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CENTRAL INTELLIGENCE AGENCY
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MEMORANDUM FOR: The Director of Central Intelligence

SUBJECT : MILITARY THOUGHT (USSR): Surface Effects Vehicles and Other Developments in Antisubmarine Warfare

1. The enclosed Intelligence Information Special Report is part of a series now in preparation based on the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought." This article discusses the employment of amphibian aircraft and surface effects vehicles in antisubmarine warfare. Mention is made of a remote-controlled torpedo for helicopter use. This article appeared in Issue No. 1 (89) for 1970.

2. Because the source of this report is extremely sensitive, this document should be handled on a strict need-to-know basis within recipient agencies.

W. E. Colby
Deputy Director for Operations

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DIRECTORATE OF OPERATIONS

Intelligence Information Special Report

COUNTRY USSR

DATE OF INFO. Early 1970

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SUBJECT

MILITARY THOUGHT (USSR): Amphibian Antisubmarine Forces

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SUMMARY

The following report is a translation from Russian of an article which appeared in Issue No. 1 (89) for 1970 of the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought." The author of this article is Captain First Rank A. Potemkin. In discussing antisubmarine platforms, he stresses the advantages of amphibian aircraft and surface effects vehicles. Developments in detection equipment emphasize sound-ranging and underwater surveillance. Along with standard antisubmarine weapons he cites a remote-controlled torpedo to be directed from helicopters operating either from shore or off helicopter carriers.

END OF SUMMARY

COMMENT:

In 1959 Captain Third Rank A. Ya. Potemkin was associated with the Military and Political Academy i/n Lenin. Military Thought has been published by the USSR Ministry of Defense in three versions in the past--TOP SECRET, SECRET, and RESTRICTED. There is no information as to whether or not the TOP SECRET version continues to be published. The SECRET version is published three times annually and is distributed down to the level of division commander.

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Amphibian Antisubmarine Forces

By Captain First Rank A. Potemkin
Candidate of Naval Sciences

None of the arms of the Navy are general purpose because each of them has its strengths and weaknesses. This is why cooperation is basic to their use, since a weakness in one arm of forces is compensated by strength in another. Thus, over a period of time the extent of participation and of success in joint actions will vary among individual arms of forces, primarily because of the constant development of combat equipment and various types of armament, and because of the development of tactics and of methods of their operational use.

It is now recognized that multipurpose nuclear submarines are the most effective antisubmarine force. And this is difficult to deny. At the same time, they are comparatively slow; their deployment to the ocean takes considerable time; and they all are vulnerable to the actions of similar enemy forces. But, now, as never before, we are faced with the problem of destroying enemy nuclear submarines in the shortest possible time in remote areas of oceans and seas, as well as engaging his submarines in combat in coastal areas.

The aforementioned weaknesses of multipurpose submarines may be compensated in many respects by modern antisubmarine aircraft and helicopters. Thus, in warfare against multipurpose nuclear submarines in coastal areas, it is quite suitable to employ shore-based helicopters and, in some instances, those based on helicopter carriers. First they usually conduct a search by laying radiohydroacoustic buoys in areas where they suspect the submarines are located, after which they destroy the submarines. During searches helicopters can also successfully use radiohydroacoustic buoys or any other stationary search means which are installed beforehand, primarily along the antisubmarine lines. In addition, while "hovering", they can use the "dipping" or so-called "lowering" of hydroacoustic sets functioning as sound-bearing and echo detectors with a significantly greater range of submarine reflectivity than that of hydroacoustic buoys. The capability of helicopters to employ (in addition to aerial depth bombs) antisubmarine homing,

circling, and remote-controlled torpedoes, with either conventional or nuclear charges, ensures the destruction of any detected submarine with maximum probability.

The problem of destroying enemy nuclear submarines in the remote areas of the ocean in the shortest possible time is much more complex, because to accomplish this we need shore-based aircraft with a range of ten to twelve thousand kilometers and speeds of six hundred to seven hundred fifty kilometers per hour, and the capability of carrying torpedoes and bombs with both nuclear and conventional charges.

In penetrating the ocean area the antisubmarine aircraft will have to cross enemy air antisubmarine barriers (lines) which are known to be protected by fighter aircraft.* The need to bypass such barriers at any time will inevitably result in a significant reduction in the radius of action. Besides, the possibility exists that enemy aircraft carriers might appear in the flight zone of antisubmarine aircraft; and one of their tasks is to achieve air supremacy within these waters, thus ensuring air cover for their submarines.** And it is apparently not by coincidence that areas in the Norwegian Sea, for example, which the Americans have designated for patrolling by missile submarines and for use in combat maneuvers, by strike aircraft carriers, practically adjoin one another. This is why long-range antisubmarine aircraft must also have the capability of overcoming enemy air defense counteraction.

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*Doubts are occasionally expressed about the existence of such barriers (lines) on the grounds that the majority of missile submarines are deployed in the ocean in advance. However, antisubmarine exercises of foreign navies ("Quick Pursuit," "Perfect Plot" and others conducted in 1967) are evidence of further development of antisubmarine lines.

**Speech by Deputy Chief of Staff of the Combined Armed Forces of NATO, Rear Admiral Bell, on Operational Planning in the Atlantic (February 1966).

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Apart from the aforementioned circumstances, our antisubmarine aircraft must have a variety of search capabilities, including thermal direction finding sets, gas analyzers, and dosimeters. It must be said that the perfection of all these means, which are based on new principles of operation, has been slow. Actually, because the development of search means for antisubmarine aircraft has lagged behind the pace of submarine development (which, by the way, is the case in all the navies of the world), the capabilities of long-range antisubmarine aviation are far from being realized. This situation developed (temporarily, one must assume) when it became easier for aircraft to destroy a target than to find it. In connection with this, scientific-technical research is persistently seeking new search capabilities for aircraft, and it must be said that definite success has already been achieved in this sphere. A number of countries are creating (or trying to create) underwater surveillance radar as well as special equipment for the detection of submarines at the moment a missile is launched from below the surface.

It appears impracticable to use radar as a means for search aircraft to locate nuclear submarines underwater. However, according to the press, this type of radar has already been patented.* It is suggested that with the use of special equipment it is possible to determine simultaneously the moment the missile leaves the water and the location of the submarine, on the basis of four indicators: water splash, the body of the missile in flight, its gas trail, and its light trail. At the same time that this type of search means is being developed, intensive work is also continuing in the perfection of heat detectors, gas analyzers, dosimeters, and radiohydroacoustic buoys.

Simultaneously with the search for new, more effective means for aircraft to detect submarines in remote areas of oceans and seas, a way has been developed to create aerodynamic vehicles which can land on water and monitor the surrounding waters with hydroacoustic equipment. Examples of such vehicles

*The New York Times, 1964, No. 976, pp. 35 and 37.

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are amphibian aircraft with vertical takeoff and landing capabilities, and surface effects vehicles (ekranoplan).*

The flight, dimensional, and weight characteristics of ocean amphibian systems and of proposed surface effects vehicles will permit them to carry almost any kind of search equipment and the longest range and most effective antisubmarine weapons (including all present types of antisubmarine torpedoes) with different types of combat loads. When searching for submarines they can also use the so-called "explosive" (sound) method of locating submarines (U.S. "Julie" type system).** Amphibian forces can also adapt for their use the hydroacoustic sets with large radii of action, such as are installed in submarines. To reduce the weight of these sets, it is only necessary to remove

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*A surface effects vehicle is an aerodynamic vehicle with aircraft construction features. It takes off from the water as a result of the interaction of the thrust of stern sustainer engines and the airflow forced under the wing of the vehicle by the "supercharger" engines installed in its bow section. Flight is effected, using only the sustainer engines at an altitude usually of about five meters, resting on the compressed surface layer of air (screen). Domestic and foreign research indicates that it is possible to create a surface effects vehicle with a takeoff weight of several hundred tons and a takeoff speed of three hundred kilometers per hour. Scientist-designers do not believe these to be the limits in the development of such vehicles. The British are known to already have a program of series production of surface effects vehicles.

**The procedure for the use of such a system by amphibian forces is as follows. At least three charges, set to explode at a designated depth, are fired simultaneously from the search apparatus at trajectories with maximum possible angles of diffusion and for specific equal distances. The search vehicle records the exact time that it receives the sound signals from the explosions and also those reflected from the target. Then ellipses of the possible positions of the targets are graphically plotted, based on differences in time intervals and the known distances between the search vehicle and the points of the explosion.

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from the hydroacoustic system some of the components which are not used by aircraft (in particular, components used by submarines for underwater sound communications and for classification of underwater targets). With such sets at their disposal, amphibians and surface effects vehicles, while in the water, will be able to hit targets on their own using their own underwater surveillance data.

The availability of perfected search sets and effective antisubmarine weapons, plus the considerable autonomy of amphibian aircraft and surface effects vehicles, will allow them to conduct a positive search for submarines and, if necessary, to surveil them for a prolonged period of time (for example, while on combat duty in peacetime). It is true, though, that they must land on the water every time they wish to monitor the surrounding waters. This prolongs search activities, increases fuel consumption and, consequently, reduces the radius of action.

According to press reports, work is being done on the adaptation of hydroacoustic "dipping" sets for towing. When work on this is completed, amphibian forces will be able to conduct prolonged searches without landing.

Ths use of amphibian aircraft and surface effects vehicles also provides a passive method (by flying at altitudes of two to five meters) of fairly successfully circumventing enemy air defense counteraction, especially fighters; this is quite important in actions taking place in remote ocean and sea areas.

But amphibian aircraft also have a serious deficiency: they cannot land on water in windy weather; and this is particularly true in stormy conditions, whereas enemy nuclear general purpose submarines not only can move into any or all areas but they can also successfully employ their weapons.

After the development of aircraft and surface effects vehicles, a number of countries have been attempting to build convertiplanes--high-speed helicopters with the characteristics of aircraft and capable of landing on water (Americans call these vehicles vertoplanes).

In our opinion, the widespread introduction of antisubmarine amphibian forces will permit intensive group searches of submarines to be conducted in the broad expanses of the ocean in relatively short periods of time.

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To conduct this kind of search requires complex electronic equipment which will determine the positions of search aircraft relative to one another, process target information, determine current and previously established coordinates of a detected submarine, and work out basic data for the use of weapons. The use of modern means of communication facilitates the organization of group action and ensures the centralized control of forces from both coastal command posts and from special aircraft in the air.

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