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CENTRAL INTELLIGENCE AGENCY
WASHINGTON, D.C. 20505

2 May 1974

MEMORANDUM FOR: The Director of Central Intelligence

SUBJECT : MILITARY THOUGHT (USSR): National Air
Defense Participation in Naval Operations

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 characterizes the air defense capabilities of the Soviet navy and discusses the extent to which the Soviet coordinated national air defense system can provide air defense of naval operations. Limitations on warning ranges are cited, with the authors recommending radar ships and radar aircraft to extend this capability seaward. Long-range land-based missiles are said to provide cover out to 120 kilometers, and the YAK-28P fighter is granted a capability out to 400 kilometers. Required warning distances for various weapons systems are stated. This article appeared in Issue No. 2 (84) for 1968.

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.

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David H. Blee
Acting Deputy Director for Operations

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Intelligence Information Special Report

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COUNTRY USSR

DATE OF INFO. Mid-1968

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DATE 2 May 1974

SUBJECT

MILITARY THOUGHT (USSR): The Cover of Naval Forces by Air Defense Forces of the Country in Operations on a Maritime Axis

SOURCE Documentary

Summary:

The following report is a translation from Russian of an article which appeared in Issue No. 2 (84) for 1968 of the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal 'Military Thought'. The authors of this article are General-Mayor of Aviation I. Lyubimov and Colonel V. Zemlyanushkin. This article characterizes the air defense capabilities of the Soviet navy and discusses the extent to which the Soviet coordinated national air defense system can provide air defense of naval operations. Limitations on warning ranges are cited, with the authors recommending radar ships and radar aircraft to extend this capability seaward. Long-range land-based missiles are said to provide cover out to 120 kilometers, and the YAK-28P fighter is granted a capability out to 400 kilometers. Required warning distances for various weapons systems are stated.

End of Summary

[Redacted Box] Comment:

Gen.-Mayor Lyubimov wrote "Coordination of National Air Defense Troops with the Navy", Military Thought, Issue No. 3, 1969, the RESTRICTED version. Col. Zemlyanushkin wrote "Certain Aspects of the Scientific Approach to Troop Control", Vestnik PVO, No. 5, 1968. The SECRET version of Military Thought was published three times annually and was distributed down to the level of division commander. It reportedly ceased publication at the end of 1970.

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The Cover of Naval Forces by Air Defense Forces of the
Country in Operations on a Maritime Axis

by
General-Major of Aviation I. Lyubimov
and Colonel V. Zemlyanushkin

Front (army) operations on maritime axes will be conducted, as a rule, in close coordination with the navy.

In the process, the navy can accomplish such extremely important tasks as the disruption and prevention of enemy maritime shipments to reinforce his ground groupings; fire support of front (army) troops when they are seizing important areas on the coast, and cover of their flanks from the sea; amphibious landings; anti-landing defense of the coast; the transport of forces and material means; and other tasks.

The successful fulfilment of these tasks will depend to a large extent on how reliably we are able to cover naval forces at sea, and also their bases, airfields, and other shore installations, from enemy air strikes; to what extent we are able to prevent enemy aviation from laying mine barriers and conducting aerial reconnaissance; and to what extent we can protect naval missile-carrying aviation from attacks by enemy fighter aircraft during flights to and from a target.

The urgency of this problem and the difficulty in solving it are due to the capabilities of modern enemy aviation and the assumed nature of his actions against our naval forces.

An analysis of air and naval exercises of the US and Great Britain, as well as a study of the experience of USAF combat operations in Vietnam, shows that carrier-based, tactical, and land-based aircraft can be used for the delivery of strikes against ships and other naval objectives. Attacks against ships are more likely from low altitudes (on a flight over water, 50 to 100 meters; over rugged terrain, 100 to 300 meters). Flight speeds reach 900 kilometers an hour, and they may reach supersonic speeds of 1300 to 1500 kilometers an hour in the future. Groups of carrier aircraft for strikes against ships may consist of from 2 or 3 to 12 to 18 aircraft, depending on meteorological conditions and the time of day. Tactical aviation, as a rule, operates in small groups of 3 to 5 aircraft for each target, and in a strike against an objective a total of 12 to 48 aircraft or more may take part, not counting support groups. Coastal and deck-landing antisubmarine aviation seeks out submarines in prescribed

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areas (about 50 x 100 meters for one aircraft). The extent of the search on the antisubmarine defense line can be as much as 350 to 500 kilometers. The search for submarines is carried out at low speeds (250 to 450 kilometers per hour by aircraft, and 150 to 170 kilometers by helicopters of antisubmarine defense), and at low altitudes (500 to 2000 meters for radar scanning, 250 to 550 meters by sonar, and 15 to 50 meters by magnetometers).

Enemy air defense means are destroyed by Shrike homing missiles, and radar sets are subjected to active and passive jamming. The density (level) of the jamming is expected to be as follows: passive, up to 12 to 24 packets per 100 meters of route; active noise jamming, 60 to 100 watts per megahertz (selective) and 5 to 15 watts per megahertz (barrage); and active response (deflecting) jamming, 100 to 250 watts.

All this puts great demands on the air defense of naval forces and the places where they are based. Air defense must cover all altitudes, and it must be stable and capable of waging combat against various types of aircraft and cruise missiles.

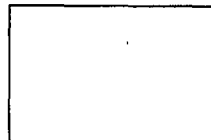
It is obvious that the full range of these requirements can be fulfilled only by the combined efforts of the Air Defense Forces of the Country, the air defense of the front operating on the maritime axis, and the air defense forces of the navy.

Let us examine what the capabilities of the Air Defense Forces of the Country are for accomplishing these tasks, and what coordination between the forces and means of naval air defense and the Air Defense Forces of the Country involves.

Analysis of the combat capabilities of the forces and means of Air Defense of the Country shows the following.

Antiaircraft missile systems do not destroy aircraft operating at altitudes of less than 100 meters, while at other altitudes they possess limited capabilities for covering ships and objectives in the coastal zone. The depth of the coastal zone of cover, depending on the altitude and speed of the target, varies: for long-range systems, from 10 to 70 kilometers (at altitudes of one kilometer or more); for medium-range systems, from 10 to 25 kilometers (at altitudes of 300 meters or more); and for short-range systems, from 3 to 5 kilometers at altitudes of 100 meters or more. When firing at air-to-surface missiles, these figures drop by 25 to 35 percent.

The capabilities of fighter aviation are shown in Table 1.



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In order to realize the maximum capabilities of fighter aviation of the Air Defense Forces of the Country over the range of cover of ships at sea, it is essential, as is clear from the table, to have the proper radar control equipment on ships and a radar field of detection. A proper field of detection is necessary also for anti-aircraft missile troops.

In order to make timely use of fighter aircraft from Readiness No. 1 (the status of "duty on the airfield"), and anti-aircraft missile troops from Readiness No. 2, the system of detection and target designation must meet the following requirements (see Table 2).

The existing radar stations in the armament of the Air Defense Forces of the Country have a detection range at low altitudes of up to 80 to 90 kilometers, and at medium and high altitudes of up to 450 kilometers. Therefore, for timely warning and target designation for anti-aircraft missile troops and fighter aviation, and also for the realization of the capabilities of fighter aviation in providing cover for ships at sea, it is necessary to build up the radar field in the direction of the sea by 400 to 450 kilometers. And in order to commit long-range fighter aircraft to combat on the necessary line before the launching of air-to-surface missiles by enemy aircraft, it is important to have the warning line at a distance of up to 1800 kilometers from the airfields of fighter aviation. This kind of buildup of the radar field is possible only by using special ships or radar patrol aircraft. But, at the present time, owing to the insufficient detection range by the radar stations of the Air Defense Forces of the Country, the combat capabilities of fighter aviation in a maritime sector may be realized by only 50 to 70 percent.

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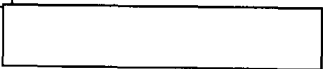
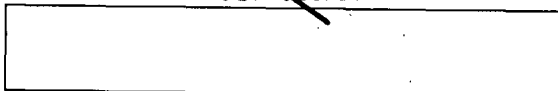
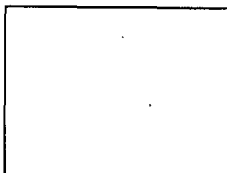


Table 1
Capabilities of Fighter Aviation of Air Defense of the
Country in Providing Cover for Naval Forces in a Coastal Area

Description of characteristics	Altitudes of enemy action	
	Low altitudes (500 meters or less)	Medium and high altitudes
Maximum distance of the line of interception according to the fuel supply	300-450 km	400-550 km
Distance of the enemy line of task fulfilment from the objective (when bombing)	5-10 km	25-30 km
Depth of the battle zone	40-60 km	80-120 km
Necessary distance of the line of the beginning of destruction of enemy aircraft from the objective of a strike	Up to 70 km	Up to 150 km
Range of control of fighter aircraft (according to the range of radar stations located on shore)	Up to 70 km	Up to 350 km
Distance of objectives from the seacoast at which cover is provided by fighter aviation controlled from shore	On the coastline	Up to 200 km (in the direction of the sea)
Distance from the seacoast of objectives being covered at which cover is provided when fighter aircraft are controlled from ships (from a status of ("duty in the air"))	230-380 km	250-400 km*

* Only YAK-28P fighters



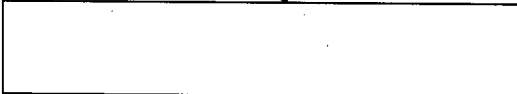
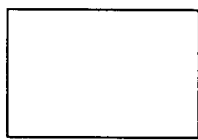


Table 2

Weapons	Requirements		Maximum necessary detection range	
	Line of warning (approximate)	Complete radar coverage (exact)		
Long-range air-launched missile system/interceptor (ARKP DD) (SU-22 w/ AR-22)	1200-1800 km	700-900 km		
High-altitude, high-speed fighter aircraft (MiG-25; Su-15)	950-1100 km	550-700 km		
Low-altitude fighter aircraft (YAK-18)	620 km	220-650 km		
Long-range antiaircraft missile system (SA-5)	900 km	350 km		
Medium-range antiaircraft missile system (SA-2)	600-650 km	250-280 km		
Low-altitude antiaircraft missile system (SA-3)	370-500 km	220-250 km		

Thus, based on actually existing combat capabilities, the Air Defense Forces of the Country can provide effective cover, by means of fighter aviation and antiaircraft missile troops, from air strikes against naval bases, ports, ships in dispersal points, aircraft on airfields, and other naval shore installations. In addition, they can provide fighter aircraft cover for ships at sea at a distance of up to 200 kilometers from the shore (by their own means at medium and high altitudes with the support of a radar field of detection and control of fighter aircraft), and up to 250 to 400 kilometers (given the availability on ships of radar means of reconnaissance and control of fighter aircraft, and from the status of "duty in the air"). It is possible to accompany naval aviation to this depth (when they take off on a task and on contact when returning) in order to interdict attacks by enemy fighter aircraft.

It is also possible, to a certain extent, to carry out the search and destruction of antisubmarine defense aircraft, mine-laying aircraft and reconnaissance aircraft at a distance of up to 450 to 500 kilometers, by low-altitude aircraft missile systems of the YAK-28P type.



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As for anti-aircraft missile cover of ships operating in the coastal zone, the capabilities of the Air Defense Forces of the Country are extremely limited, with the exception of long-range anti-aircraft missile systems, which can reinforce the cover of ships to a depth of 70 to 120 kilometers (at medium and high altitudes).

The provision of cover for installations located on shore, and also for naval forces at their bases (dispersal points), is, as is known, carried out by the Air Defense Forces of the Country within the general system of air defense, along with the accomplishment of its basic tasks; while for fighter aviation cover of ships at sea, independent air defense forces and means will have to be allocated. Since the cover of ships at sea is carried out from the status of "duty in the air", this will result in an extremely large expenditure of fighter aircraft. Thus, for the continuous cover of a group of ships for one day by four YAK-28P aircraft standing patrol at a distance of 850 kilometers from an airfield (in order to destroy enemy aircraft even before they deliver strikes against ships 400 kilometers offshore), up to 90 to 100 air sorties will be required.

Or another example. For fighter aviation cover of the first echelon of an amphibious landing force during the sea crossing and in combat during the landing (at a landing depth of 350 to 400 kilometers), an effort of three sorties per crew requires the involvement of three to four fighter aviation regiments. At least half of these aircraft should be special low-altitude interceptors.

It is unlikely that a maritime air defense formation (large unit) could have enough fighter aircraft to be able to provide direct cover for every ship grouping at sea. We must therefore seek additional capabilities in order to solve this problem in the most effective and rational manner. In particular, we feel that such measures could consist of the following.

The buildup of a radar field of detection and control of fighter aviation of the Air Defense of the Country requires a speed-up in supplying maritime large units of the Air Defense Forces of the Country with radar patrol aircraft, and in supplying fleets with radar patrol ships capable of controlling fighter aviation. We obviously must also increase the number of long-range interceptors in the aviation of maritime air defense large units, which will make it possible to allocate part of the forces specifically for the cover of naval forces at sea.

The presence of prepared ship control posts for fighter aviation (KPUNIA)--and, in the future, combined with automated control systems on shore and on ships, or special control ships--will make it possible to

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achieve more effective control of fighter aircraft when they are operating at sea. ↑

The creation of a special aircraft for naval aviation with an operating radius of 3500 to 4000 kilometers and with equipment for seeking out and destroying enemy aircraft at low altitudes, would make it possible to wage successful combat against enemy reconnaissance aircraft and antisubmarine aircraft in distant areas of the sea.

The organization of combat actions of the Air Defense Forces of the Country in providing cover for naval forces in operations on maritime axes in coordination with the forces and means of naval air defense should be based on zones, as shown in the diagram. ↓

The first zone. This is the zone of the Air Defense Forces of the Country, in which they provide cover for shore installations and naval forces with their own forces and means. The air defense means of ships only reinforce the Air Defense Forces of the Country. This zone is determined by the capabilities for the control of fighter aviation from ground control posts of large units of Air Defense of the Country when the fighter aircraft are operating by the method of "duty at airfields". The depth of this zone from the seacoast will be no more than 150 to 200 kilometers.

The second zone is the zone of joint operations of the forces and means of the Air Defense Forces of the Country and the navy. This zone is determined by the capabilities of fighter aviation over their operating radius when controlled from radar patrol ships and aircraft. The depth of this zone from the seacoast will be 250 to 400 kilometers. Only part of the fighter aviation specially allocated for naval cover at sea will operate in this zone.

The third zone is the zone of operations of naval air defense forces and means beyond the range of fighter aviation of Air Defense of the Country. In this zone on open stretches of sea only individual aircraft or small groups of long-range fighter-interceptors of Air Defense of the Country, as well as radar patrol aircraft, can operate (to a depth of up to 1000 kilometers).

In the first zone, the basic forces performing air defense tasks in support of the navy are the Air Defense Forces of the Country. Therefore, the organization and implementation of control and coordination in this zone is the responsibility of the formation commander of the Air Defense Forces of the Country. Air defense tasks in support of the navy are performed here along with other tasks (in support of the front and the

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territory of the country). Therefore, the procedure for the control of forces and means of Air Defense of the Country, and also their coordination with the forces and means of the air defense of formations of other branches of the armed forces, is provided for by operational air defense plans of formations and by the plans for combat operations of large units (divisions, corps) of air defense.

In the second zone, the Air Defense Forces of the Country operate only as part of the forces of fighter aviation. It is advisable on the whole to assign the organization of the cover of naval forces in the second zone to the navy and to provide for this organization in the appropriate plans. These plans will obviously have to reflect the following questions: the organization of reconnaissance of the air enemy, the organization of control of fighter aviation, and the procedure of coordination with the fire means of ships operating in the second zone.

In such operations as amphibious landings, where forces of the various branches of the armed forces will take part, including the air defense forces and means of the ground forces, the navy, and Air Defense of the Country, the need arises to create a special air defense command. This command will conduct the planning and will organize the control and coordination for each period of the operation.

However, control of fighter aviation of the Air Defense Forces of the Country operating in the second zone must in all cases be exercised by the senior aviation representative of that unit (large unit) of air defense to which the fighter aircraft belong. He may be on one of the ships having ship control posts for the control of fighter aviation, and appropriate means of communications and control of fighter aircraft. As a rule, he will be stationed in the same place as the chief of air defense of a large unit of ships or, for example, the air defense chief of the landing forces of an amphibious landing.

The tasks of coordinating the Air Defense Forces of the Country and the navy may be broken down into two groups.

The first group involves questions of coordinating zones of responsibility of the forces and means of Air Defense of the Country and the navy, the distribution of efforts in these zones, the ensuring of the mutual exchange of information, various kinds of support, and other operational questions. The sequence of the performance of these tasks is planned at the operational echelon in the coordination plan of the forces and means of Air Defense of the Country, the navy, and the front.

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The second group of tasks involves the coordination of questions concerning the combat use of weapons and the exchange of information during battle, i.e., of a tactical nature. Obviously, they will be accomplished differently in each zone.

In the first zone, the coordination of fighter aviation, antiaircraft missile troops, and radio countermeasures means of both the Air Defense Forces of the Country and the navy must be organized. The sequence of this coordination is defined by appropriate instructions and will remain in effect also when conducting joint operations. ↓

In the second zone, the coordination of fighter aviation of Air Defense of the Country and the air defense means of ships must be organized. The sequence of this coordination must be provided for in the standard plans of the air defense of large units of ships, and agreed upon with large units (formations) of air defense. When conducting such operations as, for example, amphibious landings, questions of coordination are reflected in the plan of coordination of the air defense forces and means allocated for the operation. This coordination is organized by the air defense chief assigned to the operation.

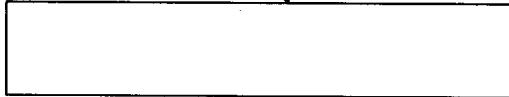
As for the third zone, coordination in it is based on mutual notification about the air enemy between radar reconnaissance aircraft and aviation systems of long-range interception. It is organized by the commanding officer of air defense of the fleet on the level: naval headquarters--headquarters of the operational formation of air defense. ↑

The tasks of providing cover for naval forces by Air Defense Forces of the Country during joint operations will be carried out not in an isolated manner, but jointly with the forces and means of air defense of the ground forces, since we are dealing here with the joint operations of a front (army) and a fleet. But in this article we have dealt with those tasks of air defense of the navy performed only by the Air Defense Forces of the Country, bearing in mind that providing cover for ship forces by the air defense means of a front (army) is a no less important and complex task, and therefore may be a special subject for study. A brief analysis of the tasks of the Air Defense Forces of the Country in providing cover for naval forces, and of the conditions of their fulfilment, leads us to conclude that the full resolution of this problem is determine on the one hand by a whole complex of organizational measures, and, on the other hand, by the technical capabilities of air defense means and their further development.

The successful fulfilment of all the enumerated tasks by the Air Defense Forces of the Country will be facilitated by the inclusion in maritime large units (formations) of a greater number (compared to other) ↓

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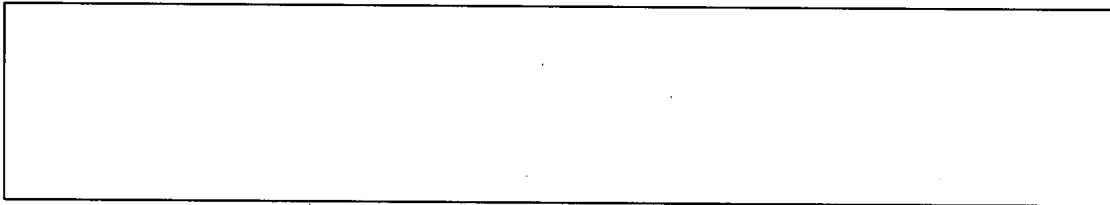
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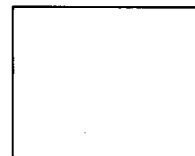
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large units of the Air Defense Forces of the Country) of fighter aviation units and armed with aircraft which will permit the fulfilment of tasks at low altitudes and at sea far from its shores. Even in peacetime these units and large units should master the operations of fighter aircraft to the full radius of flight at sea, and work out coordination with the navy, [↑] and control of fighter aircraft from ship control posts.

(See Chart and Key to Chart on following pages)



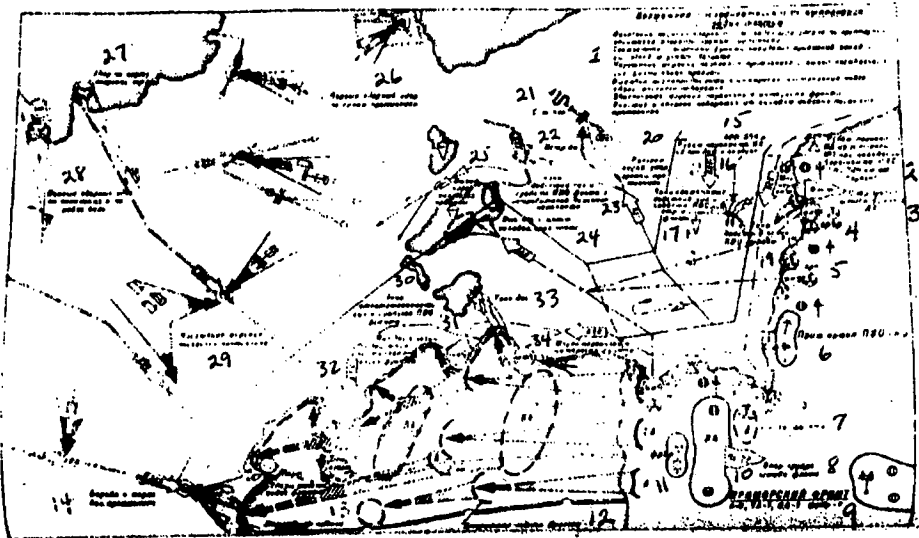
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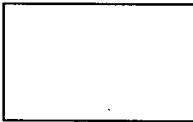
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Chart



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Key to Chart

1. Possible sequence of fulfilment of tasks by the navy
Delivery of the initial nuclear and subsequent strikes against enemy groupings of nuclear weapons delivery means;
Joint seizure of the zone of the straits by front troops and an amphibious assault landing;
Disruption of enemy maritime deliveries and the passage of naval ship forces through straits;
Landing of an amphibious force in support of an offensive by troops along the seacoast;
Ensuring maritime shipments in support of a front;
Participation in the defense of a seacoast against an enemy amphibious landing.
2. Line of entry of fighter aviation at Readiness No. 1 into control by shore radar stations (up to 200 kilometers from shore)
3. Operational groups of front headquarters and long-range aviation
4. Antiaircraft missile brigade
5. Antiaircraft missile regiment
6. Maritime army of Air Defense of the Country
7. Second echelon of a front
8. Operations group of naval headquarters
9. Maritime front
Army - 3, Tank army - 1, Air army - 1, Front missile brigade - 1
10. Maritime front headquarters
11. Front missile brigade
12. Immediate task of the front
13. Subsequent task of the front
14. Battle against enemy amphibious landing
15. Line of interception of fighter aviation from zones of "duty in the air"

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16. Command post of the strike group
17. Zone of joint operations of forces and means of the Air Defense of the Country and the navy
18. Maritime shipments
19. Zone of operation of the Air Defense Forces of the Country
20. Destruction of enemy ship strike group
21. Means of antisubmarine defense
22. Long-range fighter interceptor
23. Zones of operations of naval air defense forces and means and of long-range fighter interceptors
24. Amphibious landing for the purpose of seizing the zone of the straits
25. Withdrawal of ships through the straits
26. Initial nuclear strike against enemy forces
27. Strike against port of embarkation
28. First nuclear strike against an aircraft carrier and in a base area
29. Disruption of enemy sea shipments
30. Zone of responsibility of front air defense forces and means
31. Amphibious landing for the purpose of aiding the offensive of front troops
32. Landing
33. Tank landing
34. Maritime shipments in support of the front

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