

## ELECTRONICS

# Locates Survivors at Sea

TNT charge exploding 3,000 feet under water operates hydrophones at shore stations. Can find men within a square mile of sea as far as 2,000 miles from shore.

► “SOFAR,” an underwater sound system developed by the Navy in cooperation with Woods Hole Oceanographic Institution, makes it possible to locate air and ship survivors far at sea. The system utilizes a TNT charge dropped underwater by the survivor and timed to explode at a depth of 3,000 to 4,000 feet, which sets up underwater sound waves that are picked up by hydrophones at shore stations. Survivors can be located within a square mile of sea as far as 2,000 miles from shore, it is claimed.

To determine the location of the survivor the underwater sound waves must be picked up by three widely separated shore stations, using hydrophones at the same depth. By comparing the times when the signal is received and then referring the differences to special charts, station operators are able to plot the position of the explosion within a few minutes after the most distant station receives it.

The new system's name, “SOFAR”, has no relation to the great distance through which it can be used, but comes from the initial letters of the phrase “Sound Fixing and Ranging.” SOFAR depends upon an underwater sound zone, the existence of which was confirmed as a by-product of wartime submarine detection studies carried on for the Navy by Dr. Maurice Ewing while director of research in physics for Woods Hole Oceanographic Institution.

Dr. Ewing's studies, the Navy Department says, demonstrated that, as the result of a “speaking-tube” effect, sound travels amazingly far in the depth zone between 2,000 and 6,000 feet. During tests conducted in the Bahamas, sound within the zone was heard with useful intensity a distance of 3,100 miles.

No other man-made sound has ever been heard more than a small fraction of this distance, Navy officials declared. However, at a depth of 600 feet the TNT

bomb explosion could be heard for distances of only 100 to 300 miles.

Although the sound lasts less than a second at the point of explosion, it is heard for 24 seconds 2,000 miles away, the Navy states. The signal at the receiving hydrophones is likened to a kettle-drum building up to a sharp, grand finale. The sharp concluding sound makes possible time measurements within one-tenth of a second.

*Science News Letter, January 26, 1946*

## RADIO

## German Submarine Menace Was Lessened by HF/DF

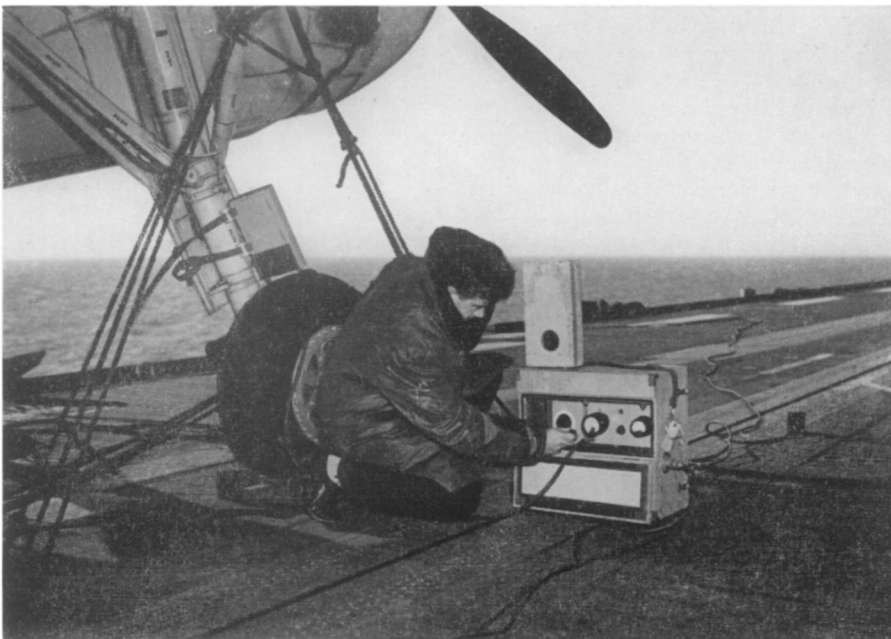
► THE GERMAN submarine menace in the Atlantic was greatly lessened by the use of a network of high-frequency radio direction finders housed in stations along the coastline on both sides of the ocean and on mid-ocean islands, it has been revealed by the U. S. Navy Department. Cruising warships in the Atlantic were equipped with similar apparatus.

German U-boats long followed a practice of coming to the surface at night to report on their high-frequency equipment to their headquarters at Lorient, France. When one of these broadcasts was picked up by one of the Allied radio listening posts, the station immediately alerted all other Allied stations, giving them the submarine's radio frequency.

All stations immediately tuned to this frequency and each adjusted its direction finder receiver for maximum volume. A device attached to the receiver indicated the direction from which the submarine's broadcast came. This direction, or bearing, was immediately sent to a “net control station” which forwarded the information to a plotting center at Washington. By plotting the directions on a chart the probable location of the enemy craft was determined. In a matter of minutes a “killer” group of escort carriers and destroyers was on the way to attack.

This high-frequency radio direction finder system was known technically as HF/DF. The Atlantic operations were conducted by a network of American, British and Canadian stations which were grouped into nets for convenience in operation and efficiency in communications. Each net had its own internal communication system with external radio communication from the net control station to the main plotting centers at Washington, London and Ottawa.

*Science News Letter, January 26, 1946*



**SPOTTED SUBS**—Equipment for locating the source of high frequency radio transmissions played a major role in defeating the German submarine menace. Direction finders at coastal stations and on board ships proved capable of pinpointing the exact location of any submarine using high frequency transmissions. Official U. S. Navy photograph,