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# FOREIGN TECHNOLOGY DIVISION



## ATOMIC SHIPS

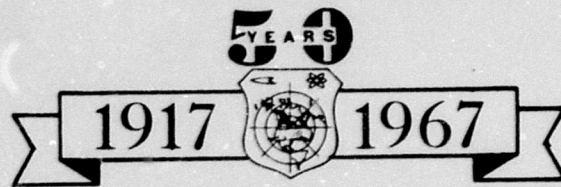
by

M. Otto

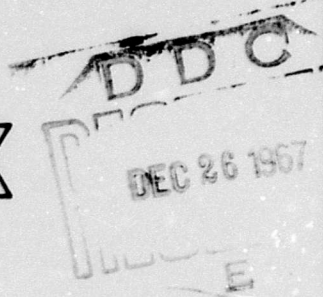
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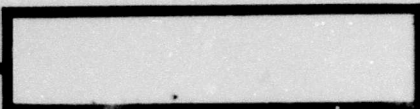
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# UNEDITED ROUGH DRAFT TRANSLATION

ATOMIC SHIPS

By: M. Otto

English pages: 5

SOURCE: Volksarmee. (The People's Army), No. 20,  
1966, p. 8.

Translated by: E. Novak/TDBXT

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**ABSTRACT :** According to Soviet Minister of Defense Marshal Malinovsky, the development of Soviet missile submarines has been particularly active during recent years. These vessels incorporate the latest developments of Soviet science and technology. The Commander-in-Chief of the Soviet Navy, Admiral Gorshkov, one year ago discussed new means of antisubmarine defense; today they exist, particularly against missile submarines. A blue belt of defense has been established, and modern Soviet nuclear submarines, equipped with long-range missiles and torpedoes with nuclear warheads, are the most powerful battleships of our time. Admiral Gorshkov has indicated that new solutions have been found to certain problems, saying that, "The nuclear ships are provided with the newest means of navigation, which make it possible to find the submarine's position at any moment. Versatile electronic equipment makes it possible for the ship to 'see' all underwater and surface conditions and to effectively employ its weapons. The submarine's communications equipment permits contact with the command post from any point in the ocean without surfacing." The gyroscopic devices used in today's inertial navigation systems sense every acceleration or change in course; these changes are evaluated by computers which give the actual positional information. The fact that Soviet nuclear submarines have completed an around-the-world journey, evading American vessels and reconnaissance aircraft and without surfacing, demonstrates that they can observe everything in and above the water. Answering the question of how this can be done, since radio range-finding, which uses very high frequencies, cannot be used by submerged submarines, and since hydroacoustic devices work only within the water, the author answers that there are other possibilities. For instance, the electric and magnetic fields of objects can be located. Electrochemical processes along a ship's hull create an electric potential which varies at different points. The electric current flowing between such points creates an electromagnetic field which can be detected. It might also be possible to detect

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a helicopter from a submerged submarine since a helicopter, is relatively small. A picture shows six methods by which missiles are launched from Soviet submarines (Fig. 1). The caption indicates that diesel-electric submarines in addition to atomic submarines have been fitted out for launching missiles. English translation: 5 pages.

## ATOMIC SHIPS

(As large as light cruisers; 40,000 km in 1 1/2 months;  
radar detection under water?)

M. Otto

Is the expression "boat" still applicable to a ship which has about the same displacement as a vintage World War II light cruiser, i.e., 5000 to 8000 tons? Even though neither size nor striking power justifies this description, we still call modern atomic submarines U-boats.

The XXIII anniversary of the CSU turned its attention thusly to war materials because, according to the words of the Soviet Defense Minister, Marshal of the Soviet Union, Malinovskiy, especially the strategic rocket troops and the rocket submarines have been further developed in recent years. Thus, the atomic submarines in the Soviet rocket submarine fleet represent the last word in Soviet science and technology.

About a year ago when the Commander-in-Chief of the Soviet Navy, Fleet Admiral Gorshkov, spoke of the new methods of submarine defense, the myth of the "invulnerability" of the American Polaris submarines, was shattered. Today a blue defense belt has been built up, new rocket ships, forces, and methods of submarine defense have been built up which are specific in countering the rocket submarines

of the agressor nations.

As Fleet Admiral Gorshkov now established, the modern Soviet atomic submarine is the most powerful war vessel at present. It has, of course, been well-known for quite some time that these ships are equipped with long-range rockets and torpedos with nuclear warheads. The fact is that an atomic submarine can remain submerged for an indefinite time and travel at high speeds. This was proved by a group of Soviet atomic submarines that had completed a trip around the world shortly before this celebration. In slightly less than one and a half months, the group had covered a distance in excess of 40,000 km. This means that the entire group during this time had an average speed of from 18 to 20 knots (33 to 36 km per hour). Naturally, the actual cruising speed is somewhat higher because none of the maneuvers were taken into consideration in the average speed. The nuclear power plant which makes speeds of this type possible for extended periods of time could, for comparison, power many industrial complexes and also supply the electrical energy for a large city. An average-size power plant aboard a ship!

This example shows us the progress that has been made in nuclear power plants; in addition, Fleet Admiral Gorshkov has made the following statement with regard to new solutions of specific problems:

"Atomic ships are equipped with the newest means of navigation which makes it possible to find the position of a submarine at any time. The versatility of the electronic equipment makes it possible for the ship to "see" all underwater and surface conditions and to effectively employ its weapons.

"The communication equipment allows a submarine to contact its command post and receive orders from any point in the ocean without surfacing."

What means is the ship equipped with for navigation, direction finding radio

communications?

For some years, for example, work has been conducted on inertial navigation systems. "Sensing organs" of this type are instruments that use gyroscopes that record all accelerations that occur when the ship is under way, when changing course, etc. Computers process this data and determine the coordinates of the submarine's position. Since the installation is constantly operating, the corresponding coordinates can be read from the indicating instruments.

Up to now, only hydroacoustic equipment has been available for submarines to orientate themselves when submerged. The possibility of submarines to detect objects under water with the aid of radar has been discontinued because the water acts as a mirror to the ultrashort waves that are used by radar stations. The radar stations, as we know them, are blind under water. And, in addition, the propagation of radar waves under water is limited. Only long wave (wavelengths in excess of 10,000 meters) are propagated under water. Since these waves, however, cannot be focused, they cannot be considered for radar stations. Even for radio communications they can only be used to a limited extent, because the range is not much greater than 100 km. Moreover, submarines would see these waves only when they are not submerged more than about 25 meters. Naturally, these characteristics of the radio waves do not change. In order to accomplish what Fleet Admiral Gorshkov has spoken about, entirely new methods must, therefore, be found. The fact that Soviet nuclear submarines completed an around-the-world journey, evading American vessels and reconnaissance aircraft without surfacing, demonstrates that they can observe everything in and above the water.

How then is this possible when radar devices are not used and hydroacoustic installations can be used only in the water?

There are, however, other possibilities as, for example, the electric and magnetic fields of individual objects can be used for location. Electrochemical processes, for example, on a ship's hull create an electric potential which varies at different points. Since sea water conducts electricity, a current flows between these points and thus an electric and electromagnetic field results, which can then be detected. In addition, every object has a magnetic field. For this reason, it has been possible up to now to detect a submerged submarine from a helicopter. Naturally, therefore, the reverse situation also holds true. Nevertheless, the considerably small mass of an aircraft requires considerably more sensitive instruments aboard a submarine than in the case of a helicopter that is looking for a large submarine.

All this points out that the Soviet Navy has developed a modern fleet within the last few years. This then makes it ever clearer that also from the standpoint of the oceans, the aggressors no longer have the advantage as with the "Polaris" submarines, especially not with aircraft carriers or even with rocket carrying transport ships with which other NATO nations are equipped.

GRAPHIC NOT REPRODUCIBLE

Launching variations of Soviet submarines.  
In addition to atomic-powered submarines, diesel-electric submarines are also equipped with rocket launchers.

GRAPHIC NOT REPRODUCIBLE

A group of Soviet atomic submarines in harbor.