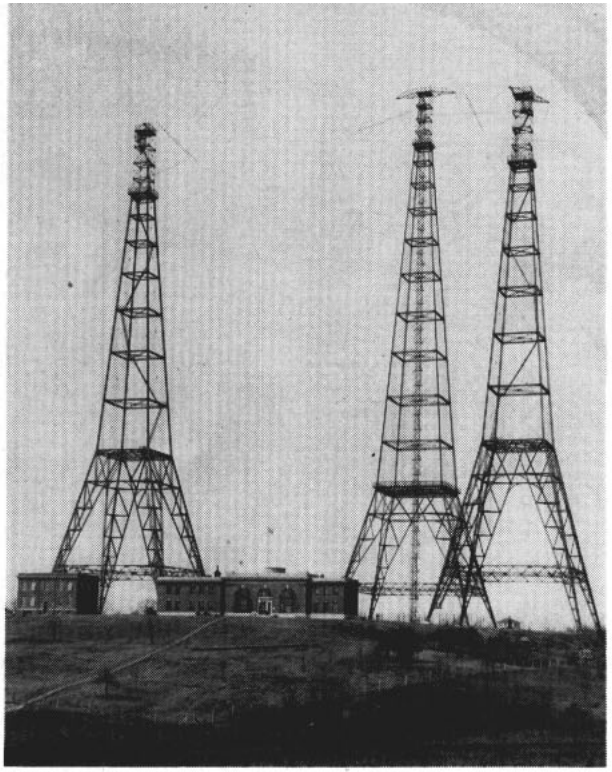
Now, almost single-handed, the Navy proceeded with the development of radio while skeptics laughed and many others totally underestimated the potential of an invisible radio wave. However, by 1908, one-half of all the "wireless" stations in the world were operated by Navy personnel. Such was the world leadership of the Navy in the new science of radio communications. By 1908, also, the Navy had established the Navy Radio Laboratory (predecessor of the Naval Research Laboratory) to conduct radio communications research.

While many others were just awakening to the possibilities of radio-telephony, the Navy was active in aiding its development. In 1906 Navy tests with the

FIRST radio was installed by Navy at White House in '20's. *Right:* Navy electronic telemetering used 25 years later.







HIGH IN THE SKY reach towers of Navy's first radio station. *Below:* Old photo of Navyman at 'Radio Arlington.'

Poulsen-type modulated arc transmitter were made on a number of ships; and by 1909 USS *Connecticut* and *Virginia* were equipped with "wireless" telephone equipment for experimental use during the cruise of the old White Fleet.

Radiotelephony actually came of age in 1915, when NAA succeeded in completing the first trans-oceanic radio-telephone circuit in history. This was followed by similar unprecedented overseas voice transmissions by the Navy from Virginia to the Hawaiian Islands.

Less than two years later and before World War I ended, the Navy had in operation the most extensive radio system in the world. The Navy radio communications system had progressed to such a point that it not only handled messages of the United States naval forces on the seas, but also those between the War Department and the American Expeditionary Forces in France.

In this same period, 1917, the Navy developed the radio beacon, and made the first such installation at Point Judith, R. I.

It was also from the antennas of the Naval Radio Station at New Brunswick, N. J., that President Wilson's historic "Fourteen Points" were transmitted from the United States and received at Nauen, Germany; and it was by the Navy radio station at Otter Cliffs, Bar Harbor, Maine, at 2100 on the night of 6 Oct 1918, that the first German Peace Note was received from Nauen, which was followed by the Navy's receipt of the second German Peace Note at 1542 on 12 Oct 1918.

UNTIL THIS TIME, laws and regulations governing radio were in a chaotic state. This was true in the international area as well as local. Foreign countries and foreign business interests were at liberty to "invade" any area which they considered might be profitable and, as a result, many had radio stations operating within the United States. All cables were owned by a single company—foreign-owned.

Such a situation was not in the best interests of the United States. It was the Navy which, in 1919, took the lead in eliminating foreign radio operations from U. S. shores and which proposed setting up a wholly United States-owned international radio company—which is today one of the largest radio corporations in the world. It was this Navy-conceived, privately-owned corporation which, with naval encouragement, succeeded in buying out foreign interests and dissolving their radio operations on U. S. territory.

The year 1919 was also fruitful in the technical areas. By that time, the Navy was successfully transmitting radio voice communications from air to ground and ground to air and a year later, radio voice communications were successfully exchanged between a U. S. Navy flying boat and a partially submerged submarine, an accomplishment of great importance to the future operations of the Navy.

AS FOR RADIO BROADCASTING, the Navy's broadcasting station at Anacostia was the first broadcasting station in the Nation's Capital, and except for very early experiments, was one of the very first broadcasting stations in the United States. Anacostia was such a pioneer in the history of broadcasting that its LAST important broadcast was the FIRST broadcast in history of the President's message to Congress, that of Warren G. Harding in early December 1922.

The Navy's early projects in the development of radio control led to radio-controlled target ships. *Iowa* was equipped for radio control in 1923 and was soon followed by a destroyer which was similarly equipped. These ships were used as targets for gunnery practice in the Fleet. The Navy had already begun work about this time on pilotless target aircraft known as "drones" and in the next year, 1924, radio remote control of aircraft was successfully accomplished.

Between 1920 and 1925, development had increased to such a degree that earlier, tentative plans for allocation of the frequency spectrum were obsolete. As a result, the then Secretary of Commerce called several national radio conferences at which the Navy recommendations which gave both government and commercial interests their own bands were ultimately accepted.

The Navy's proposals meant a sacrifice of its own slice of the spectrum, but the growth of private industry broadcasting was fostered, with a profound economic

effect upon the nation. Former opposition to the Navy's move soon turned into approbation and its foresight was applauded.

The Navy also contributed to the U. S. efforts to obtain international agreement to the allocation of frequencies.

AT THE INTERNATIONAL RADIO Convention of 1927, the Navy offered what appeared to be the only plan which existed on paper for "frequency allocation."

Motivated as always by its intent to go anywhere on the seas and maintain communications with the home base and other Navy ships wherever located, the Navy also sought orderliness in international communications which only a practical frequency allocation plan could effect.

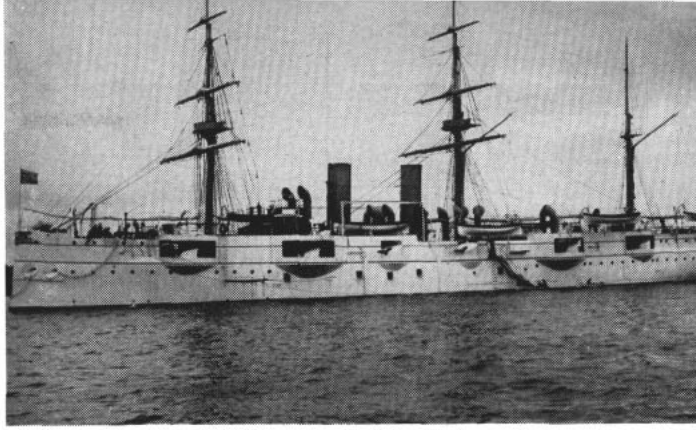
It had both the radio experience and the frequency plan, which accommodated every known radio service, including amateur radio. *Then, as now, Navy considered amateur radio operators an invaluable technical and development reservoir in the national interest.* The Navy's allocation concept still forms the basis of frequency assignments throughout the world. World radio was spurred by this historic landmark in communications.

The Navy's aid in the formation of our present age of radio is so great that space limitations prevent enumeration. For instance, it had an important part in the first "radio propagation" studies ever made.

It was a Navy enlisted man (whose name is unfortunately lost to history), who first pointed to the influence of "sunspots" on radio communications. At that time mankind did not know that radio communications, and particularly long-range communications, are vitally affected by the sunspot cycle; today this is common knowledge. At the time, however, it was another foundation stone.

Today it means little or nothing, perhaps, that our communications facilities which were once called "wireless stations" are now "radio stations." The Navy was the first to adopt the novel term by designating NAA a Navy "radio station." The Navy term has since been adopted by the entire communications industry.

WHEN PRESIDENT Theodore Roosevelt sent the Great White Fleet around the world on an international goodwill mission, Dr. Lee de Forest, the "father of radio broadcasting," was on board the battleship *Connecticut,* flagship of the Fleet. Using his new vacuum tubes, Dr. de Forest supervised one of the first successful tests of the wireless telephone between *Connecticut* and the Naval Radio Station at Point Loma, Calif., and what we know as "radio broadcasting," or the transmission of voice by radio, was in part born.



STRANGE SOUNDS—In 1888 an electric current sent via *USS Newark's* coils, received at a distance on Navy tug.

Less than a decade later, the world's first remotely controlled radio station was installed and operated by the United States Navy in Washington, D. C.; and one of the very earliest automobile radios was developed by personnel of the Naval Research Laboratory.

The Navy was also the first to broadcast the voice of a President of the United States, that of Warren G. Harding, during the dedication of the Lincoln Memorial, and at this time, the Navy also installed the first radio receiving set in the White House.

The Navy was one of the earliest users of the very low frequencies, which are of the same as high frequency sound waves. Our newest very low frequency transmitter is at Jim Creek, in the State of Washington, and is the most powerful radio station of its kind in the world.

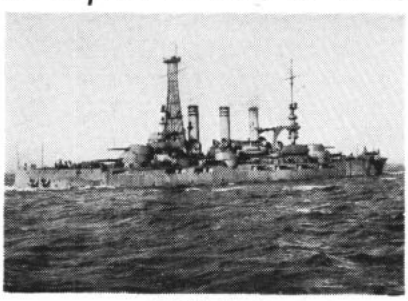
In the early 1920s, personnel of the Navy were already investigating and testing facsimile equipment, and in 1923, recognizable pictures of President Harding were transmitted by the Navy from Washington, D. C., to Philadelphia, Pa. Twenty-two years later, photographs of the Japanese surrender ceremonies aboard USS *Missouri* (BB 63) were transmitted by the Navy more than 5000 miles to the United States and the nation's press. Today, weather maps and other valuable pictorial data are transmitted thousands of miles for the benefit of the Navy and public alike.

Great as the Navy's role has been in this important field, vital contributions have been made by our sister services, by industry, and by many individuals. A true history of the development of radio will include all.

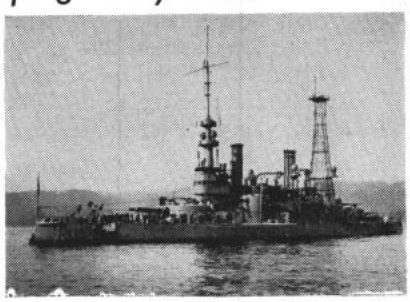
The Navy does, however, hope to participate in the continued development of radio in the present era as it has in the past, and welcomes the wide participation of all interests now equally active in this field.

Ships That Played An Important Role In Developing Navy Radio

USS Massachusetts



USS Nebraska



USS Virginia