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New Developments in Combat with Carrier Strike Large Units  
in the Initial Period of a War

by

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In the leading NATO countries a revolution of the forces of the combined navies has recently been made. In performance of the tasks of armed conflict at sea, submarines equipped with missiles capable of destroying military-political and economic targets with high-yield nuclear weapons have moved into first place, ahead of aircraft carriers. However, the complement of the carrier fleet has not decreased. The plans of the NATO command provide, as before, for the retention in operation of 15 strike carriers. It is also a characteristic fact that new strike carriers have recently been brought into service, among them the atomic carrier "Enterprise". The atomic carrier, according to views previously expressed by the U.S. Naval command, should represent the basic nucleus of the offensive strength of a fleet.

The carrier aircraft fleet (park) has also been brought up to date. In the near future, a large number of new carrier attack and fighter aircraft will enter service. They have a ceiling of 24,000 meters, a flight speed exceeding 2000 to 2200 km, and the extent of their tactical radius of action is not less than that of the present heavy attack aircraft "Sky Warrior". On each carrier of the "Forrestal" type, as has now been established, about 80 aircraft are based, of which 40 to 50 are attack aircraft—delivery vehicles for nuclear bombs—for which there is a stock of about 140 nuclear bombs, which it is calculated will be expended during the first 72 hours after the beginning of a war (in peacetime the number of bombs on a carrier is approximately half of this). The combat capabilities of a carrier strike large unit

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(avianosnoye udarnoye soyedineniye— AUS) are significantly increased by its possession of such a quantity of nuclear bombs.

If it is accepted that an AUS will consist of three aircraft carriers of the type mentioned above, about 200 nuclear strikes will be carried out by aircraft from such a strike force in the first three days after the start of a war, even though the losses of carrier aircraft in the air are not less than 50 percent. Thus, each day carrier-borne aircraft will destroy an average of some 60 — 70 large targets, located not only in the coastal zone, but also in the interior of the territory of the country. It follows that in spite of the revolution of forces which has been conducted, strike carriers have not lost their former significance in offensive operations at sea, and that they will retain this significance for at least the next decade, so that their destruction is one of the primary tasks at the outset of a war.

Combat with carrier strike large units has already been discussed\* However, we can not agree with a number of the propositions which have been stated. Several of these are, in our opinion, incorrect in principle, and some require more precise definition, since the use of an AUS is now seen differently by the command of NATO than it was earlier. Confirmation of this is found in recent exercises held by the NATO command.

The view that operations for the destruction of these units take either a defensive or an offensive form, in accordance with the aims pursued by the operations, can not be considered correct. We see immediately that a division of the possible operations for the destruction of an AUS into offensive and defensive can not be considered successful. Naval operations, in our opinion, can not be seen as analogous to the operations of formations of ground forces, as has previously been done. The term "offensive operation" or "defensive operation"

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when applied to a naval formation does not permit one to determine precisely how to distinguish between the operations of this formation. Now should it be forgotten that there is no front line at sea, and that a particular section of a sea or an ocean is not occupied as the result of an offensive.

Nor does the direction of movement of an AUS across an ocean determine the form of combat operations. In our view, therefore, the terms "defensive" and "offensive" operations have no practical significance when applied to the navy and should be rejected, particularly since the character and aims of the combat operations of naval forces—submarines, aircraft and warships—in carrying out the tasks of combat with carrier strike large units are always offensive.

It is also not entirely correct to consider the task of destroying the AUS as being in all cases the main task of the submarines, of the naval missile-carrying aircraft and, to an equal extent, of long-range aviation. Long-range aviation may, of course, take part in the destruction of a carrier strike large unit with part of its forces. But must this be considered a law? Assuredly, this is without foundation for the following reasons.

In the first place the basic function of long-range aviation is obviously that of action deep in the rear area of the enemy, and primarily that of destroying the nuclear/missile and aviation groupings of the enemy, together with his strategic missile troops. Besides this, long-range aviation may also be assigned to perform tasks in the main theater of military operations. Naturally, under these conditions, one can not expect that even before the beginning of hostilities, forces able to be at constant readiness, solely for operations against an AUS, could be assigned from its complement.

Secondly, the basic weapons of long-range aviation—missiles with powerful nuclear charges—are designed for

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the destruction of area targets of large dimension, such as large military-industrial targets, naval bases and ports, especially strongly built structures, nuclear weapon depots and structures which are underground or in rock. The weapons of naval missile-carrying aviation have been created for a single purpose --- destruction of mobile naval targets such as are represented by all surface warships, including large aircraft carriers and transport vessels. If such weapons are supplied as armament for individual large units of long-range aviation, these cease to be long-range aviation large units, in the true sense. By their nature these would be large units of naval missile-carrying aviation, although organizationally they might not enter the composition of the navy. Thus, the organizational designation has no significance here and the forces of the navy will be cooperating not with long-range aviation as a branch of the air forces, but with aviation large units, which will strengthen it constantly and which will always perform their tasks within the framework of a naval operation.

In view of what has been said, one can not view an operation for the destruction of carrier strike large units solely as one in which, together with the basic types of naval forces of submarines and missile-carrying naval aircraft—long-range aviation, troops of the Anti-air Defense of the Country, and strategic missile troops will also participate. The situation in the initial period of a war may develop in such a manner that other branches of the armed forces will not be able to take part in this operation, at least not in its first stages, in which case the full weight of combat with the strike groupings of the enemy, and primarily with his aircraft carriers and missile-carrying large units, will rest upon our Navy. In such a case, this will be an independent naval operation, a fact which must not be lost sight of in scientific developments or in practical operational training. The devotion of proper attention to the independent naval operation will permit us to find the most effective methods for combat with the AUS, and to

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determine the direction along which forces and means must be developed to support the combat operations of submarines and naval aviation.

Let us define the aim of combat with the AUS. Sometimes, for example, it is asserted that this aim can be either destruction or weakening. In our view this is not entirely correct.

Since a carrier strike large unit always carries nuclear weapons, and has its own means for their delivery, one simply can not speak of weakening such a grouping. In all cases one must strive for its destruction before the carrier aircraft have reached the take-off line (rubezh podyema). It is therefore more correct not to speak of weakening but of the immediate destruction of the strike carriers at the beginning of combat operations. The mere weakening of a grouping of the enemy's carrier forces does not remove the threat of a sudden nuclear attack by him, and does not decrease the strain on the forces detailed to repulse an enemy incursion from the air.

Arguments that the location of carriers in distant regions of an ocean precludes their destruction are unfounded. Atomic submarines will clearly be able to carry out combat operations against the AUS anywhere in the oceans of the world. Moreover their missiles and torpedoes with nuclear warheads permit them to achieve complete destruction of the enemy. All possible help will be given to submarines in distant areas of the oceans by missile-carrying aircraft, which are a strong factor in the destruction of the AUS as the latter is approaching the point at which it launches its aircraft. Therefore, an operation for the destruction of carrier strike large units beginning with their detection and logically ending with their destruction, can not be called a defensive operation, aimed at weakening the AUS, either in forces, or still less in content. In armed conflict in land theaters of military operations, the task of destroying the nuclear/missile means of the enemy can not be of an indefinite nature. It is directed towards the decisive destruction of the nuclear/missile grouping of the enemy. The objective of combat with his carrier forces

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must be defined in exactly the same manner.

The methods of combat with carrier large units must also be clarified. For some reason it is sometimes asserted, without reservation, that combat with carrier strike large units should follow these lines: the destruction of the AUS themselves, destruction of their mobile supply detachments at sea, and the destruction of the naval bases at which they are based. However, it is not indicated which of these lines will probably be the most important one. On the other hand, the fact that the destruction of the AUS at sea (ocean) is the main task of submarines and missile-carrying aircraft still does not add precision to the situation which is being examined nor does it explain to which method preference must be given in combat with the AUS.

If it is considered that the probable enemy will endeavor to unleash a war suddenly, in organizing combat with the AUS one must proceed from the fact that at the start of a war all carrier strike large units will be, not at their bases, but at sea. Then, in the first four to five days of the war, they will be able because of their self-sufficiency to carry out combat operations without feeling the need to replace supplies of weapons or of material-technical means. This alone shows which means of struggle with the AUS will become the most important in the course of the first days of armed struggle at sea. As for the destruction of AUS at bases or of their supply detachments at sea, these methods will take on a subordinate character.

The destruction of bases, for example, will most probably occur as the result of strikes by missile troops aimed at disrupting the military and economic potential of the enemy, and not as the result of the destruction of the strike carriers at these bases. As for supply detachments, their destruction will not solve the problem of destroying the AUS. Carrier large units would only lose their combat effectiveness temporarily as a result, and would be able to regain it quickly;

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the destruction of all the detachments is no less difficult a task than combat with the AUS. The most difficult task is reconnaissance and observation of the AUS, and the assignment of forces which possess a wide radius of action. This would be, moreover, in the period of the first operation, when the basic forces of the fleet are directed towards the destruction of carrier large units as the main targets, destined for destruction during the first hours of the war. These are some of our definitions of the tenets of naval science on the general question of combat with the carrier strike large units.

Let us now examine some of the practical questions of combat with these large units. As before, carrier strike large units possess unlimited capabilities in the choice of area for deployment and for the delivery of nuclear strikes. Nor has the distance of the take-off line (dalnost rubezha podyema) carrier aircraft changed. However, the method of using an AUS has changed. In recent NATO naval exercises the use of carrier strike large units along a single operational-strategic axis has been practiced, and these have proceeded dispersal into individual carrier groups, in each of which there is one, or at the most two, strike carriers and warships possessing various types of defense. These groups carry out combat operations while deployed at a distance of 150 to 200 miles from each other. Each such group is able to carry out, simultaneously, with its aircraft a minimum of some 15 to 20 nuclear strikes against our installations which are located at a distance of up to 2000 km, and 25 to 30 strikes against targets at a distance of up to 1000 km from its maneuvering areas.

The area over which an AUS is now deployed may reach enormous dimensions (for example 300 x 150 miles). Therefore, in an operation for the destruction of carrier strike large units, particular importance is acquired by reconnaissance, by the creation of a large grouping of submarines and aircraft and by the determination of methods for their actions in the routing of the AUS at sea (in the ocean).



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Reconnaissance is responsible for the timely detection of the AUS and for establishing observation, not of the large unit as a whole, but of each of its groups. The timely discovery of all carrier groups is becoming an extremely critical problem. Reconnaissance aircraft are able to perform this task most adequately. It is true that great hopes have been placed in submarines. However, in our opinion, there is little basis for this. The capabilities of reconnaissance submarines are significantly less than those of reconnaissance aircraft. The only advantage possessed by submarines lies in their ability to attach themselves to a single carrier group and to follow it unceasingly, maintaining prolonged observation of it secretly. Against this, aviation is able, in a short period of time, through the use of single aircraft, to survey enormous stretches of ocean, and to discover the complete operational formation of a whole large unit, and the order which carrier groups are following. This is, unfortunately, impossible for submarines. Moving with the same speed as carriers, they can not leave them, and if they should, renewed contact with the same group is difficult to achieve. Thus, nuclear-powered submarines remain an auxiliary means of reconnaissance, as diesel-battery submarines were in their time.

It seems to us that one of the more acceptable methods of reconnaissance against AUS by submarines may be the method of "lying in wait" ("podkaraulivaniye") for the carrier strike groupings of the enemy, by submarines previously stationed in the areas in which the former are based. This method may prove sufficiently effective, since in this case the likelihood that the submarines will meet the enemy carriers will be increased. When they detect carriers leaving their bases, the submarines would attach themselves and follow unceasingly, until they receive the order to use their weapons. Obviously, the observation of an AUS is a particularly difficult task for submarines which are deployed singly, and it would be advisable to use groups of submarines.

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Basically, the capabilities of aerial reconnaissance are technically determined by two factors—the range of the aircraft and extent to which they are equipped with technical apparatus. Unfortunately, neither the range nor the equipment of existing reconnaissance aircraft fully meets the requirements for the conduct of reconnaissance at a great distance without establishment of visual contact with the target being reconnoitered. The TU-16r aircraft, as is known, has a limited tactical range in relation to the dimensions of the oceans. Without in-flight refueling they can not even reach the northern part of the Atlantic Ocean. However, in order to achieve the successful destruction of carrier large units it would be necessary for them to reach at least a significant part of the world's oceans.

It is true that the T-95r aircraft has great capabilities for long-range operation alone. The presence of such aircraft in the reconnaissance forces of the navy would make ocean reconnaissance to some extent practicable. However, naval aviation does not have any such aircraft in its composition. Thus, for the time being, there is no possibility of meeting the requirement of naval strike forces for reconnaissance data if a war should break out. It can not be hoped that long-range aviation will be assigned to reconnaissance, and that it will immediately and successfully cope with the functions entrusted to it. The practical operational training of the fleets has not yet produced any such positive results.

It is only the receipt from industry of the above-mentioned type of aircraft, which also have installed in them, for reconnaissance purposes, sets for guiding the flight of missiles of the "air-to-ground" class, launched from the same type of aircraft, which will represent the first step towards the solution of the critical problems of reconnaissance at sea. In other words, one of the problems of reconnaissance of carrier strike large units can be resolved by administrative action, and is awaiting solution.

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Apart from aerial reconnaissance, mobile targets in the ocean, such as are represented by an AUS, can be successfully detected by space reconnaissance (kosmicheskaya razvedka). The present state of development of missile construction and radio-electronics already presents a real possibility for reconnaissance of carrier strike large units with artificial satellites. As is shown by calculations, when photographing from a satellite at an altitude of 300 km, the image of an aircraft carrier on a photograph will be .7 mm in length (with a camera of a focal length of one meter). The necessary information on an AUS can be obtained, after interpretation and enlargement of these photographs. A system of such artificial satellites will allow carrier strike large units to be detected at any point of the world's oceans and will provide the necessary time for an aircraft sortie and for the possible redeployment of submarines for the delivery of strikes against the enemy.

The preparation of an operation for the destruction of enemy carrier strike large units, performing all the operational and tactical measures which arise from the decision of the fleet commander on the conduct of the initial operation, must be carried out in advance. Practically, this should find expression in the fact that it is necessary even in peacetime to have ready strike groupings of our forces consisting of submarines and naval missile aircraft and including specified large units of long-range aviation, and to work out jointly the tasks of the combat training of these heterogeneous forces in the areas of their probable future combat operations. As has been shown in practice by operational training in the fleets, the very rare use of long-range aviation in training exercises has a negative effect on its readiness for the conduct of a combat operation at sea. In addition, submarines need to deploy oceanwards from their bases initially even before the beginning of an operation. Disposition of our fleets near the borders makes it possible to accomplish this. However, it must be taken into account that lines of anti-submarine defense, of which enough has been said already, will

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present a considerable obstacle to the submarines of the Northern Fleet.

One of the tasks conducted by our reconnaissance in peacetime must be to ascertain the dimensions of anti-submarine defense lines and the nature of their equipment, since the overcoming of these lines will present difficulties -- firstly by causing a considerable increase in the time required for the deployment of submarines, which, even without this, will be lengthy.

This is why it is also necessary to have organized forces and developed methods for their control ahead of time, together with a system for the mobile and dispersed basing of the navy. This should ensure the employment of all strike forces within the shortest possible time from the moment of receipt of the command for the repulse of a surprise attack and for the delivery of powerful strikes against the enemy's invasion forces.

The Anglo-American military leadership has already organized a number of advanced base areas for the rapid deployment of the strike groupings of its naval forces. One such area, for example, has been established in the Firth of Clyde in the British Isles.

It is certainly difficult to imagine that our ballistic missile submarines may succeed in delivering a strike against the enemy's strike groupings, while the latter are undeployed and still at their bases. It is more likely that strikes against these groupings will be delivered while they are moving to the carrier aircraft take-off and missile-launching areas. Such strikes can be carried out only by missile-carrying aircraft and by submarines which have been deployed in advance near the carrier bases of the enemy and along the probable routes of his movement.

If one takes into consideration the ability of a carrier large unit to move 600 to 700 miles (1100-1300 km) within 24 hours, it becomes quite obvious that the task of

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destroying these large units in the first operation can be performed mainly by an aviation grouping. The delivery of repeated strikes against so highly mobile an enemy will entail serious difficulties and can be accomplished only if he moves repeatedly up to the take-off line of his aircraft. As for submarines, they are the type of force which provides for the repeated delivery of strikes against the enemy over a lengthy period of time.

In speaking of submarines, we are thinking of those with atomic propulsion; torpedo-carrying diesel-generator driven submarines are of little effectiveness as a force for combat with carrier strike large units. In our view, these submarines can count only on a minimum of success, and then only if a carrier large unit, for some unknown reason, fails to detect them and passes through their position. In the event of an unsuccessful attack, these submarines, because of their slow speed, will have no chance to re-deploy for repeated attacks. It is true that diesel-generator submarines can nevertheless count on success in a final strike against a carrier large unit which has already been routed, but only at a time when the surviving carriers are taking on fuel, when the mobility and maneuverability of the remaining part of the unit has been reduced to a minimum.

The assertion that the shortcomings of diesel-generator driven submarines, which result from their extremely limited capabilities for operations against AUS, can be made up by the deployment of a large number of them, or to put it more precisely, of a "large mass" ("bolshaya massa") of such submarines\* is a most dubious one. It is difficult to imagine the number of submarines which would have to be deployed in an ocean, and how it would be possible to cover all the routes for crossings by carrier large units with them, so as to ensure the emergence of the maximum number of submarines against an AUS and the execution of a strike.

\* [There is a reference here to a note at the bottom of the page, which is missing.]

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The use of carrier strike large units, divided into separate strike groups, will create considerable difficulties for those of our forces engaged in combat with these groupings. For successful performance of the task of breaking up an enemy nuclear attack from the sea, it will be necessary to deliver strikes simultaneously against all carrier strike groups, which will lead to dispersal of efforts against a large number of objectives. At the same time, the reconnaissance of strike groups and the control of forces delivering strikes against the enemy will grow more complicated. This new aspect of the use of carrier large units creates serious difficulties in the organization of combat with them, and has the single aim of increasing the operational stability of the carrier fleet. There are, however, other circumstances which should also be considered here. The "divided" use of carrier strike large units will naturally lead to the weakening of the anti-air and anti-submarine defense possessed by individual strike groups. A single hunter-killer (poiskovo-udarnaya) anti-submarine defense group which is based on a single anti-submarine defense aircraft carrier will not be able to offer serious opposition to all the submarines capable of launching an attack simultaneously against several carrier strike groups (AUG - avianosnaya udarnaya gruppa). Nor will the limited number of small ships in each AUG provide an adequate degree of stability for these types of defense, a fact which will facilitate the delivery of strikes against the enemy by submarines and aircraft.

It seems that the main difficulty in the organization of combat with carrier strike large groups will lie in detecting them at sea and in guiding the strike groupings of our forces towards them. The first operation against carrier large units will probably be characterized by the limited amount of time available for its fulfillment, because of the short time for which the carrier strike large units will remain within range of the basic composition of our forces. Under these conditions it is very important to act quickly and in a well-coordinated

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manner, in accordance with that variation for conduct of the operation which suits the actual situation best, selected from those which have been previously developed in peacetime. The combat operations themselves may begin with the decisive rout of the enemy's carrier large units as the result of the delivery of simultaneous and consecutive strikes by the entire deployed naval force and by long-range aviation if, by the decision of the Supreme High Command, the latter take part in the first sea operation.

The most effective type of operation, from the point of view of achieving the goals of the operation within a limited period of time, will clearly be one which permits the delivery of a single powerful strike by the maximum number of aircraft and submarines, using almost all the nuclear warheads allocated for the destruction of the particular AUS, especially those of the aircraft.

Such a statement of the question may seem unusual. Hitherto, there has been no challenge to the opinion that the most effective method for operations against a carrier strike large unit is to deliver a series of strikes against it, and that the initial strike must be the most powerful of these, in order to deprive the enemy of the capability of making massed use of his aircraft and in order to reduce his mobility to a considerable degree; a subsequent gradual increase of the efforts against carrier large units will be carried out by the deployment, from the beginning of a war, of the first operational echelon of submarines, primarily of submarines with nuclear propulsion, and by using that part of naval aviation which did not take part in the delivery of the first strikes. In our opinion, it is impossible to perform the task of breaking up an enemy nuclear attack from the sea by conducting operations in this manner.

The most important condition for success in a nuclear/missile war will be the immediate seizure of the initiative and its subsequent retention. Therefore, forces must be used at once in their main mass, for decisive purposes, so that the enemy is given no

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chance to destroy them at their bases or airfields. The principle of a preliminary weakening of the enemy, or operations aimed at reducing the mobility of the enemy can not now be regarded as they were in the past. Submarines and naval aviation are capable of destroying an AUS with one strike regardless of whether it is moving in a single formation or in separate carrier groups. Of course, in the latter case, units of the naval forces will not be committed to battle at once, but in accordance with the approach of each group to the take-off line of its carrier aviation. However, the destruction must be accomplished as the result of a single strike rather than of many.

Here there is no need for an examination of the question of which type of forces should perform the main task. It must be performed both by submarines—those equipped with atomic propulsion—and by missile-carrying aircraft. It should be noted at this point that in case the problem of destroying an AUS arises suddenly, naval and long-range aviation may prove to be the only forces able to fulfill the task consistently and at high speed. All measures are therefore being taken, even in peacetime, to maintain these types of aviation at a state of high combat readiness. This fact must be taken into account in working out possible variants for the development of the first operation. However, other factors should also be kept in mind: in difficult weather conditions, the capabilities of submarines for combat with carrier large units may at present prove to be considerably greater than those of existing piloted aircraft, and in such cases the task of destroying carrier strike large units must be performed mainly by submarine forces.

The delivery of a combined strike against a carrier strike large unit or one of its groups will be more effective than could have been expected when aviation had no long-range missiles, and when existing missiles could be guided only when launched separately from a single direction. Now submarines, too, have no need to approach the target being attacked closely. They (missile-carrying submarines, for example) can



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use their weapons even without entering the zone of the strongest anti-submarine defense of the enemy. Thus, missiles with nuclear warheads, which are carried by both submarines and aircraft, are altering our previous ideas on operations by these forces in a joint strike. The difficulties which used to arise in the course of operational training because of the need to create favorable conditions for the employment of weapons by slow-moving submarines, and to coordinate the timing of their strike with the arrival at the target area of aircraft whose presence over a target was limited to minutes, while the time needed by submarines for their approach to the target was measured in hours—these difficulties are becoming a thing of the past.

Conditions for operations have now been created in accordance with the principle "no one waits for anyone", but even here a strike by heterogeneous forces should not be looked upon as an arbitrary operation by them. It is especially difficult to regulate the timing of operations by aircraft and submarines against different targets. To help the submarines, aircraft must first of all destroy the hunter-killer anti-submarine group and the ships providing anti-submarine defense for the strike carriers. For their part, submarines, in order to ensure freedom of action for the aircraft and as part of the coordinated action, must destroy the anti-air defense ships and the radar patrol ships. All these tasks can be performed in the first operation only if there is a simultaneous strike by all the forces involved. Aviation destroys the carrier and the anti-submarine defense ships with its individual units, while its main force strikes against the carriers. By a strike against the main units (ships) of the AUS, missile-carrying submarines may disorganize its anti-air defense and help the aircraft toward success. Torpedo-carrying submarines, using their advantage of detecting enemy surface ships at long range, may make their way toward the strike carriers through gaps in the enemy's anti-submarine defense which have been made by aircraft, destroying anti-air defense ships within their attack sector.

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The organization of operational and tactical coordination calls for a similar synchronization of simultaneous operation of forces, since in the process of performing the task of destroying an AUS, one form may give way to another. Greater results can be expected when the tactical coordination of forces prevails. Almost simultaneous action by all forces, using various types of weapons, creates conditions for the enemy which are too complex for counteraction by him at one and the same time against both submarines and aircraft.

The final rout of a carrier large unit can be accomplished during its retirement from the take-off line of its aircraft or in the areas in which it is refueled by mobile supply detachments. Since carrier strike large units, which at present still consist of ships with conventional propulsion, must be refueled approximately once every four days, it is necessary, when planning an operation, to establish with sufficient reliability the probable refueling areas for these large units, with a view to the possible delivery of subsequent strikes against surviving carriers in these areas.

The existence in the strike composition of the American Navy of the atomic aircraft carrier "Enterprise", which is capable of operation for a longer period of time away from bases or supply ships, still does not essentially change the situation. This aircraft carrier can take on board more aviation fuel, which, as the foreign press reports, provides for the use of its deck aviation, for eight full days. Thus, the aircraft carrier "Enterprise" possesses twice the degree of self-sufficiency possessed by the "Forrestal" and the "Midway", which must refuel once every four days. However, since the "Enterprise" needs the support provided by other ships performing various defensive functions, its self-sufficiency will be limited by that of these ships, which require more frequent refueling and the replenishment of other material-technical means. Thus, the existence of one atomic ship in the composition of a navy does not

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increase the self-sufficiency of an AUS. It would be a different matter if a carrier strike large unit or group were entirely made up of atomically propelled ships. At the present time, however, this is not the case.

Submarines will remain the principal force for completing the rout of a retreating carrier strike large unit. It is unlikely that their repeated attacks will meet serious opposition if a comparatively large number of submarines are taking part in the pursuit of the AUS. We do not share the opinion that individual submarines will be able, as a rule, to decide the fate of an AUS; we must not be guided by possible exceptions. Therefore, even while planning the first operation, it is necessary to start with the idea that the main body of submarines which took part in the first strike must pursue the surviving ships of the large unit and inflict total defeat upon them. For this, submarines can even use torpedos with conventional warheads, saving their unexpended nuclear weapons for subsequent operations.

With the arrival of surviving ships in a refueling area, favorable conditions are created for a strike against them by our strategic missile troops. During refueling, even carriers are transformed into slow-moving targets for a considerable time, and initial data for the launch of missiles for the purpose of covering the area where the warships and the vessels of the supply detachment are located can be obtained by reconnaissance conducted in good time.

In the course of the first operation, an important part will be played by well-organized radio countermeasures covering all axes and wave bands, disrupting the stability of the enemy's control of his forces and his use of guided missile weapons. In the area of an operation it is necessary to achieve a kind of "supremacy in the ether" which, nowadays, in the age of missile weapons, is as important as the achievement of supremacy in the air was important and decisive in the last war.

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The great complexity of conducting an operation for the destruction of carrier large units calls for the careful organization of coordination between the forces participating in the operation, and of their control, taking into account that these forces must operate in remote areas of the world's oceans. It seems to us that the most suitable type of control of forces deployed at sea is one of centralized control from the shore, at the same time permitting commanders at sea a wide degree of initiative. Thus, for example, the control of a brigade (brigada) of submarines can be carried out from a shore command post with duplication of the transmissions of the latter through control submarines in the area of the operation. In the case of disruption of ship-to-shore communications, control is assumed by the commander of the submarine large unit (brigade or division).

It is necessary to remember, however, that a control submarine duplicating transmissions from the shore is subjected to great danger of destruction by the enemy's anti-submarine defense forces. Intensive activity by the submarine's radio stations may enable the enemy to locate it and to take measures to destroy it or to force it to a great depth, from which it can not continue to exercise control. Nevertheless, in spite of this danger, such a method of control should not be rejected.

The complexity and speed of an operation for the destruction of enemy carrier large units make the introduction of comprehensive automation into the system of control of the Navy and the automation of the necessary calculation processes urgently necessary.

It seems to us that all interconnected control links in the Navy should be automated. Automated systems for the control of forces, based on electronic computers, should be installed in submarines, in surface ships supporting submarine combat operations, in aircraft, in the headquarters of naval and aviation large units, in fleet headquarters and in the Main Staff of the Navy.

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An automated control system on board a submarine should, it seems to us, provide, for example, for the collection and processing of information on the situation, on the navigation of the ship, on combat maneuvering and on missile control and the firing of torpedoes. This system will make it possible to replace numerous instruments with a single electronic computer and to install a single control board for the submarine. The automation of the control of aircraft should ensure the reliability of lengthy flights over the sea under difficult weather conditions.

Automation of the control system of large units of aircraft or ships will greatly facilitate the work of a commander and of his staff if it provides for the collection and processing of information on the situation, for the production of tactical calculations, and of calculations on maneuvering, on target allocation and on the preparation of target designations in the employment of weapons, and for the transmission of commands, of target designations, and of information on the use of weapons. Here, the coding and decoding of material should be provided for, together with the optimum choice of a line of communications. A similar system for the control of forces in an operation, if installed in the headquarters of a fleet and in the Main Staff of the Navy, will provide for the collection and processing of information on the situation, for the production of calculations on the use of forces and means and for control of the large units of a fleet.

Automation of the control of the forces of a fleet should be augmented by a system of comprehensive automation of materiel-technical supply, capable of keeping an account of provisions and of determining the needs of the fleet, and of large units, ships, and units with regard to materiel-technical means, and able to plan the delivery, and control of transportation of materiel-technical means, and to plan medical support.

In order to introduce comprehensive automation on a broad scale, we must do away with technical conservatism

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and with a resigned attitude toward old methods, and must overcome the difficulties connected with the introduction of the new technique, using a fundamental approach to the problems of technical improvement. It would be unnecessary, for example, to introduce automation (which is so expensive) to compute the number of aircraft searching for the enemy in the ocean, using the "combing" method. This is "grandfather's" method, used in the 1940's and it can not be taken as a guide; such calculations can be done with adequate speed and accuracy with paper and pencil. For reconnaissance, for example, automation of the calculations of the line on which enemy carrier strike large units will appear is necessary in order that a timely strike may be delivered against them.

It would also be advisable to automate computation of the timing of deployment of forces and of the quantity of these necessary for successful combat with carrier large units, as well as the best ways of using submarines and aircraft in the organization of strikes against an AUS. The automation of control procedures will speed up the process of reaching decisions in situations which are frequently changing and which are sometimes unclear, and it will increase the effectiveness of the use of forces in the first operation for the destruction of the carrier strike large units of the enemy.

The new features of combat with carrier strike large units which have been examined are the result of the adoption into the armament of the navy of a new weapon and of its delivery-vehicles—submarines and aircraft. Of course, by no means all the natural consequences of this have yet been brought to light. However, the time has come for a critical appraisal of everything which has been worked out in the past on the questions of combat with carrier large units. An attempt at this has been made in this article.