

290/

[Redacted] ~~SECRET~~ [Redacted]

CENTRAL INTELLIGENCE AGENCY  
WASHINGTON, D.C. 20505

2 June 1977

MEMORANDUM FOR: The Director of Central Intelligence  
FROM : William W. Wells  
Deputy Director for Operations  
SUBJECT : MILITARY THOUGHT (USSR): The Employment of Operational-tactical Missiles for the Destruction of Enemy Amphibious Landing Forces

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 examines methods of preparing and delivering operational-tactical missile strikes against enemy amphibious landing forces based on the experience of exercises in the Far East Military District and the Pacific Fleet. The authors discuss the procedure for organizing cooperation between the front rocket troops and artillery and the fleet forces, and the conduct of reconnaissance by TU-16 aircraft, ground artillery reconnaissance radars, and remote-observation posts on ships. They further examine the sequence of preparing single and grouped strikes, indicating the method for fixing the coordinates of the lead point of a target based on its course and rate of movement. A table is also provided indicating the total yield of nuclear warheads required to destroy targets of various sizes at different ranges. This article appeared in Issue No. 3 (82) for 1967.

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. For ease of reference, reports from this publication have been assigned

[Redacted] [Redacted]

William W. Wells

[Redacted]

~~SECRET~~

Distribution:

The Director of Central Intelligence

The Joint Chiefs of Staff

The Director, Defense Intelligence Agency

The Assistant to the Chief of Staff for Intelligence  
Department of the Army

Director of Naval Intelligence  
Department of the Navy

The Assistant Chief of Staff, Intelligence  
U. S. Air Force

Director, National Security Agency

Deputy Director of Central Intelligence

Deputy to the Director of Central Intelligence  
for National Intelligence Officers

Deputy Director for Intelligence

Director of Strategic Research

Director of Weapons Intelligence

~~SECRET~~

~~SECRET~~



[Redacted]  
Intelligence Information Special Report

Page 3 of 11 Pages

COUNTRY USSR

DATE OF INFO. ~~late 1967~~

[Redacted]  
DATE 2 June 1977

SUBJECT

MILITARY THOUGHT (USSR): The Employment of Operational-Tactical Missiles for the Destruction of Enemy Amphibious Landing Forces

SOURCE Documentary  
Summary:

The following report is a translation from Russian of an article which appeared in Issue No. 3 (82) for 1967 of the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought". The authors of this article are General-Leytenant of Artillery A. Sapozhnikov and Lieutenant Colonel S. Ostroumov. This article examines the employment of operational-tactical missile strikes against enemy amphibious landing forces based on the experience of exercises in the Far East Military District and the Pacific Fleet. The authors discuss the organization of cooperation between front and fleet forces, the conduct of reconnaissance by TU-16 aircraft, ground artillery reconnaissance radars, and remote observation posts on ships, and the preparation of single and grouped strikes by fixing the lead point of a target based on its course and rate of movement.

End of Summary

Headquarters Comment:

In 1975 General-Leytenant of Artillery Aleksey Mitrofanovich Sapozhnikov was identified as Chief of the Central Artillery Officers Course in Kazakov. General-Leytenant Sapozhnikov also wrote "Certain Questions of the Employment of Rocket Troops in a Landing Operation" in Issue No. 1 (77) for 1966

~~SECRET~~

~~SECRET~~

[REDACTED]

[REDACTED]

Page 4 of 11 Pages

The Employment of Operational-Tactical Missiles for  
the Destruction of Enemy Amphibious Landing Forces

by

General-Leytenant of Artillery A. Sapozhnikov

and

Lieutenant Colonel S. Ostroumov

In the Far East Military District, together with the Red Banner Pacific Fleet, methods of preparing and delivering operational-tactical missile strikes against enemy amphibious landing forces have been improving for a number of years; as a result of this some generalizations and conclusions can be made.

First of all we would like to stress that the decision to deliver operational-tactical missile strikes against sea targets located within reliable fixing range of the fleet's radars (100 to 120 kilometers from the water's edge) is made by the front commander in coordination with the fleet commander. Strikes against more distant targets are delivered by decision of the fleet commander. The organization of cooperation of the rocket troops and artillery of the front and army with the fleet, specifically with the naval bases of the fleet, is based on this.

Exercises have shown that to maintain close cooperation between the front rocket troops and artillery and the fleet forces, it is necessary to have at each naval base on the main axis a special group for control and maintenance of cooperation, which consists of two or three officers with control and communications means, from the staff of the front or army rocket troops and artillery. It is advisable that the deputy chief of staff of the rocket troops and artillery of the front or the deputy chief of the operations department head this group.

The following tasks can be assigned to the group: to maintain cooperation with the staff of the naval base; to report to the chief of the rocket troops and artillery on the situation at sea; when a task concerning the delivery of a strike is received, to determine the coordinates of the aiming points and the time of the launches, and to transmit this data to the staff of the rocket troops and artillery and to the missile brigade; and to establish the deviations of the ground zeros of the bursts

~~SECRET~~

[REDACTED]

~~SECRET~~

Page 5 of 11 Pages

and the effectiveness of the nuclear strikes. Despite existing opinion that it is needed only until the front or army radiotechnical means begin to operate, this group should continue to be located at the command post of the naval base until the enemy amphibious landing force is completely repelled.

In order to maintain reliable communications, it is necessary to set up a special radio net including the radios of the chief of the rocket troops and artillery, the control group, and the commander of the missile brigade. In addition, to reduce the time of preparing launch batteries for a launch, authorized receivers in the missile battalions should be tuned to the frequency of this net.

The coordination of the employment of the radiotechnical reconnaissance means of a front and army operating on a coastal axis with the reconnaissance means of a fleet deserves particular attention when organizing cooperation.

During exercises the TU-16 aircraft was used for initial reconnaissance of sea targets and also to determine the effectiveness of operational-tactical missile strikes. A seagoing tug and tanker were used to identify the center of the cruising formation of the landing detachment. Their radar fix range was 70 kilometers. Based on this data and the tactical-technical characteristics of radars, we can calculate that, under conditions of average radar visibility and with the radar site located 100 to 200 meters above sea level, ~~the radar fix range for individual sea targets will reach 70 kilometers and that of group targets 100 kilometers and more.~~

The experience of exercises confirms that it is possible to employ remote observation posts on ships to determine the coordinates of targets. Such a post located on the radar line of sight fixes the position of the target in the polar system of coordinates by using radar. The remote observation post on a ship determines its own position at the moment of fixing the target by radar according to shore reference points or dead reckoning. As a rule, target indication is made from a prearranged reference point.

The tactical-technical characteristics of shipboard radars for observation and fire control make it possible to reconnoiter

~~SECRET~~

~~SECRET~~

Page 6 of 11 Pages

targets at distances of 40 to 50 kilometers. Thus, if the position of the ship is determined relative to shore reference points, ~~the depth of reconnaissance by remote observation posts on ships can reach 100 kilometers~~; if the ship's position is fixed by dead reckoning, then the depth is virtually unlimited.

The fix on the points of impact of the missiles was taken by an escort ship by using radar from a distance of approximately 20 to 25 kilometers, and also by cross observation (set up on a 12-kilometer base). A comparison of the results of determining the coordinates by both methods makes it possible to judge whether they are sufficiently accurate. Certain distortions in determining the location of the ship and especially in converting the fix data relative to the prearranged reference point are, in our view, the main source of past errors. If the process of converting the data improves, the accuracy of the determination of the targets' current coordinates by remote observation posts on ships can be considered completely acceptable.

Among front and army means for reconnoitering sea targets, ground artillery reconnaissance radars can be used to a range of 60 to 70 kilometers and, under favorable conditions, cross observation can be used up to 30 kilometers from the water's edge (if the radar sites are located up to 100 meters above sea level).

Thus, the radar reconnaissance means from the fleet and the front large units operating in defense of the seacoast can, with a high degree of accuracy, fix the coordinates of mobile and stationary sea targets and determine: the time of the approach of the enemy's ships to the shore; their number and axis of actions; the station areas for transports and landing ships; the area for transferring the landing force to the landing means; the time of departure and axis of movement of the waves of the landing force; the area in which fire support ships maneuver; and the approach of convoys with subsequent echelons of the landing force.

Methods of preparing single and grouped strikes by operational-tactical missiles against mobile sea targets were tested during the exercises. As is known, such a strike can only be delivered against a point predicted along the route of movement of the target (lead point). The missiles must be launched so that the center of the target is at this point at the

~~SECRET~~

~~SECRET~~

Page 7 of 11 Pages

time of the burst. The coordinates of the lead point are fixed based on data on the target's course and rate of movement by means of consecutive fixes on the target at equally timed intervals. The total strike preparation time is composed of the time required to determine the course and rate of movement of the target, the lead time which is spent on preparing and launching the missile, and the flight time of the missile.

In working out a method of preparing strikes, the lead time was assumed to be 1.5 times as great as the time spent on observation, during which five fixes were always taken to calculate the course and rate of movement of the target. Under these conditions the lead and observation times are determined by the time used in taking the fix. Experience has established that, when preparing single strikes during the day, this fix time should equal four minutes; and at night and when preparing grouped strikes -- five minutes. Then, in the first case the observation time is 16 minutes and the lead time 24 minutes; in the second case they are 20 minutes and 30 minutes, respectively.

The choice of lead times (24 or 30 minutes) was based on the fact that during a sea transit enemy landing detachments are not capable of abruptly changing their course and rate of movement in this amount of time. An increase in the lead time results in an increase in the errors in fixing the coordinates of the lead point, while a reduction limits the time available for preparing the missiles for launch. In this is contained a well-known contradiction. In order to better prepare the missiles for launch, we recommend that, without changing the lead time, the coordinates of the aiming points be fixed and transmitted to the missile brigade twice: the preliminary coordinates after the third fix, and the final ones after the fifth fix.

During the exercises the preparation of single and grouped strikes conformed to the following sequence. When targets were detected, the control group reported all data necessary for the front commander to make a decision to the chief of the rocket troops and artillery: the number of the target (assigned by the fleet); the composition of the target; its area and location at the moment of detection; the time of detection; and its course and rate of movement.

~~SECRET~~

~~SECRET~~

Page 8 of 11 Pages

After the front commander (or the army commander when appropriate) made the decision to deliver nuclear strikes, the chief of the rocket troops and artillery assigned a task to the missile brigade commander and to the control and cooperation group. The number of the target for destruction, the number of warheads allocated, the yield of the nuclear warheads (damage factors), the approximate time for delivering the strike, and the preliminary target coordinates were indicated in the task. The latter were determined at the staff of the rocket troops and artillery on the basis of an analysis of reconnaissance data sufficiently accurate to orient the launchers. The task was assigned by means of a signal-code table.

On the basis of this data the missile brigade commander designated batteries for the strike which possessed missiles having the stipulated yield of the warheads and issued the command to move them into the launch positions and to shift to Readiness No. 1 if they were not on alert.

On the basis of the results of the first three fixes on the target taken with means from the naval base, the control group determined the preliminary coordinates of the lead point and the launch time on the fire control equipment and transmitted these data to the missile brigade. To determine the time for the start of the missile launches, 50 or 40 minutes (according to the time used to take the fix -- five or four minutes, respectively) were added to the time of the first fix, and the flight time of the missile was subtracted. On the basis of the preliminary target coordinates the missiles in the launch batteries were shifted to Readiness No. 1 without entering the range value into the guidance system.

After the five fixes on the target, the control group fixed the final coordinates of the lead point and, when the dimensions of group targets exceeded 3.5 to four kilometers in frontage and in depth, assigned the aiming points according to the number of launch batteries. Based on the final target coordinates the launch batteries corrected the sight for the difference in ranges and the azimuth for the difference in directions between the preliminary and final aiming points; entered the range into the guidance system; carried out the final guidance of the missile and checked the guidance; and precisely at the designated time launched the missiles.

~~SECRET~~

~~SECRET~~

[REDACTED]

[REDACTED]

Page 9 of 11 Pages

After determining the coordinates of the aiming points, the control group continued to take fixes on the target right up until the strike. In case of a sharp change in the course or speed of the target, this made it possible to give the signal to stop the strike, to report to the chief of the rocket troops and artillery, and to transmit the new coordinates for the aiming points.

To evaluate the accuracy of the determination of the coordinates of the lead point during the exercises, a fix on the target was taken at the calculated time of the burst, and the target's position relative to the lead point was determined.

On the basis of an analysis of the statistical material gathered at the exercises, we can draw the conclusion that the number of errors in determining the coordinates of a lead point during the destruction of a mobile sea target increases insignificantly in comparison with the errors in determining the coordinates of ground targets. With a lead time of up to 30 minutes, determining the coordinates of the aiming point by radars and by remote shipboard observation posts provides sufficient accuracy in missile strikes against group targets, such as landing detachments during a sea transit.

The results of combat training launches and particularly combat launches make it possible to draw certain conclusions on the effectiveness of nuclear strikes delivered by operational-tactical missiles against enemy amphibious landing forces.

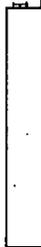
During a sea transit and in the station area enemy amphibious landing forces can occupy an area up to 12 kilometers in frontage and four kilometers in depth and present a group target. According to existing views, the destruction of a group target is achieved by destroying at least 40 percent of the target area with 90 percent reliability. We have calculated the nuclear warhead yields required to achieve the reliable destruction of an enemy landing detachment (the destruction of at least 40 percent of the targets in the landing detachment). The results of these calculations are given in the following table.

[REDACTED]

~~SECRET~~

~~SECRET~~

Range of the launchers, in kilometers		Required total yield of the nuclear warhead (in kilotons) with a target area of				
Operational-tactical missiles		10 square kilometers	20 square kilometers	30 square kilometers	40 square kilometers	50 square kilometers
R-170	R-300					
50	50					
	100					
	150					
100	200					
	250					
150	300					
170						



~~SECRET~~

~~SECRET~~

[REDACTED]

[REDACTED]

Page 11 of 11 Pages

Depending on the launch ranges and the target's area, the number of missiles and the yield of their nuclear warheads which are needed to destroy an enemy landing detachment during a sea transit and in a station area, can be determined by using these data.

As is known, a group target can be of any size. Among the factors determining the effectiveness of a nuclear strike against a group target, the total circular error is the only one which can be judged following the launch of combat missiles. In comparing the data obtained in the exercises with errors calculated based on the tactical-technical characteristics of radars, we come to the conclusion that differences between them are insignificant. In fact these discrepancies can be ignored.

Thus, according to the experience of exercises, it is completely possible to employ front and army rocket troops to destroy targets during a sea transit at distances which ensure the required accuracy in reconnaissance and in determining coordinates (at present not more than 100 to 120 kilometers from the water's edge). The necessary effectiveness of grouped strikes by operational-tactical missiles is achieved at these distances. Single strikes against enemy landing forces during a sea transit have little effect. It is advisable to deliver them against a transshipment area and during the movement of the landing forces to the shore.

In our view, it is necessary to continue studying this problem in a series of exercises involving the launches of combat missiles in order to work out in final form the method of preparing and delivering strikes. After this it is advisable to issue the appropriate official instructions or manual on the destruction of sea targets by the missile means of the Ground Forces in cooperation with units and large units of the Navy.

[REDACTED]

[REDACTED]

~~SECRET~~