SELECTED READINGS FROM *MILITARY THOUGHT* 1963–1973

STUDIES IN COMMUNIST AFFAIRS
VOLUME 5, PART I

SELECTED READINGS FROM *MILITARY THOUGHT* 1963–1973

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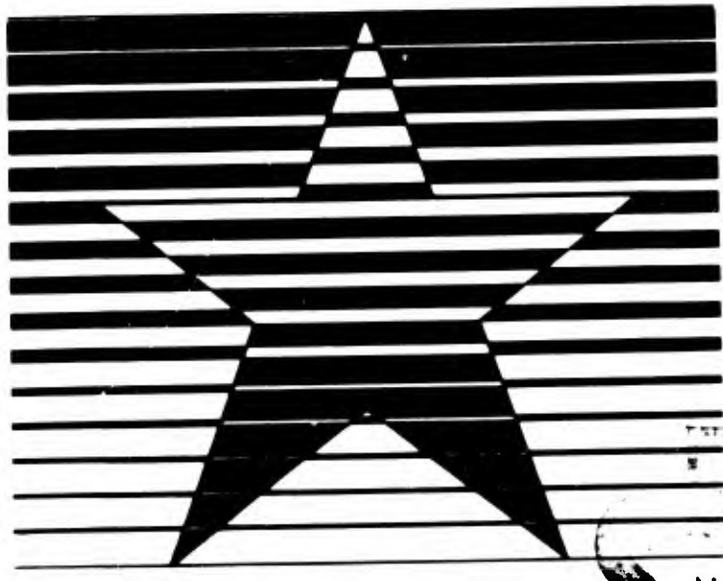

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Editor's Comments

The reader should note the fact that this compilation is the product of the work not just of individual authors, but also of individual translators as well. For this reason one will find that style and choices of terminology will vary from article to article, as also will readability. Within the time constraints applicable to editing, an attempt has been made to reach some degree of consistency for the reader's sake. The latter will observe, however, that it was not possible to achieve an absolute ideal in this respect. One should, therefore, be alert to the following terms that have been used interchangeably, as well as others that have not been pointed out (in which case the logic of the context should suggest the reader's preferred terminology):

arms of services, branches of troops;
branches of armed services, services of the armed forces;
chair, department (in an educational institution);
military construction, military development;
cooperation, coordination;
direction, axis, sector;
faculty, college or school (in an educational institution);
Ground Troops, Ground Forces;
group, grouping;
link, element, echelon, level;
means, equipment, resources;
radioelectronic, electronic;
reconnaissance, intelligence;
rocket, missile (to include Strategic Rocket Troops/Forces, Strategic Missile Troops/Forces);
sides, belligerents;
use, exploitation.

The U.S. Board of Geographic Names transliteration system was used throughout, with the *National Geographic Atlas of the World,* second enlarged edition, used as the standard for rendition of place-names.

The recurring problem of how to treat Soviet terms describing military entities was resolved by using the following equivalents:

subunit [*podrazdeleniye*]—all military entities from battalion (except separate battalion) down to the lowest echelon;
unit [*chast'*]—regiment, separate battalion (i.e., tank or artillery);

formation [*soyedineniye*]—corps, division, and brigade;
field force [*ob''yedineniye*]—front, fleet, and army.

Translation of Soviet military ranks follows the convention now used by the majority of U.S. Government agencies, as follows:

Abbreviation Used	*Expansion in English*	*Russian Term*
MSU	Marshal of the Soviet Union	*Marshal Sovetskogo Soyuza*
Ch Mar (of a specific branch or specialty)	Chief Marshal	*Glavnyy Marshal*
Army Gen	Army General	*General armii*
Col Gen	Colonel General	*General-polkovnik*
Lt Gen	Lieutenant General	*General-leytenant*
Maj Gen	Major General	*General-mayor*
Col	Colonel	*Polkovnik*
Lt Col	Lieutenant Colonel	*Podpolkovnik*
Flt Adm SU	Admiral of the Fleet of the Soviet Union	*Admiral Flota Sovetskogo Soyuza*
Flt Adm	Admiral of the Fleet	*Admiral flota*
Adm	Admiral	*Admiral*
Vice Adm	Vice Admiral	*Vitse-admiral*
Rear Adm	Rear Admiral	*Kontr-admiral*
Capt 1st Rank	Captain 1st Rank	*Kapitan pervogo ranga*
Capt 2nd Rank	Captain 2nd Rank	*Kapitan vtorogo ranga*

In all branches of service except the infantry, branch designations are part of an officer's rank.

Examples:

Ch Mar Avn	Chief Marshal of Aviation	*Glavnyy Marshal aviatsii*
Mar Arty	Marshal of Artillery	*Marshal artillerii*
Mar Armored Trps	Marshal of Armored Troops	*Marshal bronetankovykh voysk*
Col Gen Tank Trps	Colonel General of Tank Troops	*General-polkovnik bronetankovykh voysk*
Col Gen Engr Trps	Colonel General of Engineer Troops	*General-polkovnik inzhenernykh voysk*
Lt Gen Sig Trps	Lieutenant General of Signal Troops	*General-leytenant voysk svyazi*
Vice Adm Engr	Vice Admiral Engineer	*Vitse-admiral-inzhener*
Maj Gen Tech Trps	Major General of Technical Troops	*General-mayor tekhnicheskikh voysk*
Col Gen Justice	Colonel General of Justice	*General-polkovnik yustitsii*
Maj Gen Intend Serv	Major General Intendance Service	*General-mayor intendantskoy sluzhby*
Col Engr	Colonel Engineer	*Polkovnik-inzhener*

Introduction

Soviet political-military writings are extensive and can be extremely valuable sources of information about Soviet thought. A particularly valuable such source is the journal *Voyennaya mysl'* [Military Thought]. This journal, designed mainly for internal use, is one of the few Soviet journals in which problems and issues of military and political-military strategy are regularly examined in depth by senior military and Party officials.

The charter, mission, and guidance for the journal were described in a 1968 article celebrating the 50th anniversary of the journal:*

At the end of 1965 the USSR Minister of Defense in his order No. 303 noted: "The Journal *Voyennaya mysl'* as the basic military-theoretical organ of the USSR Ministry of Defense plays an important role in the elaboration of military-theoretical problems, propaganda of Marxist-Leninist teaching on war and the army and in the interpretation of CPSU and Soviet government policy on questions of military organization. Materials published in the journal contribute to the development of military science and the perfection of the military knowledge of generals, admirals and officers of the Soviet Army and Navy.

In its work, the journal is constantly guided by decisions of the CPSU Central Committee and the Soviet Government requirements of the Party Program on military questions, orders and directives of the Minister of Defense, Chief of the General Staff, and Chief of the Main Political Administration. The journal reflects the wishes and advice of readers expressed at readers' conferences, in questionnaires and letters sent to the editorial staff, and generalizes and distributes the best experiences.

Having a clear program of action, the editorial board and editorial staff of the journal consider it their duty to apply all forces so that *Voyennaya mysl'* in the future will make a contribution to the further development of Soviet military science, to the mobilization of forces of the military-theoretical front in the implementation of complex tasks of further strengthening the defensive capability of this socialist power, and raising the might of the Soviet Armed Forces.

The modern stage of historical development is characterized by a sharp aggravation of the ideological struggle between capitalism and socialism. It is noted in the resolution of the April (1968) Plenum of the CPSU Central Committee that "under these conditions, relentless struggle with hostile ideology, decisive unmasking of the endeavors of imperialism, communist education of CPSU members and all workers, and intensification of all ideological activity of the party acquire particular importance and are one of the main obligations of all party organizations." The journal sees its task in more fully revealing the leading role of the CPSU in the organization of the USSR Armed Forces; ensuring the security of the Soviet state and the entire socialist community; carrying out propaganda of the Marxist-Leninist teaching on war and the army and of the military-theoretical legacy of V. I. Lenin; working out problems of methodology; using the laws of dialectical materialism in military affairs; consistently unmasking the reactionary nature of the military theories of imperialism, the aggressive nature of its policy and plans for preparing a new world war, and

* "Fifty Years of *Voyennaya mysl'*," [Military Thought], *Voyennaya mysl'*, No. 6, June, 1968, FDD 0005/69, 16 January 1969, pp. 14-28.

the falsification of military history by bourgeois historiography; and in showing the grandeur of feats accomplished by the Soviet people guided by the Communist Party in the struggle for the defense of the great conquests of the socialist revolution.

Our journal will in the future systematically work out important problems of modern warfare, explore ways of organizing the armed forces and the combat resources of new kinds of weapons and military equipment, and contribute in all possible ways to the development of the theory of military art. Even greater attention will be devoted to raising the combat readiness of troops, researching problems on the use of all branches of the armed forces and combat arms in warfare and operations, problems of control, cooperation and comprehensive supporting of combat operations; to elucidating the experience of operational training, research of the importance of the moral-political factor in modern warfare, and the experience of the last war. The journal will continue to pose on its pages new problems of military theory, drawing attention to them and thereby contributing to their more thorough scientific elaboration.

The journal is published monthly at a classification level similar to Official Use Only or Restricted. Occasionally special issues are published at higher levels. In recent years the Director, Foreign Press Digest, downgraded to Unclassified and released for public use roughly 8,000 pages of translations of 80 of the Restricted level issues from July 1963 through December 1973. This report contains a representative selection of the more interesting articles from these translations, biographical information on the authors when available, and a detailed index to the material.* It is worth noting that nearly all the authors are associated with the Academy of the General Staff or other high-level Soviet military institutions, such as the Frunze Academy. The selected articles span a wide variety of material and reader interests relating to ideology, military doctrine and strategy, military forces, combined-arms operations, command and control, civil defense, nuclear targeting, correlation of forces calculations, and principles of military art. We hope that making this material more widely available will assist students and practitioners of national security to better understand Soviet military thinking during the crucial time when the balance of forces between East and West underwent major changes in favor of the Soviets in nearly all areas—intercontinental and theater nuclear, conventional land and air, chemical, and radioelectronic to mention a few.

* For a detailed index to all the downgraded issues, see *Index To and Abstracts From Voyennaya mysl' (1963-1969)*, System Planning Corporation Report 464 and *Index To and Abstracts From Voyennaya mysl' (1971-1973) (U)*, System Planning Corporation Report 583, (CONFIDENTIAL/NO FORN DISSEM).

Contemporary Strategic Theory on the Goals and Missions of Armed Conflict[1]

Maj Gen V. Kruchinin

Modern means of armed conflict, especially nuclear and rocket weapons, jet aircraft, radioelectronic equipment, and atomic powered, nuclear rocket armed submarines, are continuing to be developed in an intensive manner. Further mechanization of the arms of services is also taking place. This introduces serious changes into the combat capabilities of the branches of armed forces and into the contents of the strategic missions they are to perform, and visibly changes the course of achieving strategic goals.

The appearance of space vehicles and the persistent efforts of the U.S. militarists to use space for military goals brings out the problem of combat in space. To our way of thinking, science does not exclude the possibility of developing basically new types of weapons, for example, similar to the "lasers" mentioned in the foreign press, for the destruction of various targets and for the accomplishment of other missions in the interest of armed conflict.

Contemporary nuclear weapons, having appropriate types of carriers, charges of great destructive power and possessing specific destructive factors, are capable of traversing virtually limitless space. Through their use it is possible to carry out major strategic missions in extremely short periods of time. However, despite the heretofore unheard-of destructive power of the rocket and nuclear weapons, the final victory in a war against a strong, unfriendly coalition is possible only as a result of the combined efforts of all branches of armed forces.

The determination of the strategic goals and missions for the strategic groups of armed forces and for the armed forces as a whole, is usually based on concrete military-political goals which are based on the appropriate periods of the war. What enters into the understanding of strategic goals and strategic missions and what are its contents under contemporary conditions?

It seems to us that by strategic goals, we should understand that goal whose attainment by the armed forces during the course of an armed conflict will result in basic changes in the strategic and the military-political situation, and will have an effect on the entire subsequent course of the armed conflict as a whole.

The attainment of strategic goals may be the content of the entire

period of the war, while in it are the contents of strategic operations conducted in continental and oceanic theaters of military operations by strategic groups of armed forces. In a number of cases, particularly with the initiation of combat operations, however, the attainment of strategic goals will be accomplished in relatively shorter periods of time.

Modern armed forces locked in conflict with a strong enemy are capable of attaining various strategic goals. The following can be considered examples: the frustration of a surprise enemy attack by effectively repelling massive nuclear strikes and carrying out a rapid retaliatory strike against the most important aggressor targets, the withdrawal from the war of one or several countries of the unfriendly aggressor bloc, the disorganization of the enemy's deep rear area, the destruction of his strategic groups of armed forces in the continental and oceanic theaters of military operations, and others.

The attainment of concrete strategic goals by the armed forces may be ensured by executing appropriate strategic missions simultaneously or successively. In other words, the strategic goal may be divided into component parts, each of which is an independent strategic mission.

The contents of the strategic mission may be the destruction or suppression of groupings of enemy armed forces; the destruction of his most important targets; the occupation of specific areas, resulting in the creation of favorable conditions in the strategic situation for a subsequent expansion of military activity and the execution of subsequent strategic missions.

The execution of a strategic mission is usually accomplished by a grouping consisting of one of the branches of armed forces in operational coordination with the other branches of armed forces within a given strategic grouping. In a number of cases the execution of the strategic missions will be possible only by appropriate groupings consisting of two or more branches of armed forces.

In our opinion, the difference between a strategic mission and strategic goal lies in the fact that the execution of a strategic mission brings about a change only in the strategic situation along a given line and does not have a decisive effect upon the entire course of the armed conflict, while the achievement of a strategic goal, which is usually linked with the attainment of a particular military-political goal, will result in a sharp turning point in the course of military operations which will exert a substantive effect on the course of the war as a whole.

Strategic goals and missions will have the most varied character and will depend upon the concrete conditions of the strategic situation. A full and deep analysis of the military-political conditions during the corresponding period of the war will always permit a well-founded and purposeful determination of the concrete strategic goals and missions for the armed forces as a whole, as well as for individual strategic groupings.

Prior to examining the strategic goals and missions which may be executed by the armed forces during the course of contemporary armed conflict, it would be expedient to briefly examine the most substantive

changes in their contents which have occurred during the current century.

During World War I strategic missions were executed primarily by the efforts of the ground troops. The most typical objectives of armed action were the opposing enemy groups, as well as those targets lying close to the front lines whose capture by the ground troops created favorable strategic conditions for subsequent operations. Actions of the qualitatively and numerically weak air forces and fleet operations along the coastal areas as a rule only assisted the ground forces in the execution of strategic missions for the destruction of enemy groupings and territorial occupation. However, fleet operations by the warring powers in the struggle for the enemy's lines of naval communications had a relatively independent strategic significance.

During the years of the Civil War, the missions levied upon the Red Army were not only those of destroying the interventionists and the internal counterrevolution, but also those of maintaining and capturing the basic sources of raw material, bread, and fuel without which the young Soviet Republic could not exist.

World War II, as a result of a significant development in the qualitative characteristics of the various means of armed conflict and their sharp quantitative increase, introduced significant corrections into the strategic capabilities of the armed forces. During the course of the war this was also facilitated by the development of such new forms of combat equipment as radar stations, flying bombs, rocket artillery, and others. Improvements in the quality and increases in the quantity of combat equipment permitted not only a significant expansion in the spatial boundaries, but also an increase in the efficiency of one or another branch of armed forces and of the means for armed conflict against the military and rear area targets of the warring nations. The impact of this was such that it had already begun to have strategic results at times. With this, the strategic missions during World War II consisted primarily in the destruction of opposing enemy groupings of armed forces and the seizure of important targets and areas in which they were located.

The motorization of troops, the wide-scale employment of heavy and long-range artillery and armored equipment, and improvements in aircraft of all types and in ships of all classes facilitated an increase in troop maneuverability, an increase in the tempos and depth for the ground operations, and an acceleration in combat operations at sea, and, consequently, decreased the time necessary for the execution of strategic missions more complex in content.

It is sufficient to say in support of what has been said, that in the major strategic offensive operations of the Great Patriotic War, from one-fifth to one-third of all enemy ground forces operating on the Soviet-German Front were destroyed. As an example, in the battle for the Volga, 50 divisions, which equalled 20 percent of all divisions operating at that time on the Soviet-German front, were destroyed; in the Belorussian operation, 76 divisions, or 32 percent were destroyed; in the Wisla-Oder operation, 60 divisions or 33 percent were destroyed.

Simultaneously with the destruction of the major enemy strategic groupings our Armed Forces occupied important areas and targets, forced the Hitlerite allies out of the war, and gave realistic assistance in the liberation of the peoples of southern and southeastern Europe.

During the Great Patriotic War the scale of strategic operations reached 1,000 kilometers of front and 700 kilometers in depth.

The employment of airborne troops and the wide use of amphibious landings during World War II ensured the execution of a series of strategic missions which were new for that time. Operational examples of such missions were the Crete airborne operation by the German troops in May 1941, the Kerch'-Feodosiya amphibious operation by the troops of the Caucasus Front and the Black Sea Fleet in December 1941, the airborne operations of the Anglo-American troops in Sicily in July 1943 and in Normandy in June and July of 1944, and the Kurile amphibious operations of the troops of the Second Far East Front and units of the Pacific Fleet in August 1945.

Regarding content, the strategic missions during World War II were far more significant than in the past, and their execution required massive employment of various forces and means of combat.

The contemporary means of mass destruction and their carriers are capable of conducting strategic missions and operating against enemy targets under any conditions and on all continents and military theaters. They have opened up a new era in the development and building of armed forces, have fundamentally changed their capabilities in armed conflict, and force a different approach to the examination of the question of attaining strategic goals.

As previously indicated, armed forces achieve a strategic goal by executing a specific number of various strategic missions. Subsequently, all discussions pertaining to the preparation of the conduct of military activities for the attainment of strategic goals will have a common theoretical background issuing from the execution of one strategic mission.

In the execution of a strategic mission, an armed forces grouping usually operates in a specific manner employing the appropriate forms of military activities which support the most efficient execution of the mission with a minimum expenditure in effort and time. It is difficult to examine in one article the concrete methods and forms of activities of strategic armed forces groupings which differ in composition in one or another strategic situation because of the number of possible variants in such a situation. The selection of the methods and forms of activity is a creative process based on a careful analysis of the varying factors in a situation and a generalization of the practice of armed conflict.

In the interests of executing strategic missions, the various command levels, control organs, and troops will carry out a whole series of comprehensive measures. Let us examine some of them in the most general terms.

The composition and grouping of friendly forces and means necessary for the execution of an assigned mission are determined in the process of

formulating the strategic mission on the basis of a complete evaluation of the conditions of the situation and in selecting for destruction the most important targets and also the enemy armed forces groupings in a given theater of military operations or on concrete strategic axes.

Initial attention is given to the selection of those enemy targets against which strategic nuclear means could be best used. Depending on the features of the strike targets, a selection is made of the nuclear weapons carriers (strategic missiles, missile-armed aircraft, submarines, or surface craft) which could best and most rapidly execute the assigned mission with minimum expenditure of explosive power.

It should be mentioned that the execution of a large number of strategic missions, whose basic content is the destruction of important strategic targets in the enemy's deep rear area, is ensured primarily by nuclear missile strikes.

An appropriate grouping of ground troops and air force is used for the final destruction of the enemy forces if they are located in continental theaters of military operations, and naval groupings and long-range missile-carrying aircraft if the enemy is located in naval theaters of operation. At the same time the most expedient methods and forms for employing these forces are determined.

Special attention is given to organizing the material, technical, and other forms of support for the forces and means which have been selected for executing the strategic mission. These measures are planned beforehand and may be put into operation during the preparatory period, that is prior to the initiation of military operations, or during the course of the operations.

In modern conditions, surprise action is of importance for the successful execution of strategic missions and subsequent achievement of strategic goals. The concealed execution of all preparatory measures and thoroughly planned, active supply of misinformation to the enemy side about the true plans may catch the enemy troops unaware, lower their resistance potential and their effective counteraction, and at the same time ensure the successful execution of the assigned mission.

Surprise actions have a great significance for attainment of success in armed conflict during the course of the war and particularly at the moment of its onset. This is why Marshal of the Soviet Union R. Ya. Malinovskiy, Minister of Defense, mentioned in one of his works, that "once the imperialist aggressors have placed their hopes on a surprise attack, then primary attention must be directed toward ensuring the high combat readiness of the armed forces, and toward strengthening their capabilities to frustrate such an attack, regardless of its point of origin, and to completely destroy the enemy."[2] Further he states that "high combat readiness is not an abstract but a concrete concept embodied in precise calculations of date and time in hours and minutes which cannot be disrupted without incurring the risk of being destroyed by the enemy before anything can be done."[3]

Strategic missions are executed by the efforts of the appropriate

strategic groupings of armed forces.

As we see it, a strategic grouping should be understood as that grouping of forces and means of a continental or naval theater of military operations or in the deep rear of the country which consists of field forces and formations of branches of armed forces assigned to execute concrete strategic missions.

Execution of strategic missions for the occupation of specific terrain areas in continental theaters of military operations and seizure and holding of enemy targets will require the concealed formation of groupings, primarily ground troops and air forces, well ahead of time.

Previously, when new strategic missions would arise, a formation of new strategic groupings of armed forces was usually required. There can be no need of this under modern conditions. For example, if a new mission arises for the delivery of nuclear rocket strikes and it will be assigned to the Strategic Rocket Troops units which are capable of accomplishing the mission from their fixed positions, then, naturally, there is no need for a regrouping of the nuclear rocket forces and means.

The composition of the armed forces groupings intended to execute strategic missions may be the most varied and will depend, first of all, upon the concrete requirements of the mission. The latter may be solved by the forces and means of any one branch or several branches of armed forces in operational coordination.

Each branch of armed forces is capable of executing with greatest efficiency those strategic missions which are unique to it.

The Strategic Rocket Troops can destroy strategic nuclear and other means of mass destruction in specific areas, important economic targets in the rear area of the enemy coalition, centers of state control, and important points of armed forces control, and can disrupt enemy communications by the destruction of important centers of the transportation system.

Long-Range Aviation can execute important strategic missions in coordination with other branches of armed forces, or independently, particularly in the destruction of enemy naval groupings and various strategic targets in continental theaters. In the selection of targets for destruction, the specific features of the air force are considered: the capability of efficient action against enemy mobile and pinpoint targets, the delivery of subsequent strikes, the immediate shift of effort against other targets, and the ability to conduct strategic aerial reconnaissance.

Modern military transport aviation is capable of executing major missions, although they are of a support nature, which under certain conditions assume a strategic significance. Such missions may be the landing of troops, the establishment of rapid maneuvering of forces and means between different theaters of military operations and even continental ones, the delivery of armament and material means to the troops, particularly in those instances when the normal functioning of other means of communications has been disrupted or when it is necessary to gain time in an existing situation.

Strategic naval groupings, consisting basically of submarine units and

the naval rocket-carrying air force, are capable of destroying enemy naval groupings, primarily his strike aircraft carriers and rocket-carrying submarines, and destroying the sea and ocean lines of communication of the unfriendly coalition either independently or in coordination with Long-Range Aviation and the Strategic Rocket Troops. In the coastal areas of continental theaters the appropriate fleets may enter with the strategic grouping consisting of several branches of armed forces and participate in the destruction of coastal enemy groupings and the seizure of straits, islands, and other important targets and areas.

The PVO Strany Troops* have the most important strategic mission of effectively repelling enemy air force attacks and the in-flight destruction of rockets and space means of attack. The cover for important strategic groupings of armed forces may be independent strategic missions for PVO Strany troop units.

From the onset of armed conflict the Ground Troops will execute strategic missions in continental theaters in close coordination with other branches of armed forces. In a nuclear war, especially in its initial phase, it is doubtful that the Ground Troops would be able to carry out major strategic missions completely independently without a close tie-in of their activities with units of other branches of armed forces.

The basic substance of the strategic missions executed by the Ground Troops is the completion of the destruction of enemy armed forces groupings achieved by nuclear rocket strikes, the destruction of his surviving means of mass destruction, the seizure of important targets and areas, and the countering of enemy efforts to enter friendly territory.

An important factor influencing the successful execution of strategic missions during armed conflict is the constant availability of various strategic reserves within the armed forces groupings. The need for such reserves is caused by the possibility of sharp and frequent changes in the strategic situation, so characteristic of modern war, which may demand additional efforts through the commitment of a specific part of the reserves. The use of strategic reserves for building up the efforts of the strategic armed forces groupings ensures a change in the correlation of forces and means in one's favor in the appropriate sectors and theaters and permits retention of the strategic initiative during the armed conflict.

The composition of the reserves may be most varied and is determined by the specific contents of the strategic missions, the scientifically based forecast regarding possible developments during the armed conflict, and the actual capabilities of the Supreme Command. The reserves may consist of units of all branches of armed forces and arms and major control organs of various designations, and may also include reserves of weapons, combat equipment, and material and technical means.

The dispersal and concealed disposition of the reserves, their cover, especially against enemy aerial and space strikes, and their prompt and

*. [*PVO strany*—'Air Defense of the Country.' Also referred to as 'National Air Defense Forces'—U.S. Ed.]

purposeful employment will ensure successful execution of the missions.

Constant replenishment and creation of reserves to replace those expended is one of the most important principles of military strategy and may play a decisive role in the successful execution of missions and the achievement of strategic goals.

As previously mentioned, the most important strategic missions in armed conflict may be executed directly and in a very short time by powerful nuclear rocket strikes delivered by the Strategic Rocket Troops, Long-Range Aviation, and the rocket-carrying forces of the Navy. The execution in continental theaters of military operations of strategic missions which have the purpose of complete destruction of opposing enemy ground troop groupings and the seizure of territory, will, in some instances, require the execution of certain intermediate operational missions.

As we envision it, the execution of such missions is possible when ground troops are within armed forces groupings assigned for this goal and, evidently, will be carried out by the forces of one or several front units within the limits of one or two simultaneously or consecutively conducted operations.

Important conditions for the rapid and successful execution of strategic missions in continental theaters of operations must be the uninterrupted and swift conduct of active measures by the troops following up the massive nuclear rocket strikes, the capability of the troops to maneuver rapidly in any direction in the theater of military operations, and the uninterrupted replenishment of the operating armed forces groupings with the necessary forces and means. Modern conditions and the expanding development of various types of transport, especially air transport, ensures the possibility of creating such conditions.

Sharp and frequent changes in the situation in theaters of military operations during the execution of strategic missions imposes high requirements on the organs and means of control. Only a constant and comprehensive knowledge of the true situation on the fronts, the prompt supply of information to the appropriate control organs, and the knowledge and consideration of the versatility of enemy actions and his intentions will permit the rapid execution of sound measures, well-founded decisions, and the most purposeful and realistic control of subordinate troops, forces, and means. Achievements in the field of automation, radioelectronic equipment, and mathematical research methods ensure a sharp increase in troop mobility and control and the dependable operation of various command and staff levels.

Holding an important place in the system of control during the achievement of strategic goals is the precise organization and the constant maintenance of strategic and operational coordination between the different armed forces groupings ensuring maximum success in armed conflict, especially in those conditions where military operations envelop broad areas of several continental or ocean theaters of military operations and various continents.

By strategic coordination we understand that coordination in which the efforts of armed forces groupings operating in different sectors in a single theater of military operations or in different theaters are united by a single strategic goal and concept. To a lesser degree, these groupings will be linked by the same spatial boundaries as is usually the case during operational and particularly during tactical coordination.

The basis of strategic coordination under contemporary conditions is the precise coordinated efforts of all branches of armed forces and means of armed conflict not only in goals but in time and place with the operations of the Strategic Rocket Troops executing the most important strategic missions during the war.

The organization of this type of coordination is implemented depending upon the concrete requirements of the appropriate strategic missions assigned for direct execution by specific armed forces groupings and with a consideration of the general strategic goals. Under contemporary conditions, the coordination of effort in time and place becomes extremely important in view of the sharply increased role of the space and time factors in armed conflict. Confirmation of this can be found in the realistic capacity of the armed forces to execute major strategic missions and achieve strategic goals in the enemy's deep rear, for example, by delivering nuclear rocket strikes within a very short period of time.

From an analysis of enemy targets having strategic significance it is possible to make conclusions as to the type of nuclear means and their carriers which may be best used in the developed situation for the destruction of these targets. Let us assume that under these conditions it will be necessary to employ strategic ballistic rockets and strategic aviation.

It is completely clear that it is not always possible to deliver simultaneous rocket and air force strikes against enemy targets, particularly if these targets are situated in a relatively limited area. Consequently, the division of targets between the rocket troops and the Air Force and the determination of the time when these strikes are to be delivered are the basic questions in the organization of their strategic coordination.

If other types of armed forces, for example, naval and ground forces, participate in the achievement of specific strategic goals, then it will be necessary to coordinate their activities with those of the rocket troops and Air Force.

It should be mentioned that the successful accomplishment of strategic missions, especially by the coordinated efforts of various branches of armed forces and means of armed conflict, as a rule, is based on the precise organization of operational coordination with the forces and means so introduced. The organization of operational coordination will be implemented on the basis of appropriate provisions for strategic coordination in the accomplishment of each specific mission.

In all instances strategic coordination is implemented in the interests of carrying out the mission in the main theater of military operations, while in the given theater it is done in the interests of the armed forces grouping carrying out the main strategic mission.

Purposeful strategic coordination ensures uninterrupted communications between the command and staffs of the different branches of armed forces and strategic groupings and permits them to have full information on the situations in the theaters of military operations.

Efficient execution of strategic missions during armed conflict is possible only if there is constant consideration given to the radiological situation and massive destruction from nuclear rocket strikes which, under certain conditions, may seriously impede the strategic groupings in the execution of their missions.

In view of the capability of rocket and nuclear weapons to act against enemy targets located at virtually any depth, new requirements are levied upon the organs and means of strategic reconnaissance. Reconnaissance is faced with the tremendous problem of locating targets in the enemy's deep rear area and in maintaining control of the results of friendly nuclear rocket strikes.

It should be expected that in the struggle for strategic initiative the enemy will be constantly countering and hindering the efforts of the armed forces groupings to execute their strategic missions successfully. He will strive to destroy the rocket and nuclear means of the other side, rout its naval and air force groupings, and the mobile shock groups of ground troops, especially the tanks and basic reserves, and particularly in the most important strategic sectors and theaters of military operations. By striking against important communications centers the enemy will attempt to isolate the advancing strategic groupings, and deny possiblities for bringing up personnel, weapons, combat equipment, and material and technical means.

Through the use of airborne and amphibious landings and the wide employment of diversionary and reconnaissance groups in the rear area of the advancing troops, the defensive will strive to disorganize troop command and create conditions which would complicate the efforts of the armed forces promptly and successfully executing the strategic, as well as most important operational missions. During armed conflict, the enemy may be expected to conduct broad misinformation measures, conceal his true designs, and implement camouflage activities which are varied in content and scale. Such enemy measures must be countered by actions which would decrease the effectiveness of these measures and at the same time would ensure the successful execution of friendly missions. Sufficiently complete and factual information from the various types of intelligence on the position and designs of the opposite side would permit the command to take the necessary steps promptly.

The execution of strategic missions and the achievement of strategic goals will frequently cause the command to assign necessary forces and means for consolidating the results attained. This may be particularly so in the seizure of vitally important economic areas and administrative and political centers of countries in the enemy coalition and in the seizure of islands, archipelagos, straits, and other areas and targets having important strategic significance.

The complexity of the varying conditions during armed conflict will demand that the command elements at all levels have deep military and political understanding, practical experience in the direction of subordinate troops, and high moral, combat, and organizational qualities necessary for the achievement of success in war over a technically strong enemy.

Victory in war is forged in peacetime. The daily persistent and intensive training of all armed forces personnel in mastering complex modern combat equipment and methods of its employment under various conditions, the inculcation of high patriotism, a conscious discipline, and firm and unlimited faith in the righteousness of the cause provides the necessary conditions for the successful execution of all missions, including strategic ones, in armed conflict.

It is indicated in the resolution of the 23rd Congress CPSU on the report of the General Committee that one of the most important items on which the attention of our party and people must be concentrated is "to maintain at a proper level and strengthen in every way possible the defense capability of our homeland, the bulwark of peace in the entire world; perfect the armament of the Soviet Army; raise the level of the combat, ideological, and political training of the personnel; increase the vigilance of our people; and dependably defend the creative efforts and peaceful life of the Soviet people, the builders of communism. . . ."

In the decree of the Plenum of the Central Committee CPSU, according to the report of the Central Committee CPSU secretary, comrade L. F. Il'ichev, "On the Immediate Tasks of the Ideological Work of the Party," passed on 21 June in 1963, states that: "in order not to be caught unaware, the Soviet government is doing and will do everything necessary to further strengthen the defense capability of the country, and to indoctrinate its people and its glorious Armed Forces in the spirit of devotion to the socialist homeland and to the great ideals of communism. It is necessary now and henceforth to increase in every way possible the technical equipping of the Army and Navy and to improve military mastery, combat readiness and the ideological hardening of the Soviet servicemen, and their readiness to carry out their sacred duty in defense of the homeland at any time."

The successful execution of these tasks will ensure that in any future war, should one be unleashed by the imperialist governments, our Armed Forces will rapidly destroy the armed forces of the aggressor coalition and thus attain the strategic goals in the armed conflict.

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Notes

1. *Voyennaya mysl'*, No. 10, October, 1963, FPD 964, 18 July 1966.
2. Marshal of the Soviet Union, R. Ya. Malinovskiy, *Bditel'no stoyat' na strazhe mira* [Stand Vigilantly on Guard for Peace] (Voyenizdat, 1962), p. 27.
3. Op. cit., p. 42.

Problems of Military-Technical Superiority[1]

Capt 1st Rank V. Kulakov

The revolution in military affairs, of which we are witnesses and in which we are participants, is connected with the appearance of essentially new armament and the sharp increase in the effectiveness of combat equipment in armed conflict. The main and, in fact, decisive element of the material basis of the revolutionary changes in military affairs was the development of nuclear rocket weapons as a result of the combination of the nuclear warhead with the intercontinental ballistic rocket. The development of strategic rockets of the megaton class was especially important. The tremendous destructive power of a nuclear warhead with a TNT equivalent of millions of tons in combination with a super-long-range ballistic rocket, and especially a global rocket, represents a virtually irresistible weapon. It gives its possessor unprecedented possibilities for the execution of military missions assuring the swift achievement of a decisive strategic effect.

Modern weapons can be created only when there is a very high level of development of science and technology and of all the productive forces of society. Here, naturally, has been demonstrated the indisputable superiority of the socialist method of production over that of capitalism. The Soviet Union in a minimum period of time not only put an end to the monopoly of the U.S. over the atomic weapon and developed the atomic and hydrogen bomb, but it also in a few years moved ahead of all countries in the development of rocket technology. The achievement by the Soviet Union of military-technical superiority over the U.S. was a historically necessary victory of our economics, science, and technology over the economically and militarily strongest country of capitalism.

A monopoly of the nuclear weapon in the hands of the U.S. militarists, if it had been maintained long enough, in combination with superiority in means of delivery, represented a great threat to peace and social progress. The existence of the powerful modern weapon in the hands of a socialist state confronted the aggressive militaristic forces with the entirely real prospect of being wiped off the face of the earth if they attempted to start a new world war.

But depriving the enemy of superiority in military technology does not mean depriving him of the capability of starting a new world war. Imperialism possesses a strong military machine, many times more powerful than that which it had during World War II, and it is continuing to

strengthen it and develop it. The governments of the imperialist states are taking all measures to overtake and surpass the Soviet Union and other socialist countries in the development of military technology and in the combat capability of the armed forces. As LTG Trudeau, Commanding Officer, Research and Development Command, U.S. Army, remarked, scientists, engineers, military strategists, and government leaders "are working intensively on programs of research and development to create superior weapons and equipment" and thereby assure "qualitative superiority over the Russians and their satellites."[2] The author of the book, "A Foward Strategy for America," reflecting the views of the most militant American militarists, seeking ways to "bring Russia to her knees," came to the conclusion that for the attainment of this goal the U.S. must possess "fundamental military components." Chief among them is the establishment and maintenance by the U.S. and her allies of "military-technical superiority over the Communist bloc."[3] To attain this goal they are insisting on a sharp step-up of the arms race, assuming that thus they can "break the back of the Soviet economy."[4]

The constant increases in military appropriations and in efforts for the development of the latest combat equipment in the major capitalist countries, along with overt and covert opposition to Soviet proposals for general and complete disarmament, is evidence of the fact that the struggle for military-technical superiority not only has not slackened, but has entered a new, still more intensive stage.

The military potential of a state, its ability to wage war and win victory now is primarily determined by its capability of using the power within the nucleus as the basic source of firepower in combination with highly effective rocket delivery means. Neither the most intensive economic efforts nor the mobilization of any number of troops can provide the firepower necessary for modern armed forces unless their armament inlcudes nuclear rocket weapons.

In turn, for the creation of nuclear rocket weapons, a great economic and scientific potential is necessary. A high level of development of science and technology in combination with a highly developed economy is an absolute necessity for the achievement of military-technical superiority over the enemy, especially in the field of nuclear rocket weapons.

Thus superiority in nuclear rocket weapons is the decisive factor of military-technical superiority. At the same time, conventional weapons, which likewise are being constantly improved, will also continue to play their part along with the latest combat equipment—rocket and nuclear.

In itself, military equipment is only one of the elements which make up military-technical superiority, which completely depends on the people superiority presupposes, along with the production of the necessary quantity of the most modern instruments of war, the most thorough and intensive training of a mass of men who are capable of providing their superiority over the enemy in the mastery of combat equipment and its use in all modern forms of combat operations for the winning of victory.

Lenin, from the experience of World War I, concluded that in war

"he will come out on top who has the greatest technology, organization, and discipline, and the best machines."' From this thesis of Lenin's it follows that superiority over the enemy based on higher technology can bring victory only to those armed forces which are distinguished by the greatest discipline and are best organized. Superior combat equipment and qualitatively superior personnel who have completely mastered its use constitute an organically unified basis of military-technical superiority over the enemy. And in order that this theoretically generally accepted unity may be assured in the everyday practice of military development, military science must in a timely manner put forth the most expedient principles of utilization and forms of organization of the armed forces, corresponding to the latest instruments of war which have become part of their armament. These principles and forms inevitably change with changes in the nature and capabilities of the instruments of combat, with the emergence of new methods of accomplishing military missions, and with the raising of demands on personnel. Thus, with the appearance of nuclear rocket weapons, Soviet military doctrine established the principle of the decisive role of the Strategic Rocket Troops, now a main branch of the armed forces.

Along with the possession of superior technical equipment and qualitatively superior personnel, the correct and timely carrying out of the organization of the armed forces plays an extremely important part in assuring constant military-technical superiority over the enemy. This in turn requires scientifically accurate solution of the problems of developing existing, and creating new, branches and arms of the armed forces and of determining their place and role in the military organization of the country and the relations and cooperation among them. In the process of solving these important problems, there is determined the total firepower and quantity and nature of the means of delivery for the armed forces as a whole; there takes place a distribution of the means of combat among the branches and arms; and there is worked out a thought-out single system of armament that satisfies the needs of the troops for personnel, technical equipment, and transport, and for all kinds of supply.

To elucidate the most general principles of this highly complex process it is necessary to abstract from the multitude of details and pick out those things most essential, involving general principles, and characteristic for the process as a whole.

The variety of combat missions and of the ways and means of accomplishing them calls for the existence of various branches and arms of the armed forces, distinguished one from another by the environment in which they operate, by their firepower, who or what carries the firepower, and the degree of operational mobility and maneuverability; and by their mission and the methods and consequences of their combat operations. But there is a more common basis on which the specifics of the organization of branches and arms of the armed forces are determined. This is the completely defined form, peculiar to each of them, of the combination of men and equipment. Therefore the process of organization of the armed

forces is essentially the search for and the establishment of the most rational form of combination of men and equipment.

Within the framework of any component of the armed forces—whether it be an infantry company or a rocket unit, a formation of ships or planes, a small subunit or a large field force—the technical instruments and the men operating them are combined in some organized form for the execution of certain combat missions. Here, naturally, there has developed between the two a certain qualitative and quantitative relationship. It is perfectly obvious that this relationship changes with developments in military affairs, and mainly as a result of the emergence of new, improved military-technical means.

Military-technical progress invariably leads to a growth in the amount of power and the supply of technical equipment available to the armed forces, increasing thereby their fighting power. As a result of industrial and technical development, there is an increase in the combat qualities of the armed forces, and less expenditure of human energy is required to achieve an immediate combat effect, thanks to the expanding use of technical equipment. Thus, the most important natural tendency of development in military affairs is the constant change in the qualitative and quantitative relationship between the mass of men and technical equipment, with the latter assuming ever greater importance in this relationship. We emphasize that we are talking about the increase in the relative importance of the immediate combat effect achieved by the weapon as contrasted with the effort of the individual. As an example we may point to the importance in the past of the rifleman-sniper and of aimed fire in general in comparison with automatic fire, and then artillery fire, the means of attack of the air forces, and finally, the nuclear weapon.

In the revolution in military affairs this tendency has been demonstrated very graphically and thoroughly. As a result of the abrupt qualitative leap in the development of sources of firepower and means of delivering it, and also the appearance of other latest technical equipment, there has been created the possibility of decreasing the number of personnel of the armed forces directly engaged in combat operations for the direct destruction of the enemy without decreasing, and in fact increasing, their firepower. In the period from 1955 to 1960 the numerical strength of the Soviet Armed Forces was decreased by one third, but their firepower, as N. S. Khrushchev has noted, increased many times during the same period, thanks to the introduction of the latest forms of modern military-technical equipment.[6]

However, this tendency, which should operate according to objective law, is not always carried out when it should be. We cite the following examples.

In his speech at the conference of officials of industry and construction of the RSFSR on 24 April 1963, Khrushchev said that our economic leaders concern themselves very little with the problems of the organization of labor, and told about the case of the purchase from the U.S. of several plants for the manufacture of cinder blocks. In one of them, built

in Kiev, over 100 men were working, while the U.S. had a total of 16 men in such a plant.[7] Thus the incorrect determination of the relationship between men and machines resulted in a lowering of the calculated productivity of labor of each man by about six times.

In the U.S. journal *Military Review* there appeared the following typical example. "To support one NATO division of 18,887 men at the front, about 35,000 men are required in the rear."[8] The journal explains this situation by the overloading of the troops with technical equipment, which results in "disturbing the balance between auxiliary services and line units."[9]

From this data it is difficult to give any accurate estimate of the degree of lowering the combat effectiveness of NATO troops noted by this journal, but it is perfectly obvious that in this case, too (though for a different reason—overloading the troops with technical equipment), the most advantageous ratio between men and machines has not been maintained.

The analogy between industry and the military has its limits, for understandable reasons. In industry, as a rule, it is always advantageous to replace the labor of a large number of men with that of a smaller number operating more productive machinery. In the organization of armed conflict such an exchange is not always possible and not always useful, in view of the specific nature of combat missions. For example, with a heavy machine gun crew of three men and a rate of fire of 300 rounds a minute, the fire rate of one soldier amounts to 100 rounds a minute, about 10 times that of a soldier with a nonautomatic rifle. The extensive use of the heavy machine gun has not displaced the individual soldier, since a variety of combat tasks of the latter cannot be carried out by the machine gun crew. For similar reasons the appearance of the submachine gun, with a rate of fire of 100 rounds a minute, in the armament of the individual soldier has not resulted in the elimination of the heavy machine gun.

But just as in industry, in military affairs any new technical means represents progress only if, while having an effectiveness greater than (or equal to) the obsolete means which it is replacing, it requires a smaller number of personnel to operate it. Therefore in peacetime there is also the possibility, without lowering, or even with raising, the firepower, combat capability, and combat readiness of the armed forces, to free human resources needed for the national economy and when necessary, to create a greater number of well-trained troops.

From the above there arises the conclusion that the results of military-technical progress, which constitute the material basis for development in the military field, are completely utilized only if in the armed forces the ratio between men and technical equipment changes in a timely manner and corresponds to the sharply increasing capabilities of new types of weapons and all the technical equipment coming into use in the armed forces. For practical military development, this means the creation in all branches and arms of the armed forces of such forms of organization as will represent the most advantageous relationship between men and technical equipment, providing the highest combat effectiveness of the

armed forces with the maximum possible release of human resources, taking into account probable losses.

Since the development of combat equipment goes on continuously, there should be continuous changes in the ratio between men and equipment in the troop units. But important changes in the organization of the armed forces, like in military art, are connected with the appearance of essentially new types of armament, qualitatively and quantitatively. In military development there are always certain periods of time when certain combat equipment is the basis of the armament of the army, even though it is constantly being improved. For such a period there exists objectively a completely determined optimum relationship between manpower and technical equipment which is most advantageous from the point of view of effective utilization and economy of manpower and equipment. And if this relationship is not maintained within the framework of the existing forms of organization of the armed forces, then it follows that these forms are not in accordance with the level of military-technical development. Here there are possible imbalances of two kinds—either there is a surplus or a shortage of combat and other technical equipment among the troops. The reasons for these imbalances, as is noted in the foreign military press, may be:

—a shortage of manpower, but with adequate industrial and technical capabilities for supplying the troops with equipment;

—adequate manpower, but a lack of industrial and technical capabilities;

—inefficient forms of organization of the armed forces, and also incorrectly established correlation among the branches and arms.

Each of these causes some lack of compatibility in the correlation between men and equipment and consequently constitutes an obstacle to the complete realization of the latest military-technical achievements in the military field.

Only with the optimum correlation between the number of appropriately trained personnel and the quantity of the latest combat equipment in all the branches and arms is there opportunity for the full utilization of the results of military-technical progress; only then can the potential power of the armed forces, founded on the organic unity of men and equipment, be manifested with maximum combat effectiveness in the waging of modern war. Strict observance of this correlation, with the increasing supply of the troops with constantly improved technical equipment, provides the basis for the creation of maximum combat capability of the armed forces and at the same time for the observance of necessary economy of manpower and industrial-technical resources.

Thus the creation of military organizational forms which assure the most advantageous relationship between men and equipment is absolutely obligatory in the process of military development. In other words, the establishment of the optimum relationship between the number of person-

nel and the quantity of technical equipment in the armed forces, corresponding to the level of military-technical progress attained, is a requirement conforming to objective laws of development in the military field. This provides a basis for the conclusion that in military development or military affairs there operates the objective law of obligatory qualitative and quantitative correspondence between personnel and technical equipment, organizationally combined in the system of the armed forces.

Failure to observe this law in the practice of military development hinders the creation of such armed forces as will correspond in their power to the economic and military capabilities of the state.

Inasmuch as for each given level of military-technical development (fixed for a given period by the types of weapons and equipment existing in the armed forces) there exists objectively a certain optimum correlation between the quantity of personnel and equipment in the armed forces, only within the framework of which the maximum power of the armed forces is attainable, this same correlation is one of the most important factors of the military might of the state, together with its human and industrial-technical resources. From this it follows that of two states on approximately an equal level of military-technical development, the stronger in a military sense will be that which is able to create quantitatively superior armed forces, organized on the basis of an optimum correlation between personnel and equipment, taking into account the high combat characteristics of the nuclear weapon. Any deviation from this correlation affects the growth of the military might of the state, since a shortage of personnel cannot be made up for by supplying the troops with a great quantity of technical equipment, just as an insufficiency of the latter cannot be compensated for by an increase in the number of people brought into the armed forces. In both cases there is a violation of the objectively obligatory relationship between personnel and equipment.

In planning any weapons or equipment unit—a tank, plane, ship, artillery or rocket complex, radar station, etc.—there is established an efficient correlation between personnel and equipment, determined by the requirements of the most effective servicing and operation of that unit. This establishes a natural limit to the number of personnel assigned to the equipment. Therefore, the supply of technical equipment to the troops at a given level of military-technical development also has its natural limit for each branch and arm, for each method of armed conflict. And since exceeding this limit does not result in increasing the combat power of the armed forces, increasing it further for mobilized deployment is possible only by increasing the number of troops adequately supplied with the combat equipment. The stronger in war will always be that state, not with the greatest supply of such equipment to its armed forces which its industry can provide, but that which has the greatest number of troops, armed and supplied with the most modern combat and other technical equipment in the necessary and adequate amount, i.e., on the basis of the optimum correlation between personnel and equipment.

The imperialist states, seeing a correlation of forces between the two

camps unfavorable to them, especially in manpower, are striving to compensate for shortages in the latter by an ever greater quantity of arms and equipment introduced into the armed forces. The emphasis here is on increasing the mobility and firepower of the military units.

Such a way of achieving military superiority might lead to success under two conditions: first, if the level of military-technical development in the socialist countries were much lower than in the capitalist countries, and second, if the technical supply of the troops could be increased limitlessly without thereby lowering their combat capability. But, as we know, these conditions do not exist. The socialist camp certainly does not lag behind the imperialists in level of military-technical development, and in many important types of weapons the Soviet Union is certainly surpassing them. Its growing industrial and scientific and technical capabilities are assuring a constant supply to our armed forces of weapons and equipment meeting modern requirements. This fact has often been noted in the bourgeois press. The well-known American military historian Walter Millis wrote in his book, *War and Men*, "that the U.S. has received repeated evidence of the power of Soviet military equipment. It is in many respects equal to our own and in some, possibly, superior. If the West has been able to replace men with new weapons, it would be reasonable to suppose that Russia can do the same and that whatever military advantage we might gain by this means, it would at best be only temporary."[10]

The idea of "replacing men with weapons" very inaccurately reflects reality. New weapons increase the combat capability of men, but do not replace them. In modern war, equipment plays an extremely great, ever increasing role. But along with this the role of men, too, in waging armed conflict is constantly increasing. The more effective the means of combat and the more advanced the technical equipment supplied the troops, the more complex, responsible, and effective becomes the role of men in combat operations, and the greater their capability to affect the course and outcome of the conflict. In other words, a growth in the role of the individual man in armed conflict is an inevitable consequence, conforming to objective law, of military-technical progress. Therefore, with the increasing role of the military-technical factor in war, the requirement for physical and spiritual qualities of men in the armed forces, for their combat and political training, and for their general cultural and intellectual development, not only are not decreased but, on the contrary, are increased.

The highly destructive and maneuverable characteristics of nuclear rocket weapons and the great degree of mechanization, automation, and plentiful supply of the technical means of command and communications makes it possible to accomplish the necessary maneuver of forces, their rapid deployment, an adequate concentration of firepower and a reliable delivery of the means of destruction to the target with much less effort but with better qualified people. But in a war against a strong enemy with extensive territory enabling him to use space and time for the organization of active and passive defense, the maneuver of forces and the mobilization of

reserves—a single attack with strategic nuclear rocket weapons is not enough for a complete victory over such an enemy. Therefore large contingents of men will be needed in all the branches and arms of the armed forces to carry out a great variety of missions on an operational-strategic and tactical level.

In a world nuclear rocket war deciding the fate of the two opposing socioeconomic systems, each of the combatants would face the necessity of mobilizing all his available human and material resources in order to attain superiority not only in quality, but also in quantity of all modern instruments of war.

A nuclear rocket war would require unheard-of straining of efforts, energy, and initiative, the greatest courage, steadfastness, and discipline, and the highest possible morale and military spirit on the part of every person in any position. With the transformation of the whole territory of the country, essentially, into a theater of military operations, the demands on the organizational capabilities of the leading party, political, and economic cadres of the country would be exceptionally great. Just as in the past, the knowledge and organizing ability of the command and political personnel of the armed forces and their ability to inspire and lead people into battle in the most unbelievably difficult conditions will play a tremendous part in the attainment of victory.

A very essential characteristic of modern weapons and equipment is that their development as well as their use requires the efforts of many highly qualified scientists, engineers, technicians, and workers. The economic, scientific, and engineering-technical aspects of armed conflict are now so great that a high level of training and creative ability of the scientific-technical cadres and the workers of industry has become a most important condition for success in such a conflict.

With the growth of the supply to the army of technical equipment, the role of the masses of the people in the achievement of military-technical superiority over the enemy, before the war and during its progress, steadily increases. The more complex and improved the weapons and technical equipment of the troops, the higher and the more varied are the demands on the personnel in the armed forces. The quality of personnel—their general cultural level, their combat and military-technical training, and their morale and military spirit—must meet the high requirements brought about by the nature of modern war and the tremendous combat capabilities of modern technical equipment.

The revolution in military affairs is being carried out by people, and to them remains the decisive role in the utilization of all the possibilities being opened up by this revolution. Along with the sudden growth of the military-technical factor, the decisive role in war will, as in the past, belong to the economic and sociopolitical factors. No matter how high the level of military-technical progress, the basic, objective law of war formulated by Lenin will not cease to operate: "He will gain victory in war who has the greatest reserves, the greatest sources of strength, and the greatest support among the masses of the people."[11] It is perfectly obvious

that the expression, "sources of strength and reserves," includes, along with human resources, all types of the latest combat equipment, including nuclear rocket weapons and that without military-technical superiority over the enemy, achieved before the beginning of the war and maintained throughout its progress, victory in modern war cannot be assured.

Weapons of tremendous destructive power have not justified the hopes of the imperialist militarists, who counted on these weapons to relieve them completely of any dependence on the will and public opinion of the masses of the people in carrying out aggressive military adventures.

Since the latest types of armament and combat equipment and the mass of conscientious people, full of initiative, who have completely mastered them constitute an organically united material basis for the waging of war, the problem of military-technical superiority does not exist, and cannot be considered, outside this unit. Consequently, it also cannot be considered outside those very closely connected economic and sociopolitical conditions in which take place the industrial and military activities of people.

The moral-political and military qualities of the workers of the socialist countries called into the armed forces are incomparably higher than those of the soldiers and sailors of the imperialist countries. This indisputable fact was repeatedly proven by the victorious military experience of the Soviet Armed Forces. In attaining military-technical superiority, in solving the most important problems of modern war, which "also necessarily demand highly qualified human material, just as does modern technology,"[12] the socialist countries have a decisive, immeasurable, and indisputable advantage over the imperialist states.

In modern war, as never in the past, the ability of a state to assure the military-technical superiority of its armed forces is determined basically not only by a high level of industrial-technical development and an absolute volume of production, but to a decisive degree it depends also on the nature of the socioeconomic and political structure of the state. It is perfectly obvious that an economic system developing on the basis of social ownership of the means of production, constantly increasing the tempo of its development, planning not only within the limits of one country but also on the scale of a number of countries united by a single socialist goal and a fundamental community of interests, not experiencing crises and anarchy of production—that such an economic system naturally has a tremendous advantage over capitalism. This advantage is a decisive factor also in the attainment of military-technical superiority.

Facing the aggressive imperialist powers, who are striving to unite their efforts to attain military superiority over the world socialist system, a comprehensive expansion of the economic relations among them is an objective necessity. Therefore the CPSU Central Committee justifiably condemned the so-called theory of "reliance on one's own powers" as having nothing in common with the principles of socialist internationalism. The policy of "reliance on one's own powers," which proposes the creation of self-sufficient national economies, for which economic relations with the

other countries of socialism are limited to trade, represents an attempt to undermine the unity of the socialist community and its economic and military strength.

Military-technical superiority originates in economics, in the economic system, which develops according to its own specific laws. The capitalist economic system has as its goal the increasing of profits for the enrichment of the exploiting upper classes of society. The basic goal of socialism is the maximum satisfaction of the needs of all the people. Scientific and technical progress and the progress of industry under capitalism leads to a sharpening of the class conflict; under socialism—to the strengthening of the psychological-political unity of society.

The world socialist system beyond any doubt has greater sources of strength, greater reserves, and greater endurance in the mass of the people as compared to the capitalist system. The military-technical superiority over the U.S. achieved by the Soviet Union is an impressive factor in containing imperialist aggression and an important condition for the achievement of victory in war, if the imperialists should start one. However, this circumstance should not become grounds for self-satisfaction or complacency. In a military respect, the camp of imperialism represents a strong and crafty opponent, forcing on us an arms race and a bitter struggle for military-technical superiority.

The favorable prerequisites being created by the socialist system do not in themselves automatically solve the problems of maintaining military-technical superiority; this is accomplished by constant strained efforts of people, both in producing the necessary quantity of modern combat equipment and in mastering the use of such equipment and using it in armed conflict. The achievement of military-technical superiority is a problem not only for economics, industry, science, and technology, but also for military art. The best armament and technical equipment of the army will not bring victory if they are not used in complete conformance with the laws of armed conflict, if the methods and forms of the use of weapons do not correspond to their combat characteristics and capabilities, i.e., if they do not meet the demands of modern military science and military art.

After science and industry have produced combat equipment excelling in quantity and quality over that of the enemy, and this has become part of the armament of our forces, the decisive role in establishing and maintaining military-technical superiority throughout the war and making it a real factor in the achievement of victory belongs to the military organization of the state, to military science, to combat training, and to the readiness, morale, and military spirit of the armed forces.

For the Soviet Union, just as for the other socialist states which are under the military threat of imperialism, it is extremely important to keep up sufficiently effective armed forces and constantly maintain military-technical superiority with a minimum expenditure of the financial-economic means and the manpower necessary for use in a rapidly developing national economy. In connection with this, the task of optimum solutions of all the problems of military development, military planning, and

the organization of troops becomes especially urgent.

In its modern form and scope, this task may be accomplished on the basis of wide use of mathematical methods of research of military phenomena. The use of electronic computing equipment in military development and planning makes it possible to produce multivariant calculations which radically facilitate the selection of the most advantageous, optimum variant of military organizational structure of the armed forces as a whole, and also the solution of problems of the most advantageous qualitative and quantitative relationship between the branches and arms, as to what should be their relative weight in the general system of military organization in accordance with their defined military missions and the combat equipment which they have in their armament.

The law of obligatory qualitative and quantitative relationship between personnel and equipment in the troops provides a direct theoretical basis for the mathematization of the process of military development. The objective necessity of establishing an optimum organizational structure of the armed forces arises directly from this law, since only in it can there be realized a complete correspondence of personnel and equipment, based, as noted above, on an optimum correlation between them.

The determination of the appropriate military-technical and military-economic criteria necessary for programming the work of computers, being a subject for special research, does not enter into the scope of this article. We will point out only one of the possible approaches to this problem. As Academician V. Nemchinov says, for the use of computer problem-solving techniques in the field of the national economy, definition of economic indices and categories must be carried to such a degree of accuracy that they would be expressed in strict mathematical form and quantitative definition and thus be suitable for transmission into the input of a computer.[13] It would be completely possible to form such a quantitative definition from the absolute and relative indices expressing the quantitative and qualitative characteristics of the branches and arms, such as their firepower and striking force, mobility and maneuverability, combat capability and combat readiness, controllability and ability to survive, and also the conditions of training and indoctrination and the living arrangements of the troops.

In evaluating the combat capabilities of the armed forces, of great importance, for example, is the relative index of the mobility of the troops, their capability of rapid maneuver, and the ratio of the quality of motor and air transport, taking into account seating capacity and speed, to the number of personnel. However, for any branch or arm the main index of its combat effectiveness and technical supply is the absolute and relative magnitude of its firepower. This is all the more true for nuclear rocket weapons, which are a single complex of firepower and means of delivery and, in view of their tremendous destructive power, have a limit of accumulation attainable in our time.

Relative firepower is essentially the firepower in a gun crew per man and therefore has a perfectly exact mathematical expression, suitable for

transmission to the input unit of a computer. In combination with other important indices (both absolute and relative) which characterize all the other combat characteristics of branches and arms and also with the position of troops, there is a complete basis for the selection of the necessary mathematically determined indices for working out corresponding models and programming the operations of computers.

Of course the computer by itself cannot give a complete and comprehensive solution to the problem of creating an optimum military organization and of optimum military planning. But it can give in the shortest time a sufficient number of variants of the solutions of these problems, facilitating the selection of the most advantageous optimum variants which provide for maximum strength of the armed forces with minimum expenditures of means and resources.

For the maintenance of constant and undiminishing military-technical superiority over the enemy it is absolutely necessary to consider carefully the general trends of development of science and technology, and especially to study carefully foreign military technology and the trends of its development. Here it is especially important always to keep in mind the possibilities of using the factor of technological surprise, which, with the modern level and tempos of the development of science and technology, are very rapidly increasing.

It is known that the U.S. is striving to provide all branches and arms of the armed forces with an ample supply of nuclear weapons by a very substantial expansion of the range of TNT equivalents of nuclear bombs and warheads. In the 1962-63 fiscal year, according to a statement by Secretary of Defense McNamara, the U.S. planned to spend $15 million for nuclear armament. The plans and already-begun projects of the American militarists encompass all possible areas and means of combat activities, from armed conflict for "supremacy in space" to equipping primary troop subunits with nuclear weapons. Our probable enemies have very substantial industrial and scientific and technical capabilities which they are using for the creation of new means of combat.

It is important to keep in mind constantly that the Western states, trying to compensate for lagging behind the Soviet Union in the development of rocket technology, are paying great attention to the development of chemical, biological, radioactive, and other means of mass destruction.

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Notes

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Augmentation of Strategic Efforts in Modern Armed Conflict[1]

Maj Gen Kh. Dzhelaukhov

The problems of augmenting efforts in a battle and in an operation have always been in the center of attention of practical workers and theoreticians in military affairs. They have been given a prominent place in field combat manuals and in various theoretical studies.

The necessity for augmentation of efforts arises from the various and complex missions carried out by troops in a battle, an operation, and in armed conflict as a whole. The nature of these missions and their scale require from the troops simultaneous efforts or efforts in sequence. Usually it is not possible to carry out missions in an operation using only the original operational formation. As a rule there arises the need to change the operational formation by strengthening already formed groups, by carrying out a suitable maneuver, by regrouping forces and materiel, by bringing them up from the depth of the country or the theater of operations, i.e., by augmenting efforts at the place where it is needed and at a definite time.

This situation is observed not only on the tactical or operational level, but on the strategic as well.

The augmentation of strategic efforts was called for by the need to achieve superiority over the enemy in forces and materiel or at least by the desire to maintain the capabilities of the operating groups and the existing correlation of forces, in order to effectively carry out the missions of armed conflict in a given theater of military operations. In the very fact of the original strategic concentration and deployment of forces usually lay the essence of the augmentation of strategic efforts, which could be effected, for example, by bringing up newly mobilized formations and units from the interior of the country.

In a general sense, the concept of "augmentation of strategic efforts" means the capability of a given state or coalition of states to increase the strength of its resistance and at any given moment of the war to be stronger than the opposing side, skillfully using all its resources, all its economic, psychological-political, and military potential.

What are the sources, directions, constituent elements, and degree of augmentation of strategic efforts? What indices determine this phenomenon of armed conflict in modern conditions?

The experience of the world wars provides rich material for the illustration and theoretical analysis of these indices. Thus the following indices were and, we are convinced, will be in the future the effective sources or premises for augmentation of strategic efforts of states during a war:

—an increase in military-industrial production as a whole on the basis of utilizing the economy of the country and technical progress; an increase in the output of armament and creation of new models of armament;

—a growth in the total numerical strength of armed forces and of the number in them of basic formations, weapons, and combat equipment;

—the existence and the establishment of strategic reserves of armed forces and of materiel and technical means for uninterrupted supply of the operating troops in the theaters of war;

—the capability of all types of transport to handle an ever-increasing volume of transportation of troops and freight to the theaters of military operations in the period of immediate preparation for war and during the war;

—a growth in the number of military-trained cadres and a well-ordered system for accelerating their training;

—an efficiently organized higher military leadership, capable of effectively utilizing the material possibilities and the political-psychological state of the personnel of the armed forces in decisive periods of the war for the attainment of victory.

As is obvious from the above list of indices, the sources of augmentation of strategic efforts do not fit within the framework of military art; economic, psychological-political, scientific-technical, and other factors are present here. The sources listed, it seems to us, might be the constituent parts of three basic interrelated (and only conveniently separated one from another) directions (or fields) of the augmentation of strategic efforts.

These fields are the following: *military-economic*, including a wide range of problems from the military-economic potential of the country as a whole to supplying theaters of operations with weapons, technical equipment, food, fuel and other supplies; *scientific and technical*, creating the theoretical and industrial bases for the appearance of new kinds and types of weapons (tanks, jet planes, radar, rocket and nuclear instruments of destruction, atomic submarines, etc.); and finally, the *military-organization field*, which in the general plan provides, in particular, for the augmentation of strategic efforts by the strategic groups, opening up of new fighting fronts, increasing the number and the combat personnel of the armed forces, etc.

In the system of fields listed above, the economic capabilities of the country and its achievements in science and technology—its military-economic potential—are decisive. Without them no kind of augmentation of efforts in a war is possible. However, this is most concretely revealed in the sphere of armed conflict; this is where are manifested the results of the efforts of the political leadership of the country in the utilization of

economics and scientific and technical thought for the all-round supply of the growing needs of the armed forces in war. So, without going into a detailed study of the first two fields, let us examine the third in more detail.

An obvious concrete indicator of one of the sources of the augmentation of strategic efforts is the successive increases in the numerical strength of armed forces in comparison with their original peacetime composition, or with that of the first months of the war. The change in the numerical strength of armed forces of certain states during the preparation for and in the course of World War II is shown in table 1.

Table 1. Numerical Strength of Armed Forces (in thousands).

Countries	1939	1940	1941	1945
Germany	4,600	5,600	7,200	10,938
Great Britain	2,223	3,291	3,291	4,683
U.S.	341	411	901	12,245

The possibilities for the augmentation of strategic efforts is graphically shown by the quantitative increase in various arms and combat technical equipment—for example, in the air forces (table 2) and in the navies of these same countries.

Table 2. Increase in Air Forces.

Countries	1940		1941		1945	
	Personnel/Planes (in 1000's)		Personnel/Planes (in 1000's)		Personnel/Planes (in 1000's)	
Germany	757	6,000	1,350	6,500	1,726	7,000
Great Britain	118	2,300	655	6,900	963	12,000
U.S.	84	2,300	—	—	2,340	34,000

In the British Navy in 1939-40 there were 373 combat ships, and in 1945, 1172. For the corresponding years in the U.S. Navy there were, respectively, 387 and 1442 ships.

By the beginning of World War I, Russia had 5,650,000 trained reservists. This was considered completely adequate for successfully carrying on a war. However, by the end of 1914 it was already necessary to call up for mobilization 5,115,000 men; i.e., the supply of trained reserves was practically exhausted. In 1915 an additional 5,010,000 men were mobilized. Altogether during the war Russia mobilized 14 million men, not counting the regular army at the beginning of the war.[2]

A similar situation existed in the other belligerent countries. Table 3 gives a graphic representation of the augmentation of efforts and the

replacement of losses by reserves.

The experiences of the wars show that the number mobilized is usually two to three times the number of trained reservists at the beginning of the war.

Along with the quantitative aspect of the augmentation of strategic efforts, the qualitative aspect has assumed great (and in some cases primary) importance. In the army fighting a just war, high morale and political awareness superior to that of the enemy, well-knit combat organization of field forces and formations, and efficient and flexible operation of the organs of command exerted very substantial influence on the augmentation of efforts and the attainment of victory. It should be emphasized that also the improvement of the combat characteristics of various kinds of weapons and the appearance of qualitatively new armament (tanks and planes of new systems, rocket artillery, etc.) to a great degree led to the achievement of superiority over the enemy. It is generally known that Soviet tanks and artillery were superior to the similar weapons of Fascist Germany.

It is true that the qualitative changes in weapons and combat equipment did not lead to the achievement of victory on the strategic level, but they may have contributed indirectly by gains on the tactical and operational levels, and thus later affected the strategic results of the armed conflict.

Let us stipulate in advance that now the very concept of "augmentation of strategic efforts" has acquired a somewhat different meaning. Actually, as a result of massed use of nuclear rocket weapons and other means of destruction, which obviously will inflict serious losses on the belligerents, it is hard to imagine that subsequent efforts by either side will prove to be more powerful than the preceding ones, especially the initial one.

Table 3. Replenishment of Armed Forces by Reserves (in millions).

Countries	World War I			World War II		
	Population	No. mobilized	Percent of mobilized to population	Population	No. mobilized	Percent of mobilized to population
Germany	67	13.3	19.7	69.3	17.0[a]	24.5
U.S.	100	3.8	3.8	131.7	14.0	10.6
Britain (without dominions & colonies)	46	5.0	10.8	47.8	6.0	12.6
France (without colonies)	39	6.8	17.2	42.0	5.0	12.0

[a]Including some contingents of Austrians, Frenchmen, Poles, Czechs and other peoples of countries occupied by Germany.

Nevertheless certain efforts are required on the part of the political and strategic leadership of the country or coalition of countries directed

toward maintaining, by consecutive commitment to action of various forces and instruments of war, the superiority over the enemy existing from the beginning of the war, or achieving subsequent strengthening of their groups of armed forces for the most rapid execution of the strategic missions of the beginning period of the war.

In explaining the idea of "augmentation of strategic efforts in modern conditions," we proceed from the following principles of Soviet military doctrine: first, recognition that even in modern war massive armies are required; second, the position that victory over a strong enemy can be achieved by the joint efforts of all the basic types of armed forces with close cooperation among them, and with the decisive role of strategic rocket troops.

Obviously, in elucidating the essence of the idea we are examining, it is necessary to take into account the differences and the specific characteristics of the different types of armed forces. In particular, the idea of "augmentation of strategic efforts" as applied to strategic nuclear weapons means their constant readiness to inflict repeated blows on various enemy targets, especially his means of nuclear attack. The strength of subsequent blows may turn out to be much less than that of the first ones; however, the capability of inflicting them contributes as a whole to an augmentation of the totality of nuclear effectiveness against the enemy.

Therefore, if we are talking about the use of strategic nuclear weapons, the position expressed, it seems to us, should be understood not in the sense of an increase in the force of each successive attack in comparison with the preceeding one, but as an augmentation of the total power of all the nuclear attacks as a result of their being launched one after the other. Such an augmentation of the power of rocket and nuclear attacks makes it possible to constantly maintain the strategic initiative, which we will speak about in somewhat more detail below.

With regard to the "augmentation of strategic efforts" as applied to Ground Troops, PVO Strany Troops, the Air Force and the Navy, it seems to us that, despite the existence of nuclear weapons in their organization, the augmentation of strategic efforts for these forces will be achieved mainly by a quantitative increase and a qualitative improvement of their forces and equipment. A similar position is noted in the military doctrine of all the major powers of the world and in theories of military strategy. In them is foreseen the necessity of creating massive armed forces and subsequently increasing their numerical strength by mobilizing and deploying in theaters of military operations large strategic groups by the beginning of the war and during its beginning period.

The term "augmentation of strategic efforts," we must assume, will keep its former meaning (when subsequent attacks exceed previous ones in their force) in a case where the warring sides are drawn into a nuclear war gradually—let us say, after some military conflict, local war, etc. In such a case the augmentation of strategic efforts is possible by a continuously increasing inclusion of troops and material in military operations.

Finally, we note that we consider a third peculiarity of the use of this

term in modern theory of strategy. While it is difficult to imagine the most "classic" form of the augmentation of efforts in the war as a whole, specifically this form may occur in the study of the military operations in one of the theaters where the operations develop in the course of the war.

The problem of the augmentation of strategic efforts in modern conditions, just as formerly, has two sides—the qualitative and the quantitative. Both are closely interrelated, but for convenience and depth of understanding, let us consider them separately.

The quantitative side is connected with the preparation of armed forces still in peacetime and is the most economical, and consequently the most essential. It includes the qualitative improvement of the weapons and combat equipment, the attainment of military-technical superiority over the enemy on the basis of very rapid development of modern science and technology. Among factors involved in the qualitative side of augmentation of efforts are combat readiness higher than that of the enemy and well-knit organization of field forces, formations, and organs of command and their great mobility and capability of executing a rapid maneuver.

The problem of qualitative augmentation of efforts primarily depends on a conscientious attitude of personnel toward carrying out combat missions—in the final analysis, on their moral-political attitudes, their readiness to sacrifice themselves in the name of the great ideals of Marxism-Leninism. Brought up on Leninist ideas, the soldiers of the Soviet Army and the armies of the other socialist countries are capable of assuring the high combat readiness of the Armed Forces. There are many instances from the history of wars when, thanks to high morale, steadfastness and combat organization, formations and field forces achieved superiority in a battle or operation over a numerically superior enemy. In modern conditions nuclear rocket weapons enable even individual smaller units to actively carry on the fight with the enemy.

There remains the other side of the augmentation of strategic efforts—the quantitative increase in the number of formations, of operational rocket installations, of planes, of ships of various classes, of the supplementary forces and materiel of the PVO troops and PVO Strany Troops, and the increase of the material and technical means which provide for the carrying on of armed conflict.

Both aspects of the augmentation of strategic efforts are closely connected with the whole system of building up and preparing the armed forces for war. During the preparation there takes place in good time an accumulation of various reserves: materiel and technical means, various weapons, ammunition, and, in addition, trained military cadres. The composition and quality of these reserves must provide for the complete mobilization of new formations in short periods of time, and also thereafter, the timely replenishment of field forces and formations which have suffered losses at the beginning of the war.

In the matter of the degree of augmentation of strategic efforts, this depends, in our opinion, on such factors as the situation and immediate

prospects for development of the military-economic potential of the country, the table of organization structure of the basic components of the armed forces, the smooth and efficient organization of the system of control of forces and equipment in the armed forces and in the government as a whole, and, finally, on the moral-political attitude of the personnel and the combat readiness of units of the armed forces.

The modern conception of augmentation of strategic efforts does not have to be bound up with just a simple quantitative increase of forces and materiel, by which to attain quantitative superiority over the enemy, though this is an important aspect of the problem. It is connected with such successive commitment of new forces and materiel to armed conflict as would maintain the strength of existing groups and a favorable correlation of forces, or would provide for the launching of attacks by these groups, with the neutralization of various strategic targets in the different theaters of operations and of superior forces and materiel of the enemy in a given sector. Implied here is the expedient use of the combat characteristics of the various arms and their close coordination on a strategic level.

Thus there enters into the concept of "augmentation of strategic efforts" a complex of strategic measures leading to a quantitative and qualitative strengthening of strategic groups and making possible the launching against the enemy in short periods of time of simultaneous or successive attacks with nuclear and conventional weapons, the seizure and maintenance of the strategic initiative, and the achievement of a substantial superiority over the enemy in the interests of effectively carrying out the strategic missions of the beginning period of the war.

The augmentation of strategic efforts in a modern world war is obviously a coalition problem, since it is impossible to solve this problem on a scale of just the armed forces of single nations, especially if the states involved are limited in size and capabilities. A constant and dependable augmentation of efforts is within the power of a state or a coalition possessing great economic and military capabilities and having a variety of state and strategic reserves for the constant replenishment of the armed forces with everything needed.

From the nature of modern war it follows that the use of nuclear rocket weapons as a decisive means of armed conflict makes it possible to achieve immediate strategic goals in a short time in the beginning period of the war.

The most probable way of unleashing a world war, as they write about it in foreign countries, may be by a sudden attack with strategic nuclear weapons against targets in the border zones and in the interior of the country. At the same time one must expect that all other kinds of armed forces in the land and sea theaters will be drawn into military operations on a global scale.

Under such conditions only a high state of combat readiness of the peacetime armed forces and their ability to repulse and frustrate the first nuclear strike of the enemy will make it possible to begin the first opera-

tions of the branches of the armed forces, seize the strategic initiative, and create favorable prerequisites for further waging of the war.

Executing the missions of the beginning period of the war may be accomplished by strikes with strategic nuclear weapons, and the conduct of strategic operations in continental and ocean theaters of operations with the participation of all the basic branches of armed forces and with the decisive role of strategic rockets. The nuclear strikes and the active military operations will obviously encompass the territories of all the countries making up the enemy coalition, as well as ocean areas.

Naturally, each of the warring sides in the very beginning period of the war will successively have to commit its forces to action, both those existing in peacetime as well as those mobilized before the war or at its beginning; i.e., there will be required a systematic augmentation of efforts of strategic groups of the armed forces. In the light of this, there will obviously arise the necessity first of all to strengthen from the beginning of the war the troops of the first strategic echelon by transferring forces and equipment to the zone of military operations from the neighboring regions, and subsequently from the depth of the theater or even from other continents (as, for example, the U.S. military command is planning).

From an analysis of the nature of modern war it is evident that a constant and rapid augmentation of strategic efforts will be one of the essential factors in the execution of such missions of the beginning period as, for example, the seizure and maintenance of the strategic initiative.

The seizure of the strategic initiative in the initial period of the war is usually connected with the surprise use by the aggressor of wide scale. The experience of wars graphically emphasizes this principle. For example, as a result of a surprise attack of the German Fascist troops on Poland, Yugoslavia, Greece, Norway, and other countries at the beginning and during World War II, Germany's military command seized the strategic initiative and achieved a quick victory over the armed forces of these countries.

The sudden and treacherous attack of the German armed forces on the Soviet Union in June 1941 likewise enabled the German command to seize the strategic initiative and achieve a major initial strategic success. The enemy maintained the initiative in strategic operations for a long time. The Soviet Supreme Command and the Armed Forces had to wrest this initiative from the hands of the aggressor under difficult conditions and in a stubborn struggle. It required almost a year and a half for a break in the strategic situation in our favor. The great battle on the Volga in the period from August 1942 to January 1943, when large forces of German Fascist troops were defeated and taken prisoner, provided the beginning of a transfer of the strategic initiative into the hands of the Soviet command.

But the seizure and maintenance of the strategic initiative in the initial period of a modern war will obviously be incomparably more difficult. A sudden and massed use of nuclear weapons by the enemy even under conditions of an effective repulse of this strike and the infliction of an im-

mediate strike upon the enemy, cannot completely guarantee, we must assume, against major destruction of economic and military targets and losses in the armed forces and among the population. Therefore, with a sudden beginning of a war by the enemy, seizure and maintenance of the strategic initiative will proceed in the very complex circumstances of a war begun with mutual losses on both sides.

The great destruction and losses from nuclear rocket weapons in the very first hours of the war will result in the necessity of replacing the groups of armed forces in the theaters of operations. Accordingly, the problems connected with the accomplishment of augmentation of strategic efforts and the attainment of superiority over the enemy in the initial period of the war will retain, it seems to us, real importance even under conditions of nuclear war.

In our opinion, after timely frustration of the first attack of the enemy and infliction on him of a crushing rocket and nuclear attack in return, very aggressive activity will be required of the existing forces and equipment deployed in the theaters of operations at the beginning of the war, and likewise of those arriving from the border regions and from the interior of the country, which will first of all promote the maintenance of the strategic initiative. This increase of efforts will make it possible to successfully carry out the operations of the initial period of the war in the main theaters of operations—continental and oceanic.

Thus initial augmentation of strategic efforts is intended for retaining the strategic initiative of operations from the beginning of the war and at the same time is directed toward the achievement of subsequent or simultaneous execution of strategic missions in the initial period of the war.

Let us examine what, in our opinion, are the basic elements of the augmentation of strategic efforts. They are as follows.

Maneuver of strategic rocket weapons for the augmentation of strategic efforts is a completely new form of maneuver. No army in the world has yet had any experience with the mass use of nuclear rocket weapons. Nevertheless, a decisive part in the augmentation of strategic efforts has been attributed to them. The augmentation of efforts by strategic rocket weapons may be accomplished by a maneuver of trajectories or by redeploying part of the rocket weapons to the necessary sectors (theaters of military operations). The great speed of rockets, the possibility of extensive changes in their trajectories, and of repeated launchings, independent of weather conditions, makes it possible to attain most rapidly the greatest effect in the augmentation of strategic efforts, especially, it seems to us, in the initial period of the war.

The maneuver of strategic air forces and of rocket-launching naval forces is likewise a very effective means of augmentation of strategic efforts. This maneuver is accomplished by redirecting planes in the air, or by redeploying them from one airfield network to another. At the same time, one must take into account the great vulnerability of modern aircraft to weapons of active antiaircraft warfare. However, under certain conditions of war the strategic air force may be a most dependable and effective

means of augmentation of strategic efforts. This may be especially true when the enemy has started the war without resorting to nuclear weapons. In such a case the augmentation of efforts will mainly take the same form as in past wars, by the use of conventional weapons.

Rocket-launching forces of the navy, like the air forces of a front, under certain conditions are able, in our opinion, to make a substantial contribution to the augmentation of efforts.

The maneuver of forces and materiel of branches of the armed forces from one theater of operations or strategic sector to others, especially by maneuver of land forces, air forces, and naval forces (especially rocket-launching submarines), and also the maneuver of strategic reserves, is an old form of maneuver, extensively used in the past, and at the same time a complicated and very difficult one with regard to scope and scale under modern conditions. Such augmentation of efforts is carried out for the creation of new strategic groups and a new strategic front of armed conflict or for the purpose of strengthening existing strategic groups.

The experience of wars, particularly of World War II, has shown that skillful use of the partisan movement in occupied territory is an important element in the augmentation of strategic efforts. The goal of organized attacks of partisans is to inflict damage to the military-economic potential of the enemy, to disrupt his commercial and operational transportation, and to draw sizable forces away from the main battle front by combined attacks against rear targets of the enemy and against his strategic groups. Naturally, all these operations are carried out on the basis of a general plan of armed conflict in a given theater of operations.

The active operations of Soviet partisans in the rear of the enemy during World War II are generally known. Hitler's command was forced to divert several dozen divisions for fighting the partisans and to weaken his groups on the Soviet-German front. As Gen. Eisenhower recognized, after the invasion of France in 1944 by the British and Americans, the French partisans with their operations took the place of up to 12 divisions.

Partisan warfare may assume especially large proportions in areas contiguous to the main theaters of military operations.

The use of the armed forces of states which have entered the war after its beginning on the side of a certain coalition may play a substantial role in the whole system of augmentation of strategic efforts. For example, during World War II, when Rumania, Bulgaria, and Hungary were put out of the war, their armed forces were drawn into the fight against the German Fascist troops. However, this situation, in our opinion, may occur only under very favorable conditions.

Most probably the joining of the coalition by such states would have a purely symbolic character, since the augmentation of strategic efforts by the armed forces and materiel of these new allies will prove to be very minor. The moral effect of such joining might be exceptionally great, and it would serve as a positive example to other states who were vacillating.

One should take into account the potential resources and the advantages of strategic position of the territory of countries which have joined

the coalition—the existence of various kinds of strategic raw materials, the possibility of bases for the air or naval forces of the coalition—and at the same time try to prevent the enemy from using these possibilities in his interests. In all cases a realistic consideration of the existing international situation is required, so as to avoid a situation where the joining of the coalition by the new allies would entail a deterioration of the strategic situation of the whole coalition.

Measures for weakening the active strategic groups of the enemy by their partial or complete isolation from the rear, destruction of strategic reserves, and an aggressive fight to destroy his ocean, sea, air, and land communications occupy a prominent place in the general system of augmentation of strategic efforts.

This method of attaining superiority over the enemy leads to an augmentation of strategic efforts, as it were, indirectly, since this takes place not as a result of a qualitative and absolute quantitative increase of one's own forces and materiel, but as a result of weakening the enemy, achieved by a sharp curtailment of his bringing up of reinforcements and of reserves in general.

Finally, a very important source for the augmentation of strategic efforts is the skillful manipulation of the existing material-technical means by redistributing them among the groups of armed forces in the theaters of operations and bringing them up from the rear of the country. This is necessary not only for the supply of formations and field forces arriving in the theaters of operations, by way of augmentation of strategic efforts, but also for the replenishment of materiel, especially of nuclear ammunition, for the operating groups of the armed forces.

Thus, analysis of the nature of nuclear war and of its initial period, and also of the possible strategic missions which can be accomplished in this period, logically leads to the necessity of augmentation of strategic efforts. The basic elements of such augmentation are the maneuver of nuclear-rocket weapons and of forces and materiel of the branches of the armed forces.

Each of the elements of augmentation of strategic efforts listed in this article is a subject of special study and is of very great importance for the further deep study of the nature of the initial period of modern war. The problems connected with the augmentation of strategic efforts are assuming great theoretical and practical importance.

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Encirclement and Annihilation of Groupings of Defending Troops[1]

Maj Gen B. Golovchiner

World War II, especially the Great Patriotic War of the Soviet Union, is exceptionally rich in examples of the encirclement and annihilation of large groupings of defending enemy troops.

During the Great Patriotic War of the Soviet Union more than ten large encirclement operations were conducted, resulting in the annihilation (or capture) of approximately 200 divisions. In the battle of the Volga alone a grouping of more than 300,000 men (22 divisions) was encircled and annihilated (or captured), and in the Iasi-Kishinev operation—a grouping of more than 250,000 men (21 divisions).

That was in the past. But now completely new means of armed struggle have appeared; the mobility, firepower, and striking force of troops have increased; combat action has taken on a more decisive and maneuvering character and a large spatial scope. Military art has naturally been confronted with the question of whether it is possible and expedient to encircle groups of defending troops under these conditions.

It would seem to be inexpedient inasmuch as defending groupings can be annihilated with nuclear weapons, without encirclement, and since encirclement is connected with the risk of tying up considerable forces and equipment of the operational field forces and depriving them of opportunities to swiftly develop the attack in depth. Also, an encircling maneuver may be difficult to execute, since the defending force, using nuclear weapons, can offer determined resistance to such a maneuver. In the grouping troops will be dispersed over large areas and will have high mobility.

However, upon closer analysis another conclusion is suggested: encirclement of large groupings of defending troops is possible and expedient in a nuclear rocket war.

We base our conclusions on the fact that the use of nuclear weapons in offensive operations of ground troops can not be unlimited, otherwise these operations would be inconceivable. However, assuming the possibility of such operations, it would be incorrect to exclude such methods of conducting them as the encirclement of defending groupings. This method would certainly accompany an attack. It could be used following the employment of nuclear weapons and the swift movements of attacking troops along axes, even when such an objective has not been planned in

advance.

This method of combat action may also be stipulated in advance as the most expedient under existing conditions. For example, the West German command considers a battle for encirclement especially advantageous, since the encirclement of groupings is one of the most convenient objectives for the most successful employment of nuclear weapons.[2] In connection with this it has been recommended that during an attack there be selected penetration areas, located on the main operational axes, through which an attack will promote the encirclement and annihilation of enemy troops in these areas.[3]

All this is proposed for situations in which the attacking force has a sufficient number of nuclear weapons to carry out the main missions of the operation. If the attacking force has a limited number of nuclear weapons or if their employment would be inexpedient, encirclement would be used even more widely.

Thus, encirclement of defending groupings in modern offensive operations can take place when the attacking troops have a sufficient number of nuclear weapons as well as when there are limited opportunities for their use.

The encirclement of defending troops is possible in various situations: when the main forces and means of a defense are distributed over a relatively small area and the attacking field forces have an enveloping position in regard to a certain grouping, or when there are difficult terrain areas (a sea, a system of lakes, large rivers, marshy wooded areas, impassable mountains) in the rear area or on one of the flanks of the defending troops and there is a chance to "pin" the troops to this barrier.

Encirclement may also occur in situations in which defending troops will try at any cost to hold an area having operational or strategic importance or during their withdrawal if the defending forces can not offer determined resistance to the swift pursuit of attacking troops. Encirclement is also possible when routing operational or strategic reserves.

What is most characteristic of the encirclement and annihilation of defending troops under modern conditions?

First of all the very concept of "encirclement and annihilation" has changed. Today we look on these actions as a means of defeating separate groupings of defending troops in the course of carrying out the main and special missions of operational field forces whereas in the past they frequently were the means of defeating the main force of a defense and achieving the objectives of an operation. The maximum force and means of one or several operational field forces were employed in these actions. The encirclement and annihilation of large operational groupings and sometimes even strategic groupings took place during these operations. At the same time combat actions were always connected with the encirclement and annihilation of the enemy at a tactical level.

The possibility of such operations in modern times is not excluded; however they occur infrequently, specifically when large groupings of defending troops are forced to conduct combat operations in relatively

small areas of operational or strategic importance or during an attack in the direction of a coast line. In view of the difficulty of their organization and execution, such operations will, of course, be planned in advance.

Judging from the experience of war and keeping in mind the new conditions of armed struggle, it may be said that a decision on an operation should include consideration of such fundamental questions as the procedure for the employment of nuclear weapons, the methods of encircling and annihilating defending troops, the directions of strikes, forces and equipment, the missions of encircling troops, and support of the operation. Missions can naturally be clarified during the operation and, if there are drastic changes in the situation, reassigned.

In the majority of cases the encirclement and annihilation of defending troops under modern conditions will be intermediate missions on the way to achieving the objectives of an operation; consequently, a large part of the forces and means of the attacking troops cannot be assigned for carrying them out.

In the encirclement of troops in operations of the last war, interior and exterior fronts of encirclement were established. The interior front, as a rule, was continuous. On the exterior front attacking field forces and formations either developed the attack to the operational depth or repelled counterthrusts.

In modern operations there is no need to establish a continuous interior front of encirclement to prevent defending troops from breaking out of the encirclement, since this can be accomplished by intercepting their probable withdrawal routes or by creating zones of contamination on them, bearing in mind that the possibilities of troop movements other than on roads will be extremely limited. Nor is there a need for an exterior front of encirclement, since approaching reserves can be successfully destroyed by nuclear weapons and the swift advance of attacking troops.

Today there can not be such methodicalness in the actions of encircling troops as in the past when there was the consecutive execution of missions such as the penetration of the defense, the exploitation of the breakthrough with mobile troops to create conditions for encirclement, the creation of interior and exterior fronts of encirclement, and the annihilation of encircled troops. Considerable time was needed to carry out these missions. In the L'vov-Sandomierz Operation, for example, the breakthrough, exploitation of the attack, and encirclement of the Brody grouping of German fascist troops required 7 days and their annihilation took 5 days; in the Korsun'-Shevchenkovskiy Operation the execution of these missions required 11 and 14 days respectively. In certain other operations the encirclement and annihilation of groupings took even longer. In the Battle of the Volga, for instance, it took more than 70 days.

Today there can be no talk of such periods of time for the encirclement and annihilation of defending troops. An encircled grouping is capable of quickly organizing a strong defense, preparing various types of obstacles on the operational axes of attacking troops, and creating strong reserves for resisting encirclement. Possessing nuclear weapons and high

maneuverability, the defending side can in a short time reinforce an encircled grouping and withdraw the main forces from the endangered area before encirclement is completed.

This does not mean that under modern conditions such enemy groupings cannot be encircled and destroyed. It only requires attacking troops to take measures to prevent the enemy from employing nuclear weapons and putting up organized resistance.

The necessity for rapid encirclement and annihilation of groupings of defending troops will be dictated by the fact that to achieve the objectives of an operation it is important that the attacking force not tie up considerable forces and means of the field forces (or formations) and deprive them of opportunities to swiftly develop the advance in depth. Therefore, the encirclement and annihilation of troops will be accomplished in a limited period of time. To do this the attacking force must obviously have the required forces and means.

The basis of actions for the encirclement and annihilation of defending groupings is the use of nuclear weapons and a swift attack from several directions. These actions will be organized in a way that will deprive the enemy of opportunities to use nuclear weapons, that will not give him time to prepare organized resistance, and that will not slow down the execution of the main missions of the offensive operation.

The most important mission of the encircling troops is the destruction of nuclear weapons; its execution will determine the success of the encirclement and annihilation of defending troops. This battle must be directed not only against the nuclear means of the grouping being encircled, but to an even greater degree against means located on the edges of the encircled area, since the main forces of aviation and operational-tactical rocket troops, capable of rendering the most determined resistance to troops executing an encirclement maneuver, may be situated there. Rocket troops, aviation, artillery, airborne troops, and various detachments of tank and motorized rifle troops can be used in this battle. The swift actions of encircling troops must also be considered an effective means of combat.

A very characteristic feature is the simultaneity of the encirclement and the annihilation of defending troops. Strikes for breaking up and annihilating the grouping being encircled will take place during encirclement maneuvers, without waiting until the encirclement has been completed, i.e., until all withdrawal routes have been cut off.

However, to prevent the grouping being encircled from breaking out of the encirclement, the attacking force will try to deliver salient thrusts in the directions of the probable withdrawal routes of the defending formations. Nuclear weapons may also be used against these routes and against units withdrawing on them to create zones of radioactive contamination and destruction. Attacking troops will either bypass these zones or, if the level of radioactivity has decreased to a safe level, negotiate them.

Airborne troops may be used to capture important road junctions, river crossings, and passes in the directions of the withdrawal of the

grouping being encircled and for combat with approaching reserves or support of rapidly advancing troops in the rear area of the grouping.

Under modern conditions, when the attacking force possesses the required number of nuclear weapons, encirclement and annihilation of defending troops can be accomplished with fewer ground troop formations than there are in the grouping being encircled. For example, in the opinion of the West German command, the overall superiority in forces and means needed for encirclement can be achieved with a superiority only in nuclear weapons and with equal (or even fewer) forces in the ground troops. A shortage of ground troop formations can be offset by wide maneuvers of armored forces and artillery and rocket fire supporting decisive actions of troops during envelopments with the objective of encircling the enemy.[4]

If the attacking troops do not have a superiority in nuclear weapons, they naturally must use more forces and conventional means or at least forces equal to those of the defending grouping.

In addition to having a superiority in nuclear weapons, it is important that troops have the ability to quickly locate the main enemy objectives and forestall the enemy in delivering accurate strikes with nuclear and conventional weapons. This will contribute to the accomplishment of the operation's objectives.

When the attacking force has little nuclear ammunition, the grouping being encircled can be broken up only in certain directions by an attack by part of the forces from the front with the simultaneous envelopment of the entire grouping. If the attacking force has the necessary amount of nuclear ammunition, the grouping does not have to be broken up by thrusts of ground troops. Annihilation will be accomplished solely by nuclear and conventional weapons.

The efforts of ground troop formations during encirclement of defending groups will most often be directed more toward the deep envelopment of the grouping than toward its immediate annihilation.

The number and directions of thrusts during the encirclement and breakup of a grouping will depend on the objectives of the operation, the missions, forces, and means of the attacking units, the capabilities and nature of the defense, and terrain conditions. Envelopment groupings capable of delivering two or more thrusts in the appropriate directions may be created to break up and annihilate the troops being encircled. These thrusts will usually be, in essence, a continuation of the development of a swift attack to accomplish the main missions of an operation.

In the opinion of West German military theoreticians, the number and composition of strike groupings will be determined primarily by the amount of nuclear ammunition which the operational command has at its disposal. Considerably fewer forces and means of ground troops will be needed when there is concentrated employment of nuclear weapons than when missions are carried out with conventional means.[5]

Conditions for the encirclement of defending troops may arise simultaneously in several directions. In this case the attacking operational field

forces, if they have sufficient forces and means, will accomplish the destruction of the groupings simultaneously in all directions. If the forces and means are not sufficient for this, the main efforts of the attacking troops will first be directed against the main grouping and then against other groupings, with the objective of completing their destruction.

If there is a sea, wide river, marshy sea, mountain, etc., on one of the flanks of the formations being encircled, a thrust may be delivered and developed in the direction of the natural barrier. In this type of action there will naturally be a deeper distribution of forces and means, providing the possibility of gradually increasing the strength of the thrust in depth.

During the encirclement and annihilation of a grouping of defending troops on a coastline, a naval blockade may be organized. The blockade is usually formed by aviation and submarine forces, and sometimes surface ships and coastal rocket and artillery units. Their efforts are directed toward annihilating rocket-armed and aviation forces, putting naval bases and ports out of operation, and preventing the evacuation of encircled troops by sea. In certain cases mines will be laid in the ports and bases located on the coastline being blockaded, on the approaches to them, and on the routes of transport means and combat ships of the defense.

During combat actions to encircle and annihilate defending groupings, the defense is capable of delivering strong counterthrusts against the flanks of the formations making the encirclement maneuver. To break up these counterthrusts systematic nuclear strikes can be delivered against the defending force's means of nuclear attack and his groupings of ground troops in their concentration areas, during regroupings and relocations. Strikes can also be delivered against the home bases of troop transport aircraft. Conventional means of destruction, especially aircraft, are also used for these missions.

Counterthrusts can also be thwarted by swift attacks. If the attacking forces are unable to break up a counterthrust while it is being prepared, they can disrupt it in a head-on encounter or repel it with part of the forces while the main forces are simultaneously carrying out missions connected with the encirclement and annihilation of groupings of defending troops.

In certain cases defending troops may employ weapons of mass destruction and deliver a counterthrust against troops developing the attack in an attempt to break out of the blockade. The clash between the attacking forces and troops attempting to break out of the blockade may develop into large tank battles. In this case the combat actions of both sides will become extremely intense.

Obviously, the greatest success in defeating groupings which are attempting to break out of a blockade is achieved only if the attacking forces forestall the defending forces in the employment of nuclear weapons and if they are able to use the results of these strikes for a swift advance into the depths of the enemy territory. This characteristic of the actions of attacking troops will ensure not only the destruction of these groupings, but also the swift annihilation of the encircled troops.

Air blockades by aviation and air defense rocket troops will have a special place in modern actions for the encirclement and annihilation of troops.

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Notes

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Development of Radioelectronic Means of Troop Control and Methods of Their Application[1]

Maj Gen Sig Trps I. Kurnosov

The effective use of nuclear weapons, which are the main means of destruction, and the successful operations of all branches of the armed forces in modern war depend very much on the availability, perfection, and operational reliability of technical means, primarily of radioelectronic equipment used to control troops, combat systems, and weapons of armies and navies.

Complex and responsible tasks concerning the achievement of a harmonious coordination between the technical development of radioelectronic means of control, including methods of their application, and the level of development of the means of armed warfare confront military specialists in the corresponding fields of knowledge.

We shall consider that part of these tasks which is connected with the control of troops and weapons.

A multitude of extensively used devices of various designs make up the radioelectronic means of troop control employed in modern conditions. These means include radios and radio receivers, radiorelay stations, video communications apparatus, and devices which improve the effectiveness of wire communications.

It is well known that the single-channel simplex radios of World War II as well as the radio communications channels which they formed were sufficiently perfected for that time, but could not satisfy postwar requirements. On the basis of the achievements of science and technology in the armies of the leading countries, a gradual process was begun for the qualitative improvement of radio communications. Obsolete radios were replaced by more mobile single-band, duplex, and multichannel radios which had increased range, speed of operation, and reliability.

With the implementation of shortwave and ultrashortwave radios, much attention was paid to the development of radiorelay stations to combine the positive aspects of radio communications with the advantages of wire communications. Radiorelay communications have provided a solution to the most important problem of providing for the passage of a large flow of information with sufficient reliability of transmission and have met all demands placed upon them, if the necessity of having a large number of relay stations is not taken into consideration.

However, in spite of many advantages, there are also disadvantages'

involved in the use of rediorelay stations. The main disadvantage is that when many relay stations are operating, interference is increased on the lines and it is easier for the enemy to employ countermeasures.

It became possible to overcome this serious disadvantage when tropospheric radio stations were developed in many countries. Tropospheric radio stations operate by using the phenomenon of the diffusion propagation of radio waves in upper layers of the atmosphere.

Tropospheric stations have overcome the basic disadvantages of shortwave and ultrashortwave communications, including radiorelay communications. Operating within a rather wide range of frequencies, they provide radio communications over distances of 400-500 kilometers without relay stations.

By combining a large number of communications channels with a significant increase in range, tropospheric equipment allows communications systems to be set up differently, the time spent on laying long lines to be shortened, the reliability of the operation of the system to be sharply increased, and the requirements placed on equipment and personnel often to be decreased. Instead of 20 intermediate radiorelay stations on a 1,000-kilometer line, only 3-4 tropospheric stations are necessary.

However, these are not the only advantages which have drawn attention to tropospheric communications. The use of these stations is most effective in sparsely populated areas of the far north and in deserts where it is difficult to maintain many relay stations. The U.S. was first to use tropospheric stations in arctic areas. One such line connects the coastal regions of Alaska, British Columbia, and the United States. It has a capacity of 240 telephone and telegraph channels.

It would seem that all problems connected with providing reliable multichannel radio communications were solved with the introduction of tropospheric radio stations. However, it soon was evident that only one technical aspect of the problem was solved. With all elements remaining stationary, especially in an air defense system, the use of tropospheric stations obviously is useful from any point of view. But these stations were not advantageous in mobile communications nets because of their poor maneuverability. Large power transmitters of 10 or more kilowatts and cumbersome antenna systems were necessary for reliable communications.

Subsequent achievements of radioelectronics allowed stations to be developed which operate on the principle of ionospheric scattering. In contrast to tropospheric stations, these ionospheric stations operate within a narrow band spread of 20-50 megacycles, but they are as difficult to maneuver as tropospheric stations.

It has been reported in the U.S. press that high altitude nuclear explosions and the detonation of the warheads of surface-to-air guided rockets have considerable effect on communications based on the use of tropospheric and ionospheric scatter and disturb their operation for long periods of time.

Presently new ultrashortwave radio stations operating on a principle

using the ionized trails of meteorites in the upper layers of the atmosphere are almost in the operational stage in the armies of the major countries.

When analyzing the technical capabilities for providing communications in modern warfare, it should be considered that it would be difficult at present to name any universal means which would completely fulfill all requirements for controlling troops and weapons. For this reason it is very important to make use of all available means of communications, giving preference to one or another according to concrete conditions.

With the extensive use of radioelectronic devices for controlling troops, many other shortcomings appear, besides those already mentioned, which decrease the reliability of communications. Interstation interference arises between operating radioelectronic devices, especially when they are located within a limited area, as may be the case with tanks, aircraft, or ships. Thus, the development of equipment which can provide reliable communications in conditions of strong interference is a very important task for radioelectronics specialists.

In this respect work abroad is being conducted in two directions. First, measures are being taken to increase the interference-killing features of conventional radio stations by several means, in particular by using one sideband of a radiated spectrum for communications, employing more effective antennas, carefully selecting frequencies with sets which automatically search and tune them, increasing the output of transmitters and the selectivity and sensitivity of receivers, using various filtering attachments, and training specialists in the skills of working in conditions of strong interstation, natural, and man-made interference.

Second, radio communications systems are being used which are based on new principles to find a radical solution to this problem. In particular, the development of the secret and reliable systems called the Phantom by General Electric and the Rasep by Martin Orlando has been reported in the press. Both are based on the principle of using a wide frequency spectrum. They have a high resistance to interference from stations operating nearby, provide signal secrecy, and allow for high speed of transmission. According to its manufacturer, the Phantom system will function satisfactorily even when the enemy knows its general principles of operation and its operating frequencies. The Rasep apparatus has even better characteristics. Such systems greatly increase the stability of radio communications in conditions of strong interference.

Intercommunication and remote control by radio and radiorelay means in command posts is a very pressing problem. To solve this problem by laying cables in a command post, for example in a front-line field force, over 200 kilometers of cable must be laid, which requires much time, and the stability of this type of communications is very low. When control posts are being moved, this problem cannot be solved with the aid of wire communications.

Presently attempts are being made to develop radiotelephone stations which would be analogous to conventional telephone stations without connecting wires. These stations are often referred to in the press as automatic

radiotelephone systems. The AN/MRC-66 mobile radiocommunications system developed in the U.S. Army is one such radiotelephone station. The system consists of one central and 16 subscriber stations and allows duplex, two-way telephone conversations to be held simultaneously. The subscriber station equipment is installed in small vehicles. The power and, consequently, the range of these stations can be regulated. They may be operated within 15-20 kilometers of the central station.

Besides communication between functionaries of control posts, it is possible with this or a similar station to go from a subscriber station to a radio or radiorelay station to receive communications over longer distances. When similar systems are used in large control points, the number of subscribers can be increased, the mobility of the posts themselves can be improved, and certain conveniences can be obtained by using the radio and radiorelay communications channels while in movement.

Attempts to use higher frequencies in areas of radioelectronics have been noted in foreign armies. What is called the problem of closeness in either is successfully solved by transferring to these frequencies. While the transmission of a television picture is not possible by long and medium waves, a large number of high-quality radio transmissions are practical and 12 television channels can be easily used in a small portion of the meter waves. Several thousand television channels are practical with decimeter and centimeter waves. In the centimeter wave band, one transmitter has such a wide range that all radio transmissions conducted on long, medium, and short waves can be completed.

Also, by decreasing the length of the wave, the capabilities of radar and radio telemechanics are increased, since the directivity of radiation is increased, which in its turn provides higher accuracy in determining the coordinates of targets in space and greater range for radiotechnical devices.

When all of these circumstances are taken into consideration, it becomes evident that there are many possibilities presented by transferring to infrared and light rays. The amount of information which can be transmitted by one transmitter and the accuracy of determining coordinates are sharply increased in these frequency ranges.

In spite of so many obvious advantages, infrared and light rays have received very limited use until now. One of the reasons for this is the difficulty of generating and amplifying electromagnetic oscillations in these frequency ranges.

According to the foreign press, intensive work is currently being conducted to decrease the length of the waves generated by ordinary super-high-frequency generators. The development of these shorter wave lengths is based on the use of klystrons, magnetrons, and other electronic devices. The essential part of all of these generators is the cavity resonator, which must be of a size that approximately corresponds to the length of the wave of the generated oscillations. Obviously the preparation of these resonators for wave lengths smaller than one millimeter is a very complex

technical task.

Lately a completely different means, the use of maser amplifiers and generators, has been suggested to solve the problem of decreasing the length of the wave of ordinary superhigh-frequency generators. Their principle of operation is as follows. As is known, atoms and molecules are always in certain energetic conditions or, as is usually said, on certain energetic levels. Transfer from one such condition to another is accompanied by radiation or absorption of a strictly determined amount of energy. If the energy is divided into electromagnetic oscillations, their frequency depends only on the difference between the initial and final energetic condition of the atom or molecule. Consequently, electromagnetic oscillations of practically any wave length may be achieved with this method.

Generators constructed on this principle are being used extensively for communications with space ships and between space ships. When the distance between two stations is increased, the directivity of radiation must also be higher to develop sufficient voltage at the receiver input if the transmitter continues to use the same power. The inherent small size of maser generators causes them to be far superior to other generators in regard to directivity of radiation. Transformed solar energy may be used as a source of power for them. The use of maser instruments also presents significant possibilities for ground radio communications. A practically unlimited number of telephone conversations and television programs may be transmitted and received by means of one such instrument.

The use of maser instruments in radar also presents great possibilities. Ordinary radars cannot differentiate between targets located near one another because of their wide antenna radiation patterns. High directivity of radiation greatly corrects this shortcoming.

The possibility of using artificial earth satellites to increase the range of communications on ultrashortwaves was first noted by Professor P. V. Shmakov of the Leningrad Electrotechnical Institute. When the Soviet Union launched the first artificial earth satellite in 1957, the realization of this idea became practical.

Presently foreign scientists, in particular in the U.S. and England, are conducting theoretical work and often experimental tests using artificial earth satellites as passive and active relay stations. A passive communications satellite is a metallic or metallic covered sphere with a diameter of several dozen meters. When radiations from a powerful earth radio station are directed to such a metallic sphere, it becomes a source of secondary radiations which may be received at other places on the earth's surface when the artificial satellite is within their line of sight. An active communications satellite must contain reception and transmission equipment with antennas and power sources. Thus, this type of communications satellite operates like an ordinary relay station in line radio communications.

An active communications satellite may be used in either low or high orbits. When these satellites are used in low orbits they are equipped with devices to store information when passing over a correspondence station

and to transmit this information when the satellite is within line of sight of a second station.

Direct communications between ground stations by means of an artificial satellite can be achieved by placing the satellite in a high orbit. When an artificial satellite is in an orbit of approximately 5,000 kilometers, direct communications can be maintained over a distance of 4,000 kilometers. However, this communication will not be continuous since the satellite is within line of sight of a point no longer than 30 minutes when the satellite has a period of revolution of approximately 3 hours. Calculations have shown that 28 of these satellites must be launched and placed in a polar orbit at altitudes of approximately 5,000 kilometers to maintain continuous communications.

The use of an active communications satellite moving in stationary, i.e., 24-hour, orbit at an altitude of approximately 36,000 kilometers, thus completing one revolution per day, presents greater possibilities for achieving long-range communications. This satellite would always be located over the same point on the earth's surface.

Wire means of communications have undergone extensive changes chiefly under the influence of radioelectronics. High-frequency telephone and telegraph equipment which can use one two-way line to provide a large number of communications channels is finding wide use in wire communications. Balanced cables can be used for several tens and hundreds of telephone channels, and coaxial cables can handle over a thousand such telephone channels. The secondary multiplexing of coaxial cables allows them to have several telegraph communications channels in place of one telephone channel.

Special attention is being paid to the problem of mechanizing the laying of cables for wire communications. There are devices abroad which allow underground cables to be laid at a speed of 4-5 kilometers per hour. Experiments are being conducted with helicopters to increase the tempo of these operations. True, some problems are not yet solved, for instance that of joining individual operating segments of heavy cables and covering lines.

There is no doubt that with sufficient development of multiplexing equipment, wire communications will be used extensively in modern operations in connection with radiorelay communications. Their value is increased in those conditions when radio communications may be hindered by man-made radio interference and cannot be used to control troops.

The use of video communications for controlling troops is often met in literature. Fascimile radio, video telephone, fascimile television communications and television are all understood by the collective term video communications.

All of these types of transmission, except facsimile radio communications, require very wide channels and are practical only when used on multichannel radiorelay lines. In view of this, the U.S. Army doubts very much the expediency of the extensive use of television, facsimile television,

and also video telephone communications for controlling troops.

It is perfectly acceptable to use standard telephone channels for facsimile radio communications. Facsimile radio communications apparatus is now available which allows long messages to be transmitted at high speed. This equipment is especially important for the rapid transmission of maps, graphs, charts, and drawings.

In regard to television communications, certain excessively optimistic opinions, including those of the U.S. Army, have been changed to more sober judgments concerning its capabilities. Admittedly, aerial reconnaissance is the only realm in which television is now being used. Further experimentation is being conducted to develop sufficiently perfected television equipment and methods for using it for troop control.

Of course, as radioelectronic means of control are perfected, the methods of their use are modified. The development of tropospheric and ionospheric communications equipment, the evaluation of multichannel wire and radiorelay systems, and the achieved use of artificial earth satellites for communications, which have all taken place in the better developed countries, allow a global system of communications to be established which operates reliably in any conditions. Considerable attention is being paid to secret communications, the speed with which they can be set up and used, their maneuverability, and their invulnerability to fire and radiotechnical influences.

Modern communications systems will be an aggregate of technically developed nets and communications stations which are interconnected by various multichannel lines. In accordance with inherent requirements, a system of control will always be developed for each system, but all systems will be interconnected to allow troop control to be centralized in operations and battle. Finally, the development of radioelectronics makes it possible for commands and staffs to utilize modern means of warfare effectively and exercise accurate troop control.

The use of radioelectronics for control of combat means is becoming even more widespread. It is difficult to find a means of combat whose effectiveness to some degree is not dependent upon radioelectronics. It is not surprising, therefore, that the expenditures, for example, on the radioelectronic equipment of modern aircraft or spaceships is approximately half their total cost. Without radioelectronics, long-range rockets would be simply unthinkable.

The use of radioelectronics for controlling weapons and equipment is called telemechanics or radio telemechanics. In the military, telemechanics are most widely used in various systems for controlling and guiding various types of rocket weapons. They are also used in systems of autonomous control, in which all necessary equipment is installed in the missile or rocket and the flight order is determined prior to launch, and in remote control systems, in which the flight of a missile is corrected by commands or signals which are sent from ground stations. Another wide application is in homing systems in which the missile is guided to the target by signals radiated by radar apparatus on the missile and reflected by the

target itself. Finally, missiles may be guided by radionavigation equipment.

There is no need to elaborate on the importance of the role of radioelectronic equipment on guided missiles, for without it their effectiveness would be so decreased that in general their use would not be expedient. Radioelectronic equipment is also used to control surface ships, submarines, and torpedoes, and for the remote control of mine fields.

Lately the use of radio telemechanics for controlling aircraft has received wider use. This is especially important when conducting aerial reconnaissance over regions strongly protected by means of air defense and when testing new types of flying apparatus. With the high speeds of modern combat aircraft it would be difficult to vector an aircraft to a target without special radioelectronic systems. Therefore, such systems are finding ever-increasing use in both air defense and aviation.

Radioelectronic systems are used in many armies to control cannon and machine guns, particularly on ships or heavy aircraft.

The triumph of radio telemechanics is the development and use of apparatus to control the Vostok spaceships, whose launch, flight, and landing was carried out by the USSR with astonishing precision by radioelectronic equipment.

Telemechanics present important possibilities for controlling tanks, armored transporters, and other combat machines when they are passing through areas of strong radioactive contamination.

Electronic computers are a special form of the use of radioelectronics in military affairs and one of its greatest achievements. Presently many problems involved in the control of combat weapons and troops are being solved with electronic computers. Theoretical research is being conducted in the armies of the best developed countries and the first steps have already been made for developing a complex automated system for controlling troops and combat equipment.

As reported in the foreign press, several automated systems of control may be used in the armed forces, for example, in combined-arms, rocketry and artillery, rear services, or air defense systems.

It must be pointed out that communications channels which permit the transmission of large flows of information with high accuracy, for instance no more than one distortion for 100,000 characters, are necessary for the successful functioning of such a system. Thus, much effort must be directed toward replacing several existing means with more perfected ones.

Electronic computers in automated control systems can summarize, process, and visually portray data on friendly troops, enemy troops, and the character of terrain. They allow operational and technical calculations to be made on the correlation of forces; the combat use of nuclear weapons, aircraft, air defense means, and radio countermeasures; and material and technical support. Ground and aerial situations can be portrayed and various types of reference data can be received on the output devices of electronic computers.

The increasing use of various radiotechnical devices for controlling

troops and combat equipment has correspondingly increased the capabilities of radio reconnaissance, which is one of the most important aspects for providing control. During World War II German intelligence received over 70 percent of their data on the enemy by means of radio reconnaissance. Presently almost all devices used for military reconnaissance are based on the use of radioelectronics. These include radio direction finders, radars, sonars, heat-seeking devices, radio receivers of various systems, infrared equipment, etc.

Foreign armies conduct radio reconnaissance by using radio receivers for search and intercept with automatic tracking and visual display of the intercepted signal. Supplementary attachments to this equipment allow the interception of such difficult transmissions as burst, printer, multichannel, and multiplex transmissions. They can also be used for decoding and performing technical analysis of the complex forms of received signals. The location of operating transmitters can be quickly and precisely determined by means of radio direction finders.

Radiotechnical devices used for reconnaissance of various military objectives and targets are especially important. These include a multitude of various radar devices which permit the detection and surveillance of aerial, ground, or underwater targets at long range and without regard to their speed.

Air defense and radar reconnaissance would no longer be effective without the extensive use of radar. This equipment may be used to observe aircraft, cruise missiles, and ballistic rockets and to locate various kinds of combat equipment to aid in the development of necessary conditions for the destruction of these targets.

The most valuable quality of radio and radiotechnical reconnaissance is not only that it can locate targets, but that it can constantly produce the coordinates of these objects while they are in movement at long range and at high speed regardless of the time of year, time of day, or weather conditions. While radiotechnical devices are carrying out this most important function, they remain essentially unnoticed by the enemy.

There is every reason to believe that the role of radiotechnical means for conducting reconnaissance will grow in step with the extension of their use for controlling troops and combat equipment.

A great many various measures designed to suppress the operation of radioelectronic apparatus are being studied in countries hostile to us. Consider only the question of using radiotechnical equipment, as advocated by the foreign press, to interfere with enemy means for controlling troops and weapons.

As in other realms of military affairs, the role of radioelectronics cannot be overevaluated easily here. Disruption of the operation of the radioelectronic devices, for example, in antiaircraft defense and especially antirocket defense in a general sense eliminates these systems. It is not surprising therefore that the main efforts in the realm of combating enemy radioelectronic means is directed toward suppressing various radiotelemetry devices, which are the basis of the control of weapons and combat equip-

ment.

It has been noted that work is being conducted in two main areas. One area envisages the development of systems which interfere with the operation of radiotechnical devices mounted in weapons of attack. Large power transmitters deployed on the ground, in aircraft, and on ships or radiation apparatus in antimissile missiles may be used for this purpose. The other area includes tne development of means for suppressing a communications system to a degree that the necessary commands for bringing various combat complexes into combat readiness can no longer be transmitted.

Both of these methods are combined into a defined principle governing their use and are employed jointly. Since all nuclear weapons delivery systems are equipped with radiotechnical devices to some degree and since their effective use depends on reliable and accurate operation of radioelectronic apparatus, means of combating enemy radioelectronic systems receive a great amount of attention in the armies of the NATO countries. Basic emphasis is being placed on increasing the speed of detecting operating radioelectronic systems and the accuracy of their suppressing them.

Lately many books have been published devoted to such subjects as radio countermeasures, radio warfare, and combating enemy radioelectronic weapons. Often claims are made in literature concerning the possibility of completely suppressing radiotechnical devices and cutting off the control of troops and combat complexes. Of course, the perfection of means for creating radio interference and the development of methods for using them are very important tasks. However, it must not be forgotten that radiated interference not only has an effect on the radioelectronic equipment of the enemy, but on that of friendly troops. For this reason the mass usage of all means will occur only in those cases when it is not necessary to use friendly radiotechnical means which operate within the same range of frequencies. Obviously, these moments are rare in modern highly maneuverable combat action and the question of this usage of radio suppression means will have to be decided individually on the basis of the complexity of a situation.

All of these problems have caused radioelectronics specialists to explore new frequencies, other methods of generating these frequencies, and new ways for using radio interference means to derive a maximum effect without influencing the operation of friendly radiotechnical means.

The basic developmental directions for the use of radioelectronic equipment to control troops and combat equipment have been pointed out in this article. There are many other realms of military affairs where radioelectronic means are considered as an organic or very important part of equipment. Finally, it must be said that the status of the technical equipment of the armed forces, the increase in effectiveness of the means of air defense, and the status of a defensive capability are completely dependent upon the level of the development and introduction of radioelectronics.

About the Author

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Note

1. *Voyennaya mysl'*, No. 9, September 1964, FPD 896, 2 March 1965.

Comments on the Article "Augmentation of Strategic Efforts in Modern Armed Conflict"[1]

Comment by Maj Gen K. Sevast'yanov

The question of augmenting strategic efforts in modern armed conflict, examined in the article by Major General Kh. Dzhelaukhov [*Voyennaya mysl'*, No. 1, 1964],* is, in our opinion, a very urgent one.

The author correctly points out the sources and basic directions of the augmentation of the strategic efforts of stages in modern armed conflict and discloses the component elements and degree of this augmentation, including its quantitative and qualitative side. However, we are permitting ourselves to supplement several propositions of the article.

The most important point, ensuring the successful conduct of a war and rendering a decisive influence on the possibility of the timely augmentation of efforts, is seizing and maintaining the strategic initiative from the very beginning of the war. This was extremely important in the past, as the author points out. Now, when armies are armed with weapons with unprecedented destructive capabilities, possession of the strategic initiative can under certain conditions even predetermine the outcome of the war as a whole.

Only when the strategic initiative is seized at the very beginning of a war can normal conditions be established for the growth of the strategic role during its course, the necessary superiority in forces and equipment over the enemy maintained, and the goals of the war achieved most successfully.

However, in order to seize and then maintain the strategic initiative in armed conflict it is necessary, in our opinion, to possess well-organized reconnaissance, to constantly know the plans and intentions of probable enemies, to possess powerful armed forces equipped with modern weapons and combat equipment and at a level of high combat readiness, and to have state reserves of all types.

Considering the aggressive plans of the imperialist states' military leaders, one must not exclude the possibility of their unleashing a war. Seizure of the strategic initiative will proceed under the extremely complex conditions of the beginning of the armed conflict, with mutual losses, much destruction, broad zones of radioactively contaminated terrain, etc. In such a strategic situation the role of strategic reserves increases with particular sharpness.

The armed forces of the leading states now have powerful means of

*[See p. 28 of this edition—U.S. Ed.]

fighting capable of putting major groups of troops out of commission at long range which they had not had previously.

Significant strategic reserves are required to replenish these losses. Moreover, the increasing scale of armed conflict requires strong reserves for augmenting the efforts of the first strategic echelon, which will hardly be in a position to execute alone the great number of important strategic missions on the path to achieving the goals of war.

Thus, to carry out modern armed conflict successfully it is necessary to have, in addition to a strong first strategic echelon, strong and well-trained subsequent strategic echelons and the peacetime establishment of powerful state reserves. This permits the power of the first strategic echelon's strike to be increased at the necessary moment and preserves the necessary force superiority in the theaters of military operations and secures achievement of the goals of war within a short time. As a result of the coalition character of a future war the strength and equipment of strategic echelons and state reserves must now be examined not within the confines of one state but on the scale of a coalition of states.

Regarding the quantitative and qualitative aspect of strategic reserves, the qualitative aspect, in our opinion, with the existence in the armed forces of the chief states of essentially new and highly effective means of armed conflict, has now acquired a more important significance than the quantitative.

Nuclear weapons and other means of mass destruction, not manpower and conventional armament, will now play the main role in strategic groups. Hence, of course, man as the master of modern equipment and the high moral and political level of personnel as a whole will, as before, have great significance.

With the sharply increased scale of military operations the scope of maneuver by strategic reserves is also increasing. The American command, for example, suggests maneuvering them over great distances, even from one continent to another and in a very short time. In these conditions the role of mobility in troop operations in general and the movement of strategic reserves in particular increases.

The maneuver of strategic reserves in modern conditions will proceed from the very beginning under the active influence of enemy means of mass destruction. In the past the only threat of action against reserves in the depth were attacks by aircraft with conventional ammunition, which did not, by the way, much damage completion of the regrouping of troops. Now nuclear weapons and other enemy means of mass destruction can create great zones of destruction and radioactive contamination in the path of the moving troops, resulting in great losses. All this complicates effecting the maneuvering of strategic reserves to a significant degree or even wrecks it altogether. Therefore, old methods of carrying out the maneuver of strategic reserves are now in many ways unsuitable, and new, more effective ways must be sought.

As is known, the American command is proceeding in this regard by increasing the mobility of strategic reserves operations, namely by further

developing military transport aviation, by creating sufficiently simple flight vehicles with vertical takeoff and landing, in addition to air cushion vehicles, and by introducing into troop units highly mobile transport equipment reliably protected from the destructive factors of nuclear weapons.

The significance of secrecy in regrouping, from its very beginning, greatly increases in modern conditions. This is explained by the fact that the enemy has effective means of reconnaissance enabling him to detect regrouping at long range and to direct nuclear weapons against the troops effecting the maneuver.

Concealment of the regrouping is effected by maintaining strict secrecy of the plans and times for effecting the maneuver of the strategic reserves and equipment and by camouflaging the troops well while in the areas in which they are deployed and while on the march. This is achieved by skillful utilization of the camouflaging characterstics of the terrain, by the dispersed deployment of the troops and the efficient formation of march order, by the timely exploitation of limited visibility conditions, and by the application of diverse camouflaging means, in addition to carrying out radio deception, counterradar deception, and effectively combating enemy air and ground reconnaissance.

Well-organized protection against the effects of mass destruction weapons is of no small significance. It is attained by thoroughly organized radiation and chemical reconnaissance and timely warning to the troops of radiation, chemical, and bacteriological danger, by reliably protecting the troops against aerial strikes, not gathering troops in narrow places, correct use of the protective features of the terrain, and advanced training in measures for eliminating the aftereffects of the enemy attack.

There are still many other interesting questions pertaining to the problem of augmenting strategic efforts in modern conditions which, in our opinion, have important significance for additional in-depth examination of the problem as a whole and of modern armed conflict in particular.

Comment by Maj Gen N. Vasendin

Augmenting strategic efforts in armed conflict always has been and, apparently, will be the most important theoretical and practical problem.

How will this problem be resolved in modern nuclear rocket war and what role in it has been relegated to nuclear means? In discussing the article by Major General Kh. Dzhelaukhov we are expressing our opinion on this question.

The problem of augmenting strategic efforts in past wars was solved, as a rule, by establishing numerical superiority of forces and equipment on one or another sector of the front at a determined time. The composition and novelty of the means of destruction, their firepower, and the combat training given to troops has defined the qualitative side of this process. Insofar as numerical superiority was successfully established, so was the problem itself successfully resolved. Thus, in the effective utilization of

force and equipment superiority, the skill of their application in armed conflict has always been of no little significance.

One must presume that with the radically changing character of armed conflict the essence of the very concept of "augmenting strategic efforts" and methods of solving this problem have become different.

It is primarily necessary, in our opinion, to include in a modern concept of "augmenting strategic efforts" in one theater of military operations or another the very fact of the application of nuclear weapons in a given theater. Nuclear weapons are a primary and necessary means of effecting the augmentation of efforts. All remaining methods of solving this problem stem from where, when, and how much nuclear means are employed. The number of nuclear charges employed in any theater of military operations or strategic direction and their total power represents the quantitative side of the augmentation of strategic efforts.

Moreover, the power of the nuclear strikes may be accepted as a criterion for the reliability of executing the assigned missions. This criterion (K) expresses the relation of the power of actual expended nuclear charges in a given area (M_r) to the theoretically required (estimated) power (M_i), that is $K = \frac{M_r}{M_i} \leq 1$. Consequently, the closer K is to 1, the greater the probability of achieving the objectives (if, of course, all the initial data for calculation are correctly derived).

From the aforesaid it follows that the concept of the "growing strategic role" in modern armed conflict means not only, as the author of the article writes, "the capability of a given state or coalition of states to increase the strength of its resistance and at any given moment . . . to be stronger than the opposing side" [p. 24],* but primarily the ability of the armed forces of a country (or coalition of countries) to deliver nuclear blows of the required power in a given theater of military operations or in the most important strategic direction. This, in our opinion, is the basic meaning of the augmentation of efforts in modern conditions. The primacy of strategic nuclear weapons over other types of weapons is also inferred by the fact that it permits the execution of the main strategic missions simultaneously, reliably, and in any theater of war.

The augmentation of strategic efforts depends, as is known, on the character of the strategic missions executed in various periods of the war.

In modern war, if the aggressive imperialist circles unleash one, the belligerents will strive to seize the initiative and execute military-strategic missions in the shortest time by employing nuclear means from the first minutes of the war. The armed conflict will assume a fierce, devastating, and destructive character. Strikes against the military-economic areas of the belligerents, the disorganization of their rear areas, and the destruction of strategic groups of troops will comprise one of the main missions.

In the beginning period of the war augmentation of strategic efforts will be manifested not only in the changing character of the operational structure of the troops and their increase in number, but also in the skill of employment of nuclear means as a whole. Thus, the term "augmentation

*[See p. 28 of this edition—U.S. Ed.]

of efforts" must not be examined in the literal sense. The augmentation of efforts, in our view, consists in maintaining necessary strike intensity until the execution of all missions is completed.

During the course of the war, solving the problem of augmenting strategic efforts depends on the character of the armed conflict and the content of the missions directed at completing the defeat of enemy groups of troops and the occupation of his most important areas and strategic points.

Troop combat operations will develop simultaneously in several strategic directions and will be carried out in complex conditions of radiation and mass devastation. The main means of armed conflict in this period, in the interest of augmenting strategic efforts, are nuclear rocket weapons. During the course of the war the strategic role will, as a rule, be increased on basic strategic axes by delivering nuclear blows, and also by employing frontal aviation in close coordination with all branches of the armed forces. Employing the results of nuclear strikes, ground troops will be able to execute assigned missions at a high tempo.

During the course of the war, the role of all ways and methods of augmenting strategic efforts by branches and arms of the armed forces will increase.

About the Authors

Sevast'yanov, K., Major General. General Sevast'yanov was the commandant of the Baku Higher Combined-Arms Command School named for the Supreme Soviet of the Azerbaydzhan SSR in 1968. He has written several articles:

"Ways and Means of Stimulating Kursants," *Military Herald,* No. 1, January 1970.

"Daily Interest of Physical Training and Sports," *Military Herald,* No. 12, December 1970.

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Note

1. *Voyennaya mysl'*, No. 9, September 1964, FDD 89[illegible], 2 March 1965.

Operations of Tank Armies in Operational Depth[1]

(From World War II Experience)

Army Gen P. Kurochkin

Soviet military thought before World War II had already come to the conclusion that for the successful performance of an offensive operation in great depth there must be available such an organization of the army and instruments of war as would make it possible to overcome the resistance of the enemy and to defeat him both in the beginning and during the course of the operation. For this it is necessary not only to quickly break through the tactical defense of the enemy, but also to exploit with furious speed the success in operational depth all the way to the completion of the operation. Here rapid exploitation of the breakthrough is considered the most important action of the army and the front offensive operation.

Prewar Soviet military art envisaged the following ways toward solving the problem of exploitation of a breakthrough: creation of powerful striking forces in the direction of the main blow; inclusion in the operational organization of fronts and armies of special echelons for exploitation of a breakthrough, consisting of mobile formations (mechanized and cavalry corps) and airborne troops; and creation of powerful reserves and second echelons. However, our prewar theory of the solution of the problem of exploiting a success in an operation, although fundamentally correct, found no practical support in our military buildup.

As a result of the influence of the cult of personality and incorrect evaluation of the experience in the war in Spain, serious errors were permitted in the organization of our armed forces. Mechanized corps, which were the chief means of exploiting a success, were broken up shortly before the beginning of World War II, and in the training of troops before the war, main attention was paid to problems of breaching long-term enemy defenses. (Mechanized corps were reestablished only on the eve of World War II, and it was not possible to train them completely by its beginning.) As a matter of fact, the problem of exploiting a success by the combat use of tanks and other instruments of battle was studied very little, and our command personnel had little experience with this, which undoubtedly led to unfavorable consequences.

World War II was a most important stage in the development of military theory and the use of the most suitable methods of operations of troops. Methods of operational exploitation of a breakthrough were con-

stantly being perfected, depending on changes in the quantity and quality of means of armed conflict, the nature of the preparation for and subsequent stages of an operation, and the increase in the organizational abilities of Soviet military commanders. In the first period of the war and in the beginning of the second, exploitation of a breakthrough was carried out by combined-arms armies, which for this used separate tank brigades and cavalry corps, which were later attached to these armies for strengthening the tank and mechanized corps. Tank armies of mixed composition were more adapted to exploitation of a breakthrough, but only by a part of their forces—the tank and cavalry corps. (Mixed tank armies were composed of tank corps and also infantry divisions. Also, cavalry corps were sometimes added to these tank armies.) Their other part, the infantry divisions, was used also, like the divisions of a combined-arms army, primarily for a breach of the enemy's defense. Thus, of heterogeneous composition, they with their own forces both broke through the enemy's defense and advanced in operational depth, which in fact split them into two parts and undoubtedly had an adverse effect on the speed with which they carried out missions in operations.

In the summer and autumn campaign of 1943 the function of operational exploitation of a breakthrough was transferred, in the main, to the front. In the composition of the latter appeared such new (for that time) powerful mobile operational field forces as tank armies of homogeneous composition. At the same time they continued to strengthen also the combined-arms armies with means (mobile troops) for exploiting a breakthrough.

Problems of the mission and use of tank armies in offensive operations of World War II have already been elucidated to some extent in the military press. In this article we will try to carry on the discussion on a somewhat different plane: from the experience of offensive operations of the Soviet Army in 1943-1945 we will examine the operations of tank armies in operational depth, emphasizing generalization of this experience and determining what we can learn from it for present-day conditions.

It should be emphasized that such characteristics of modern combat operations as decisiveness; great maneuverability; speed of movement; their development on a wide front, in great depth, and at rapid tempos; the increased importance of the march; and rapid and abrupt changes in the situation are not absolutely new. They existed to a certain degree in the operations of mobile troops and especially of tank armies in offensive operations of the last war. Now such operations are typical not only for tank troops but also for motorized infantry troops. Of course, radical changes have taken place in the conduct of a battle or an operation, brought forth by the use of nuclear weapons, rockets, and other new means of warfare. Therefore the general character of combat operations unquestionably cannot at all be compared with the past. We are concerned only with those operations of tank armies which can undoubtedly still be instructive for tank and motorized infantry troops.

With the appearance of tank armies of homogeneous composition, it

became possible to establish new relations, quantitatively and qualitatively, of the front echelons for exploitation of a success. As a result, the number of tanks taking part in operations and the depth of the operational disposition of the front greatly increased, which made it possible not only to intensify the attack correspondingly, but also to exploit a breakthrough at high tempos with decisive overcoming of the resistance of the enemy and defeat of reserves he brings up piecemeal from the march. (Having mechanized corps, in addition to tank corps, tank armies required that they include some motorized infantry.) The use, in offensive operations for exploitation of a success in operational depth, of tank armies in addition to tank and mechanized corps greatly influenced the change in the nature not only of front offensive operations, but also of the operations of groups of fronts. (In the Belgorod-Khar'kov, Bug-Dnestr, L'vov-Sandomierz, Wisla-Oder, Berlin, and other operations two or three tank armies were used, with strong air support.) The decisiveness and scope of operations was increased; their duration was decreased; combat operations of troops became much more dynamic and fast-moving.

Experience in the use of homogeneous tank armies in operations deserves attention even under present-day conditions. With the sharp increase in the depth of operations, their fast-moving and rapidly changing character, and the use in them of nuclear and other new weapons, it seems to me that some concrete situation or other may make it necessary to use not only mixed, but also homogeneous operational and tactical groups of forces. In this connection, naturally corresponding homogeneous tactical and operational elements—tank and motorized infantry, for example—may also be required.

In the last war, tank armies, cavalry and mechanized groups, and separate tank and mechanized corps, out of which were constituted echelons for the exploitation of a success, caused the appearance of new methods (new for that time) of operations of troops in operational depth. These mobile operational groups developed the attack and carried on the pursuit, as a rule, on separate axes, independent of the main forces of the fronts and armies, forced water barriers from the march, seized and expanded operational bridgeheads, and overran enemy lines of defense in depth, from the march, and with preparation in limited periods. Under such conditions, the combined-arms armies were also able to advance quickly behind the tank armies, which led to a completion of their missions in shorter periods. Experience from such operations, in our opinion, still has not lost its validity.

All these and other characteristics of the offensive operation did not arise all at once. In the second period of the war, due to lack of the necessary experience in the use of tank armies, and also in connection with the inadequacy of organization (we have in mind tank armies of mixed composition), their operations still did not provide the desired results. Only as the production of tanks increased, organization was perfected, and experience was gained in the use and operations of tank armies did they begin more successfully to carry out the missions of exploitation of a

breakthrough, and from the summer of 1943 they occupied a leading place in the operational organization of fronts.

Being of homogeneous composition (mainly tank and mechanized corps), the tank armies represented a real force, the correct use of which opened the way for still more rapid development of an offensive at high tempos, and for carrying on a number of subsequent operations in great depth, with the infliction of a complete defeat on the enemy operating on the axes concerned. To be sure, the exploitation of a tactical success in operational depth and a further continuous offensive in great depth were not carried out just by tank armies, cavalry and mechanized groups, and mobile forces of combined-arms armies. Front and army second echelons and reserves also were used for this purpose. However, lacking sufficient mobility, they could not have the same effect on the character of the operation as did the tank armies. For example, when there were still no tank armies in the fronts, the depth of offensive operations usually varied from 100 to 150 kilometers. In the second and third periods of the war, the depth of operations of fronts which included tank armies was 300-500 kilometers a day. The average rate of advance in the first case was 10-15 kilometers a day, and in the latter, 40-50 kilometers a day, and in certain operations amounted to 70-80 kilometers a day.

What is to be learned from the experience of the operations of tank armies, it seems to us, is that now also separate tank groups can be established and can function independently during operations, to a great extent separate from the main attacking forces. Also, certain missions which tank armies carried out, and ways in which they operated, can take place now with changes appropriate to new conditions of conducting operations.

In operations at operational depth tank armies carried out the following basic mission: defeat of enemy operational reserves, and primarily his tank and mechanized forces; the swift development of an attack at high tempos with maneuver for encirclement of enemy groups and the creation of an external, less commonly an internal, front of encirclement, in cooperation with other forces; pursuit of a retreating enemy, with forcing of water barriers and breaking through lines of defense; the disruption of the command and disorganization of the rear of the enemy; the seizure of important operational zones and objectives in the enemy's depth; and others.

One could scarcely deny that similar missions could be performed by tank groups under present-day conditions.

Or let us take the methods of operations used by the tank armies. Among the most typical of them is the delivering of a powerful attack with the development of an offensive on axes in depth, or toward the flank with the aim of bypassing a large enemy grouping, and then encircling and destroying him in cooperation with mobile forces and combined arms of other fronts (the 6th Tank Army of the 1st Ukrainian Front and the 5th Guards Tank Army of the 2nd Ukrainian Front in the Korsun'-Shevchenkovskiy operation; the 5th Guards Tank Army and other mobile forces of

the 3rd Belorussian Front together with the 1st Guards Tank Corps of the 1st Belorussian Front in the encirclement of groups of the enemy east of Minsk; etc.).

The delivering of powerful attacks by tank groups, including attacks on converging axes, may be typical under modern conditions. Here, we must assume, their operations following nuclear attacks will be still more swift.

Tank armies carried on an offensive in converging directions also within the limits of one front, but much less often and only in those cases when the front was launching two attacks, as happened in the L'vov-Sandomierz operation of the 1st Ukrainian Front. (It is noteworthy that of the most important offensive operations of World War II with encirclement of the forces of the enemy, 22 were carried out by the forces of groups of fronts, and only 8 by a single front.)

Tank armies also delivered powerful frontal attacks in great depth, with the aim of splitting up the enemy forces and defeating them piecemeal. Such operations provide for a furious attack by mobile groups of one or more fronts on various axes. The operations of tank armies of the 1st Ukrainian Front in the Proskurov-Chernovtsy operation, of the 2nd Ukrainian Front in the Uman'-Botosani operation, and of the 1st and 2nd Tank armies of the 1st Belorussian Front in the Eastern Pomeranian operation may serve as examples.

Such attacks, delivered by the tank armies of several fronts, resulted in the splitting and fragmentation of the defense of the enemy. Especially instructive in this respect were the operations of the 1st and 2nd Guards Tank Armies of the 1st Belorussian Front and the 3rd Guards and 4th Tank Armies of the 1st Ukrainian Front in the Lodz and Czestochowa sectors in the Wisla-Oder operation. As a result of the furious attack of our troops, the forces of the enemy's Army Group A were split up into three isolated groups: those of Warsaw, Kielce-Radom, and Krakow.

The delivering of deep splintering attacks by tank groups has become an even more characteristic phenomenon in modern operations, with the depth of these attacks, like the depth of the operations, having now sharply increased, which favors the massed use of nuclear weapons, air forces, and airborne attacks.

Just as in the past, various methods of operations of tank groups may be combined or used in turn. An example of combination is the L'vov-Sandomierz operation. In it, the 1st Ukrainian Front launched two attacks: in the Rava Russkaya and the L'vov section. For exploitation of the success after the breach of the enemy's defense, two strong tank groups were formed in the front: into the composition of one went the 1st Guards Tank Army, into that of the other, the 3rd Guards and the 4th Tank Armies. (In the composition of tank groups of the front there were, in addition to tank armies, also calvalry and mechanized groups and separate tank and mechanized corps.) These armies launched deep salient thrusts, in the course of which they surrounded with a part of their forces the Brody group of the enemy.

The use in turn of various methods of operations of tank armies took place in the Belorussian operation, where, after surrounding the enemy east of Minsk, the 5th Guards Tank Army launched a deep salient thrust against Vilnius and Kaunas. The 6th Tank Army operated in a similar way in the Iasi-Kishinev operation. During the Proskurov-Chernovtsy operation, three tank armies first launched a salient thrust, and then a group of the enemy was surrounded in the Kamenets Podol'skiy region.

In the operations of World War II, front echelons for the exploitation of a success achieved the best results with the massed use of tank formations and field forces on the principal axes, with their echelonment in depth. Committing to action in the chosen sector first the mobile groups of combined-arms armies, and then the front echelons for the exploitation of a success—tank armies, cavalry and mechanized groups, and tank and mechanized corps—provided for a steady increase in the force of the attacks during the operations.

In most operations of World War II tank armies of front echelons were used for the exploitation of a success and operated on one general axis, and only in individual cases, on different axes (when the front was launching two attacks, or when in the course of a tank army operation, due to changed circumstances, it became necessary to continue an attack on divergent axes).

With the aim of creating large tank groupings, there was also the practice of joint use of tank armies on the contiguous flanks of two fronts. This was characteristic of the operations of the second period of the war, with there being, as a rule, one tank army in each front (the 3rd Guards Tank Army of the Bryansk Front and the 4th Tank Army of the Western Front in the Orel operation, etc). Even in a number of operations, of the third period of the war the efforts of several tank armies of one or two fronts were combined for carrying out major missions. Thus it was in the Korsun'-Shevchenkovskiy operation, in which three tank armies of the 1st and 2nd Ukrainian Fronts were concentrated on the outer front of encirclement to repulse the counterattacks of the enemy. At the conclusion of the L'vov-Sandomierz operation the efforts of all three tank armies of the 1st Ukrainian Front were directed toward the seizure, expansion, and holding of the Sandomierz bridgehead.

Some data on the composition of tank groupings of fronts and information on their operations are provided in table 1.

From the table it is evident that greatest success in operations was achieved with the existence in the composition of fronts of large tank groups which operated on the principal axes.

In a number of cases, to increase the force of attacks in the course of an operation, one front or another would be reinforced with a tank army from the reserve of the Stavka of the Supreme High Command (the Bryansk Front, with the 3rd Guards Tank Army, in the Orel operation; the 1st Ukrainian Front, with the 2nd Tank Army, during the Korsun'-Shevchenkovskiy operation), or by transferring a tank army from another front (the 1st Tank Army to the 2nd Belorussian Front in the Eastern

Pomeranian operations, etc.).

Thus the concentration of the efforts of several tank armies in most cases was completely justified, inasmuch as under these conditions the striking power of the mobile forces was sharply increased, as was their operational independence, which enabled them to make deeper thrusts, maneuver extensively, attack at high tempos, and attain the final goals of operations in short periods. Besides, this provided for uninterrupted participation of tank armies in subsequent operations carried out within the frameworks of strategic operations of groups of fronts, without long operational pauses.

The creation and use of large tank groups may be expedient now, too, considering the added factor of the increased depth of offensive operations. In addition, the mass use of nuclear weapons creates exceptionally favorable conditions for swift, vehement operations. At the same time these groups may suffer great losses from the nuclear weapons of the enemy, and it will be necessary to strengthen them, but not just by committing to action fresh infantry forces, as used to be the case, but first of all by delivering nuclear attacks, by subordinating to them nuclear weapons units held by higher commands, by transferring motorized infantry troops by air, and by launching airborne attacks. In many cases, especially in large-scale offensive operations, several large tank groups may, just as formerly, be used and operate simultaneously or in succession.

Experience in sending tank armies into action in the course of an operation is instructive. For example, with several tank armies in the striking group of a front, depending on the plan of operation and the circumstances, they were sent into action simultaneously or one after the other in one sector, or if the front were launching two attacks, in two sectors (the 1st Belorussian and the 1st Ukrainian Fronts in the Berlin operation). In the L'vov-Sandomierz operation of the 1st Ukrainian Front, two tank armies (the 3rd Guards and the 4th) operated in one of the main sectors; they were sent into action one after the other. This made it possible to increase the effort from depth for the exploitation of a success, but on a narrow front, while simultaneous use of tank armies on several axes provided for the development of a decisive offensive on a wider front.

The exploitation of a success by tank armies usually began after a breakthrough by combined-arms armies of the main zone or the whole tactical zone of defense of the enemy, and was carried on in great depth. But often the tank army corps from the beginning attacked together with the units of the combined-arms armies, "completely breaking through" the enemy's defense, and thereafter they gradually operated more and more separately, exploiting the success in operational cooperation with the combined-arms formations, with air support.

Now, differing from this, large tank armies probably will immediately exploit the results of massed nuclear attacks and will swiftly develop an offensive from the very beginning of the operation. In many cases, just as formerly, tank groups may operate for some time jointly with motorized infantry, gradually outdistancing them and attacking independently, at a

Table 1.

Offensive Operations	Fronts	Tank Armies (TA)	Tank Army Composition [Key: tc — tank corps, cc — cavalry corps, mc — mechanized corps, tk — tank, bde — brigade, cav-mech — cavalry-mechanized]	Other Mobile Troops In Front Composition	Several Indicators During Tank Army Actions		
					Average Rates of Offensive	Maximum Rates of Offensive	Maximum separation from combined-arms army
Counteroffensive in Battle of the Volga (Nov 1942)	Southwest	5th TA	1st & 26th tc, 8th cc, six inf divs, one tk bde	4th tc	32	40-45	up to 40
Ostrogozhsk-Rossosh (Jan 1943)	Voronezh	3rd TA	12th & 15 tc, 7 cc, three inf div, one inf bde	4th tc	28	40-50	15-25
Orel (Jul-Aug 1943)	Western	4th TA	11th & 30 tc, 6th Gds mc	1st, 5th & 25 tc	4-5	up to 18	10
	Bryansk	3rd Gds TA	12th & 15th tc, 2d mc	1st Gds & 20th tc	5-6	up to 20	20
Belgorod-Khar'kov (Aug 1943)	Voronezh	1st TA	6th & 31st tc, 3rd mc	5th Gds & 2d Gds tc	30	35	up to 40
	Steppe	5th Gds TA	18th & 29th tc, 5th Gds mc	1st mc, 4th Gds tc, 3rd 5th Gds, & 7th cc	20	28	30
Kiev (Oct-Dec 1943)	First Ukrainian	3rd Gds TA	6th & 7th Gds tc, 9th mc	1st Gds cc, 5th Gds tc	15	40	20
Korsun'-Shevchenkovskiy (Jan-Feb 1944)	First Ukrainian	6th TA	5th Gds tc, 5th mc		Offensive jointly with the combined-arms armies		almost none
	Second Ukrainian	5th Gds TA	18th, 20th, 29th tc	5 Gds cc	20	40	40-50 (lead tank bdes)
Proskurov-Chernovtsy (Mar-Apr 1944)	First Ukrainian	4th TA	11th Gds tc, 8th Gds mc, 64th sep tank bde		18-20	up to 30	10-15
		3rd Gds TA	6th & 7th Gds tc, 9th mc	4th Gds tc	15-20	30	10-15
		4th TA	10th Gds tc, 6th Gds mc		up to 20	25	up to 15

Table 1.

Offensive Operations	Fronts	Tank Armies (TA)	Tank Army Composition [Key: tc — tank corps; cc — calvalry corps; mc — mechanized troops; tk — tank; bde — brigade; cav-mech — cavalry-mechanized]	Other Mobile Troops in Front Composition	Several Indicators During Tank Army Actions		
					Average Rates of Offensive	Maximum Rates of Offensive	Maximum separation from combined arms army
Uman-Botosani (Mar-Apr 1944)	Second Ukrainian	2d TA	3rd & 16th tc, 11th Gds tk bde		23-27	50-60	15-17
		5 Gds TA	18th, 20th & 29 tc		20-25	30-40	15-20
		6 TA	5 Gds tc, 5th mc		up to 20	30-35	15-20
Belorussia (Jun-Aug 1944)	Third Belorussian	5th Gds TA	3rd Gds tc, 29th tc	2d Gds tc, cav-mec grp (3rd Gds mc, 3rd Gds cc)	25-40	up to 55	more than 40
	Belorussian	2d TA	3rd & 16 tc, 3rd Gds tc	9th & 11th tc, 4th mc, 4th Gds cc, 1st Gds tc	up to 40	60	40-45
L'vov-Sandomierz (Jul-Aug 1944)	First Ukrainian	1st TA	11th Gds tc, 8th Gds mc	two cav-mech grps (25th & 31st tc, 1st Gds & 6th Gds cc), 4th Gds tc	25-30	up to 55	30-40
		3rd Gds TA	6th & 7th Gds tc, 9th mc		25	50-60	up to 60
		4th TA	10th Gds tc, 6th Gds mc		20-25	40-50	up to 55
Iasi-Kishinev	Second Ukrainian	6th TA	5th Gds tc & 5th mc, then 18th tc	Cav-mec grp (25th tc and 5th Gds cc), 18th tc	40-50	up to 70	60-70
Wisla-Oder (Jan-Feb 1945)	First Belorussian	1st Gds TA	11th Gds tc, 8th Gds mc	9th & 11th tc, 2d Gds and 7 Gds cc	30-35	70-80	100 plus
		2nd Gds TA	9th Gds & 12th Gds tc, 1st mc		40	up to 90	90 plus
	First Ukrainian	3rd Gds TA	6th & 7th Gds tc, 9th mc	4th Gds, 25th, 31st tc, 7 Gds mc, 1st Gds cc	25-35	up to 50	40-60

		4th TA	10th Gds tc, 6 Gds mc		25-35	40-50	50 plus
East Prussian (Jan-Feb 1945)	Second Belorussian	5th Gds TA	10th Gds & 29 tc	1st & 8th Gds tc, 8th mc 3rd Gds cc	18-20	40 plus	10-30
Vienna (Mar-Apr 1945)	Third Ukrainian	6th Gds TA	5th Gds tc, 9th Gds mc	23rd & 18 tc, 1st Gds mc	9-17	25	almost none
Berlin (Apr-May 1945)	First Belorussian	1st Gds TA	11th Gds tc, 8th Gds mc 64th Gds tank bde	9th & 11th tc, 2d Gds & 7 Gds cc	8-10	20	almost none
		2d Gds TA	9th Gds & 12 Gds tc, 1st mc		up to 10	20-	Same as above
	First Ukrainian	3rd Gds TA	6th & 7th Gds tc, 9th mc	1st, 25th, 4th Gds tc, 7th Gds mc, 1st Gds cc	30-35	up to 50	40-45
		4th Gds TA	10th Gds tc, 5th Gds & 6th Gds mc		30	40-50	45
Prague (May 1945)	First Ukrainian	3rd Gds TA	Same as above	25th tc, 4th Gds tc, 1st Gds cc	up to 60	80-90	80-100
		4th Gds TA	Same as above		up to 60	80-90	80-100
	Second Ukrainian	6th Gds TA	5th Gds tc, 2d Gds & 9th Gds mc, 83 mtr rif bde	1st Gds cav-mech group (4th, 6th Gds cc, 7th mc)	70-90	120	up to 100
Manchurian (Aug-Sep 1945)	Transbaykal	6th Gds TA	5th Gds tc, 7th mc, 9th Gds mc, 36th & 57th mtr rif div, six mtr rif bn, one mtr rif bde, five tank brigades	Cav-mech grp (25th mech bde, 43rd tank bde, four cav div, one tank regt)	approx 100	150-160	70-90

considerable distance from them. Along with the tank groups, some motorized infantry formations may also be separated.

The vehement operations of tank armies to a considerable degree made possible the successful execution of operations of encirclement and destruction of large operational groups of the enemy. This operation was fairly complicated and required the participation of sizable forces, usually of several fronts. In the Soviet Army during World War II encirclement became the basic, leading form of offensive operations. They attained the greatest success primarily due to the rapid arrival of mobile forces in the rear of the surrounded enemy group and as a result of repelling enemy attempts to free his encircled forces.

Tank armies accomplished the encirclement maneuver immediately after the breach of the tactical zone of defense of the enemy, with the development of the attack in operational depth during pursuit, when the enemy was beginning to withdraw his forces. In all these cases the tank armies, independently or in conjunction with mobile groups of combined-arms armies, took part in the establishment of an external or, less commonly, an internal front of encirclement. With the arrival on the internal front of encirclement of infantry troops, the mobile units, as a rule, were freed for action on the external front.

The operations of tank armies on the external front of encirclement were instructive. Sometimes they, together with the troops of other arms, went on the defensive, forming a fixed external front. But more often these armies continued the offensive and, swiftly developing it, comparatively quickly increased the distance between the external and internal fronts. A sizable increase in the distance between these two fronts made it possible to prevent the maneuver of operational reserves of the enemy and to destroy them piecemeal as they approached from the depth; at the same time it gave freedom of action to the combined-arms armies for the defeat of the encircled groups and resulted in a more rapid liquidation of them.

Thus, in the Iasi-Kishinev operation, by decision of Marshal Malinovskiy, commander of the forces of the 2nd Ukrainian Front, the 6th Tank Army, in cooperation with a cavalry and mechanized group, continued a furious offensive and as a result drove back the enemy 80 to 100 kilometers from his encircled groups, which deprived him of the possiblity of helping the encircled forces and made possible their rapid defeat.

In an offensive at operational depth the tank armies carried out combat actions with great maneuvering; skillfully, with all or part of their forces, executed flanking movements or envelopments; launched attacks on the flank or rear of enemy groups; and frequently accomplished maneuvers from some axes to others, traversing great distances in their movement. Unquestionably, the experience of these operations is useful for present-day operations of troops, still more dynamic and involving still more maneuvering.

Especially important now are the marches of troops for great distances and their rapid deployment and entry into combat from the march.

We should like to call attention to the lessons to be learned from the maneuvers of the 3rd Guards Tank Army during the Wisla-Oder operation. Having advanced to a great depth and continuing to develop the attack, by decision of Marshal I. S. Konev it made a sharp turn to the southwest and launched an attack on Oppeln and then on Nikolay, as a result of which the Silesian group of the enemy was enveloped from the north and northwest, and we succeeded in almost completely cutting off his communications. This played a decisive role in the conquest of Silesia. This same army, together with the 4th Guards Tank Army of the 1st Ukrainian Front, after completion of the Berlin offensive, was abruptly turned to launch an attack on Prague, which accelerated the defeat of the Prague enemy groups.

These and many other examples confirm that in the offensive operations of the past war the great maneuverablity and striking power of the tank armies was clearly demonstrated, which was of primary importance in assuring success of operations.

Modern tank forces have progressed far in their development, and their combat and maneuver capabilities can by no means be compared with the tank forces of World War II. Having modern instruments of attack, higher quality material and armament, and using new methods of operations appropriate to the conditions and nature of nuclear warfare, they are capable of carrying out any missions assigned to them. But it is useful for them to consider the experience of the vehement operations of tank armies and to a certain extent utilize this experience. This relates especially to the operations of tank armies in the pursuit of the enemy in operational depth (this began, as a rule, in from 2 to 5 days of the operation). It was precisely in this pursuit that the tank armies achieved the greatest results in the exploitation of a success, demonstrating to a maximum their maneuverability and mobility.

Thus, while the average daily speed of advance in most operations amounted to 20-40 kilometers, in pursuit it reached 40-70 kilometers, and in a number of operations, even 100 kilometers, Such speed of pursuit was provided by the uninterrupted nature of the operations of tank armies. They advanced during the day with their main forces and at night, mainly with advance detachments. During that time the main forces of the armies accomplished their marches and made ready for further action. In operations of the third period of the war, the speed of pursuit was so high that it exceeded the speed of retreat of the enemy. In these circumstances, as is evident from table 1, tank armies most often operated mainly independently, to a great degree detached from the infantry units of the combined-arms armies.

The speed of advance of troops, especially of tank groups, will be still higher under modern conditions. In this connection, there arises especially sharply the problem of the uninterrupted action of troops, day and night, despite their having to pass through zones of destruction and areas of radioactive contamination. It must be expected that the highest speeds of advance will be in sectors where the enemy is being subjected to nuclear

blows, including some from the very beginning of the operation.

It is noteworthy that tank armies, depending on circumstances, more often carried out parallel—less often, frontal—pursuit, or both in combination. In many cases the pursuit was carried out by combined-arms armies from the front, and by mobile forces on routes parallel to the retreat of the enemy. Parallel pursuit was the most decisive and advantageous. In this the tank armies made a headlong rush, prevented the enemy from moving into prepared zones of defense in his depth, intercepted communication lines, struck blows on his flank and the rear, defeated his operational reserves piecemeal (as they moved up from the depth), and from the march broke through operational defense zones and forced water barriers.

Especially instructive, it seems to us, is the fact that in most cases the tank armies pursued the enemy in dispersed formations and even in columns of the march, deploying in combat formations only on meeting the enemy. The strong advance detachments played a great role in this; they were selected from the tank and mechanized corps. In many cases they had a greater complement than usual and were assigned missions of operational importance. (In the composition of such an advance detachment most often there operated a tank brigade, reinforced by a self-propelled artillery regiment, one or two battalions of artillery and up to [one] engineering battalion, and sometimes infantry subunits.) These detachments, operating ahead of the main forces at a distance of up to 40 kilometers and more, did not become involved in protracted battles with the enemy, but bypassed his centers of resistance and hastened on to objectives subject to capture. First among such objectives were intact bridges, especially across large rivers, fords, and bridgeheads. There is no doubt that the role and importance of the advance detachments now will not only persist, but become still greater, with their being called on to execute missions taking advantage of the results of nuclear strikes, in cooperation with airborne troops, making possible the swift advance of their own forces.

It should be noted that in the last war great haste was always made to seize river crossings and bridgeheads, because crossing a river in force was for a tank army a difficult task, and accomplishing it was of great importance for attaining high speeds of advance. The fact is that tank armies did not have available enough of their own river-crossing equipment; what was assigned to them very often lagged behind, as it was comparatively not very mobile. So one of the basic missions of the advance detachments was the seizure of river crossings, which made possible more rapid crossing of the river by the main forces of the tank armies.

Modern tank forces have incomparably greater possiblities of crossing rivers, both with the aid of various mechanized river-crossing equipment, and by themselves—under the water. All this makes possible a still more rapid overcoming by them of water barriers, as a rule, from the march, without decreasing the general speeds of advance and even without seizing bridgeheads, which they used to have to do.

One of the main missions of tank armies in operations in operational depth deserves attention—that of defeating the operational reserves of the enemy. No offensive operation could do without the repulse of counterattacks or counteroffensives of large groups of the enemy, amply supplied with a great number of tanks and motorized and mechanized forces, and with strong air support. It was the tank armies, operating ahead of the main forces of the front, upon which first fell the blows of these groups. We must assume that in present-day operations large tank groups, operating separately from the rest of the attacking forces, will be the first to suffer the powerful and active effects of the enemy's action, and not only of his infantry, but primarily of the delivery of massed nuclear blows by his air force and rockets.

In many cases the tank groups will have to repulse powerful counterattacks and counteroffensives of the defending forces. In the past, successful accomplishment of these missions was an important condition for rapid exploitation of a success in depth and the attainment of the goals of the operation; it was often necessary to engage large groups of tanks and motorized infantry of the enemy. Some data on the strength and composition of these groups is provided in table 2.

Compiled from data of military-historical works published by Voyenizdat

Table 2

Operation	*Initiation of Counterblow*	*Enemy Composition*	*Number of Tanks*
Proskurov-Chernovtsy	8 Mar 44	Tank Div — 2 Inf Div — 3	Up to 250
Korsun'-Shevchenkovskiy	4 Feb 44	Tank Div — 8 Inf Div — 4	450
During Baltic Offensive	16 Aug 44	Tank Div — 7 Inf Div — 5	750
L'vov-Sandomierz	11 Aug 44	Tank Div — 7 Inf Div — 6	800 plus
Near Lake Balaton	6 Mar 45	Tank Div — 7 Inf Div — 5	1630

As is learned from operational documents captured from the enemy, the mission of his tank groups usually included the breaking up of our offensive operations. The tank armies accomplished the defeat of these groups of the enemy independently in cooperation with the air force or jointly with combined-arms armies by carrying on meeting engagements or active defensive operations.

As a rule, tank armies carried out meeting engagements (which now are even more typical than in the past) with the development of an offensive in operational depth and in the culminating stage, and only sometimes at the beginning of an operation. Such engagements were distinguished by decisiveness, dynamic quality, and variety of methods of combat operations, and not infrequently were purely tank operations. The attainment of success in them was mainly made possible by the timely discovery of the advancing enemy groups, forestalling them in deployment, and inflicting attacks by the main forces of the tank corps and armies from the march on the flank of the enemy with air and artillery support.

With regard to defensive operations of tank armies in operational depth, these were more often carried out with the completion of front offensive operations, in those cases when there had not been success in defeating the advancing reserves of the enemy in a meeting engagement, or when, according to reconnaissance data, superior enemy forces were coming up to the battlefield and a further offensive had become temporarily inadvisable. Going over to the defensive was carried out under difficult and strained circumstances, under heavy pressure from enemy air and land forces, on ground which had not been organized by the engineers, and in a limited period of time. Simultaneously the tank armies carried out a regrouping with the aim of creating a powerful group for the defeat of the enemy. Thus it was in the conduct of defensive operations of 5th Guards and 6th Tank Armies on the external front of encirclement of the enemy in the Korsun'-Shevchenkovskiy operation; of the 1st and 3rd Guards and the 4th Tank Armies in the Sandomierz bridgehead; and in other cases. In the course of such defense, tank armies carried on active, including offensive, operations with part of the forces. For example, in the Sandomierz bridgehead, while repulsing enemy counterattacks, the tank armies undertook decisive offensive actions, and even surrounded and destroyed parts of the enemy's counterattacking groups.

Under present conditions carrying out defensive actions has become extremely complicated, primarily because of the use of nuclear weapons by the enemy, creating an extensive zone of destruction and radioactive contamination of the terrain. It will be necessary to eliminate the consequences of enemy nuclear strikes and to replace those units which have been greatly weakened, or reinforce them. Under these conditions, previous experience in carrying out defensive actions by tank armies, both independently and jointly with units of combined-arms armies, has, in our opinion, only relative value.

Experience has shown that an important condition for successful operations of tank armies in operational depth is their organized entry into battle. And it was not just chance that in many operations a good deal of time was spent in preparation for this entry into battle—at least several days.[2] We always strove to break through the defense just with infantry divisions of combined-arms armies, with artillery and air support, and to commit the tank armies to battle after the whole tactical zone had been overcome. Unquestionably, this way of commitment to battle was the

more expedient to the extent that the tank armies were able to move out immediately into operational space and quickly develop a headlong offensive in great depth.

At the same time, most frequently tank armies were committed to battle with the participation of their forces in the completion of the breakthrough of the tactical zone or even the main zone of defense of the enemy. This, undoubtedly, was a less desirable version, but we cannot, in our opinion, evaluate it negatively only. This version of committing tank armies to action was often completely appropriate to the circumstances which had arisen, when the infantry divisions, because of lack of close infantry support tanks and the existence of an enemy defense strongly fortified and echeloned in depth, were unable to break through it in a short period. And if the breakthrough was delayed, this inevitably used up time which the enemy took advantage of to increase his efforts in his threatened sectors. This way the effort to commit tank armies to battle only after the breach of the tactical zone of defense by the infantry, in certain circumstances often led to a delay in commitment of the tank armies and to undesirable consequences. Thus it was, for example, with the 4th Tank Army in the Orel operation: delay in bringing in the tank forces for completion of the breakthrough enabled the enemy to get organized after the first attacks of our forces and again to set up a strong defense. Naturally there could be no thought of any success of the operations of a tank army in those circumstances, since it was unable not only to exploit a success, but even to complete a breakthrough of the defense; actually, it had to start all over again.

In noting the necessity and expediency in many cases of having a part of the forces of the tank armies participate in the completion of a breakthrough, we do not have in mind the premature commitment of all their forces, as happened, for example, in the Berlin operation, in which the 1st and 2nd Guards Tank Armies could not be separated from the combined-arms armies and had to operate jointly with them during the whole operation. To be sure, the strongly fortified defense of the enemy in the Berlin sector had a great effect on the operations of our forces in that operation. But just the same, in our opinion it was not necessary to commit all the forces of both tank armies within the limits of the main zone.

One of the most interesting and instructive examples was the commitment to combat of the 3rd Guards and the 4th Tank Armies in the L'vov-Sandomierz operation. By the time of their entry into the zone of the 1st Ukrainian Front a difficult situation had been created, as follows: it had been possible to accomplish a breakthrough of the enemy's defense at the beginning of the operation only in the zone of the 60th Army, with the front of the enemy breached in only a narrow sector. This was a corridor not exceeding 5-6 kilometers along the front. By this time the enemy, continually intensifying his resistance, had begun to bring up his immediate operational reserves. As a result there arose a threat of the disruption of the offensive operation of the front. In these circumstances the commander of the forces of the front made, in our opinion, a bold and correct

decision: to move into the gap not only the 3rd Guards Army, which had been predesignated for this, but also the 4th Tank Army (the latter was meant to be sent into action to the left, in the zone of the 38th Army's offensive). In addition, the front air forces (2nd Air Army) were skillfully utilized to assure the development of the operation; they struck massed blows at the Koltuva and Plugskaya groups of the enemy.

The results were soon apparent: the enemy did not expect this and was stunned. By decisive actions, both tank armies, and the cavalry and mechanized group which had been brought in here, with part of its forces, jointly with the infantry corps of the 60th Army, finally broke the resistance of the enemy, swiftly completed a breakthrough of all his tactical defense, and rushed on to operational depth. The development of the success was so swift that in just 2 days the immediate operational reserves of the enemy were defeated and a large group of his forces was surrounded in the Brody region.

The infantry divisions, with air support, were given responsible missions for providing for the entry of the tank armies into action. They were to hold this famous "Koltuva corridor" while being fired on from both sides by the enemy, repulse his counterattack, and then utilize the success of the tank armies for exploitation of the success, and take part with them in the encirclement and destruction of strong groups of the enemy.

Antiaircraft defense (PVO) was of great importance for the operations of tank armies in operational depth. Obviously, PVO will now also to a large extent determine the success of an offensive of tank armies in the course of the operation. This relates especially to fighter aircraft.

Successful operations of tank armies in operational depth were to a great extent determined by the organization of coordination. The high rates of advance of tank armies, their maneuvering, and the rapid change in the situation exercise a decisive influence on coordination. This was the reason for the use of the most varied forms of their coordination with combined-arms armies, air forces, neighboring tank armies or cavalry and mechanized groups, and of coordination between elements of the operational formation of the tank armies themselves.

Upon being committed to battle and in the period of defeat of the first echelon of the enemy's defense, the tank armies usually operated jointly with combined-arms armies and the tank and mechanized corps assigned to them. During this time tactical coordination was maintained between them. However, on the fifth or sixth day of the operation they were, as a rule, separated from the main forces of the combined-arms armies by 40 to 50 kilometers, and by the end of the operation, by 70 to 100 kilometers. At this stage of the operation there was operational coordination between them.

There is no doubt that under present-day conditions coordination between tank groups, and also with motorized infantry in the course of an operation, may be tactical and operational. Therefore the value of the experience of organizing and maintaining the coordination of tank armies is unquestionable. At the same time, now tank groups would have to coor-

dinate not only with the air forces and neighboring units, but also with rocket forces. The complicated conditions of combat would require more often than formerly the establishment of coordination, which the enemy would very often be able to break up.

In the experience of the use of tank armies, there becomes evident the necessity of dependable artillery support of their operations in operational depth. This arose from the fact that having in their composition self-propelled artillery and tank destroyer regiments was clearly inadequate. Tempory assignment for this purpose in a number of cases of artillery units of combined-arms armies (for the period of artillery support of the tank armies in immediate operational depth) did not fulfill the mission (In the L'vov-Sandomierz operation 122-mm and 152-mm gun artillery battalions were assigned for this purpose; in the Wisla-Oder operation there were created special groups of artillery support according to the number of corps of tank armies.) Besides, this artillery remained subordinate to the combined-arms armies, since because of its poor mobility it could not follow along with the tanks. The artillery of the RVGK (Reserve of the Supreme High Command), although by the end of 1943 it was converted to mechanical traction, likewise could not completely meet the needs of the tank armies, since it had considerably less mobility than the tanks. Achieving dependable artillery support of the operations of tank armies in operational depth required the creation of a sufficient quantity of fast-moving artillery and the inclusion of it in the composition of the tank armies. But to the very end of the war this was not done.

The air forces played the main role in securing the operations of tank armies in operational depth. It was the main means of their support in the exploitation of a success. The air forces participated in protecting entry of the tank armies into combat, covered them from the air, and delivered attacks on the advancing reserves of the enemy in the zones of operations of the tank armies. In a number of operations of World War II, with the aim of protection and support of the troops, part of the forces of the air armies of the fronts were attached to the commanders of tank armies—usually one ground support and one fighter corps to each. In addition, in the interests of carrying out the missions of tank armies, by decision of the commanders of troops of the fronts, bombers were also used, including night bombers.

Under modern conditions a decisive means of defeating the enemy in an operation is nuclear weapons and rocket troops, which first of all would be used to strike blows which are also in the interests of tank groups. At the same time, air power also must be considered one of the effective means of protecting these groups, especially when they are operating at great distances away. Here there must be considered and creatively used the experience of the organization of cooperation of tank armies with air forces and the coordination of their operations according to missions, time, and space. At the command posts of the commanders of tank armies there were, as a rule, operational groups of the headquarters of air corps (divisions), or their commanders themselves, with their base

air fields. This permitted tank army commanders to summon air support directly, omitting extra channels, which facilitated more operational use of them in accordance with the situation. And now too there can be no doubt that tank groups, especially large ones, will be supported by air forces.

The development during World War II of means of combat, and particularly of tanks, inevitably led to the need to create new means and use new methods of supply of materiel and technical equipment to the troops. The participation of large masses of tanks in operations, the increase in the volume and weight of supply loads, and the rapid increase in the hauling distances, together with the slow restoration of the railroads in comparison with the advances of the troops, made especially difficult the rear supply of the tank armies during their exploitation of a success. According to World War II experience, the average daily fuel and ammunition requirement of a tank army of medium strength was 600-700 tons. To satisfy this requirement it was necessary to provide, for a distance of 200-300 kilometers, 270-300 trucks with loads.

The difficulty in supplying tank armies during their operations in operational depth due to the greatly extended lines of supply adversely affected the tempos and, consequently, the results of the operation. Therefore transport aircraft were used in many operations for the supply of tank armies. But because of our shortage of transport aircraft at that time, this could not successfully solve the problem. Motor transport continued to play the basic and decisive role in the supply of tank armies. And yet the experience of using air transport is of very great importance. Primarily this related to supplying tank groups with fuel and ammunition. In addition, transport aircraft for the strengthening of tank armies can transfer troops, equipment, weapons, etc.

It must be said that the direction of tank armies operating in operational depth became the more difficult the more separated they were. When the distances were very great, even the radios available at that time did not make possible dependable direction, and they had to limit themselves to mobile means, mainly communications planes (PO-2). In these circumstances, advance command posts of the fronts were frequently established in addition to the main command posts. Control of mobile forces became still more difficult when the front included several tank armies, operating not as one common group, but as several, and, in addition, cavalry and mechanized groups and separate tank and mechanized corps. Control within tank armies was carried out from army command posts by radio and by mobile means of communication.

With regard to separate tank and mechanized corps, although in most cases they operated successfully, in my opinion their use outside the composition of the tank armies was not always expedient. For example, when these corps (I have in mind corps subordinated to the front) operated in the same sectors as the tank armies, it would have been better to have included them in the composition of the latter, as was done in the Iasi-Kishinev operation. Originally the mobile forces of the 2nd Ukrainian

Front in this operation operated as three independent groups: the 6th Tank Army, a cavalry and mechanized group, and the 18th Tank Corps, which had the mission of advancing on the flank of the tank army. Marshal R. Ya. Malinovskiy, commander of the Front, it seems to us, was entirely correct in deciding to subordinate this corps to the 6th Tank Army, which undoubtedly facilitated the direction of the mobile forces. If this corps had continued to operate outside the composition of the tank army, this would have dissipated the efforts of the mobile forces of the front, weakened their striking power and operational independence, and complicated the command. Inclusion of the separate tank and mechanized corps subordinate to the front in the tank armies created more powerful tank groups, all the more because some tank armies had a total of two corps each.

Also it was not always expedient to attach the tank and mechanized corps to the combined-arms armies, especially on the main sectors of the front where one, or even two, tank armies were operating. We are not in the least inclined to minimize the role and importance of the mobile groups of the armies, which are the army echelons for exploitation of a success. Their existence was fully justified in those cases when there were no tank armies in the front or they were being used on other axes. On these axes the tank and mechanized corps of combined-arms armies operated, as a rule, jointly with the tank armies, essentially in the immediate interests of the front operations (and their missions were assigned them most often by the commander of the front). At the same time, when these corps were greatly separated from the infantry formations, their control and support by the commanders of the combined-arms armies became practically impossible, inasmuch as the armies did not have the appropriate means.

It seems to us that in many cases it would have been expedient to also transfer these tank and mechanized corps under the tank armies. There was also the possiblity of creating from these corps several additional tank armies, which undoubtedly would have still further increased the combat capabilities of the front field forces and the decisiveness and speed of their offensive operations.

Creatively studying the rich and comprehensive experience of the combat operations of armored forces in World War II, it is necessary to consider that "in nuclear rocket war, if the aggressors manage to start one, the role and importance of the tank forces not only will not diminish, but on the contrary will become even more important. This is primarily because the combat capabilities of the tank, as a powerful instrument of warfare, have increased and enable the tank forces most effectively to take advantage of results of nuclear strikes."

World War II experience has shown that tank armies, correctly used as echelons in the composition of the front for the exploitation of success, were one of the most important means of successfully solving the problem of carrying out offensive operations at high speeds in comparatively short periods. The use of tank armies in operations of World War II made it possible to accumulate the rich and varied experience of their operations in

the conduct of operations in depth. Mastery of this experience has enabled Soviet military thought to arrive at important conclusions regarding the use of armored and mechanized forces.

It has been recognized that armored and mechanized forces, organized into tank armies, corps, brigades, and regiments, were the means which, in cooperation with the other arms, made it possible to successfully overcome the resistance of the enemy at the beginning and in the course of an operation, to quickly increase the effort in the region of a breakthrough, and to develop a success at rapid tempos. The enemy, on the defensive, was in no position to stabilize the front, since it was difficult for him to bring up his operational and strategic reserves to the area of the breakthrough. The tank armies committed to action and the mobile groups of the combined-arms armies, operating in operational depth, inflicted defeat on these reserves, as a rule, from the march and destroyed them piecemeal. The use of tank armies on the axes of the main blows greatly increased the scope of the offensive operations of fronts and made them more decisive, with high maneuverability and vehemence.

All these important changes in the nature of operations of World War II, brought about by the massed use of armored forces, were taken into account in the later theoretical generalization of their experience. It is true that qualitative changes in ground troops, as in the armed forces as a whole, have required the working out of new forms and methods of organization and conduct of an operation, as well as refining those established during the last war. In the development of military theory, the experience of the war has been used almost completely for the solution of practical problems in the field of training the armed forces.

Thus, the operational echelons for the development of a success have remained as before, although their functions have been transferred to second operational echelons, which it has become possible to make completely mobile.

The operations of tank forces in operational depth, just as during the war, have been foreseen as being separate from the infantry formations at rapid tempos, and with extensive maneuvering of forces, equipment, and fire in the course of the offensive. Even the basic missions carried out by troops of the tank armies and their methods of operations in operational depth have continued to remain acceptable.

We emphasize again that the combat experience of the tank forces, acquired in the operations of the past war, is also of definite interest under present-day conditions, despite the radical changes which have taken place in the armament and technical equipment of the various branches of the armed forces, and also in the conditions and methods of carrying on war and operations. It should not be a matter, of course, of mechanically copying the forms and methods of operations of tank forces and, in particular, of tank armies, but of those principles which, applied to conditions of modern warfare (nuclear and nonnuclear) require appropriate changes, but which in principle may be retained or be further developed.

Now all ground troops are completely motorized and mechanized,

and amply supplied with a great quantity of tanks; therefore, there may be no need specifically to have mobile echelons for the development of a success as there was in the past. But, as we have been saying, in modern operations one or more large tank groups may be also used to operate. Along with great differences from the methods of operations of these groups and tank forces in the past, there will undoubtedly be some similarity. Moreover, the individual elements of combat experience may prove to be useful also for modern conditions. This has to do with both the first and the second echelons, called upon following nuclear strikes, and taking advantage of their results, to swiftly exploit the success to the whole depth of the operation. In many cases, undoubtedly, the second echelons and the reserves will prove to be the main means of exploiting a success in operations, and their operations will have still more in common with the operations of echelons for the development of a success which were used during the last war.

In the new conditions of armed combat there will be further development of such methods of operations of tank forces as the advance on separate axes, separated from the rest of the forces. Especially important may be the separation of the advancing groups (not only tank, but also motorized infantry) on the axis of our nuclear strikes. Utilizing the results of these effectively, the advancing forces on these axes can swiftly exploit the success at very high tempos.

The experience of extensive maneuvering by tank forces during an operation, of their rapid penetration to a great depth into the positions of the enemy, taking advantage of breaks and gaps in his operational formation—this experience, too, we believe, has not lost its importance. Under modern conditions, the importance of maneuver and of its combination with the strikes of troops will still further increase. This is because of the unprecedented power of nuclear weapons, the great increase in the number of tanks in the composition of ground troops, and the sharp qualitative change in their combat characteristics, and also the new structure of forces.

Some elements of the combat experience of tank forces in principle retain their importance in modern meeting engagements and battles, in pursuit of a retreating enemy, in forcing water barriers from the march, and also in operations for the disruption of the enemy's lines of communication and disorganization of his command and the work of his rear.

It should also be noted that it was the mobile forces, primarily the formations of the tank armies and tank and mechanized corps, in the operations of the last war which initiated such actions as the advance of troops in approach march and march formations, without dismounting by the motorized infantry, firing directly from the combat vehicles on the march.

As we have said before, the experience of air support of tank armies is of great importance for modern operations. Of course now support of the tank groups and of advancing forces as a whole will be looked at in a completely different way due to the use of nuclear weapons, including their use

by the air forces. At the same time it will be impossible to do without the operations of the air forces using conventional (nonnuclear) ammunition, both in a nuclear as well as in a nonnuclear war.

In our opinion, much that is useful can be found in the experience of control of tank army troops in an offensive in operational depth. It is true that now the means and methods of the control of troops cannot at all be compared with the past. We have in mind the availability of high quality means of communications, the use of mobile command posts, the ever greater introduction into the process of control of means of mechanization and automatization, etc. Therefore, we must take into account, finally, that troop control has now become quite different.

It has not been our aim to examine completely all the possiblities of utilizing the experience of the combat use and operations of tank armies in the last war. Unquestionably, each case calls for new decisions as compared with the past, decisions that correspond to new means of combat, and the new character and methods of carrying out modern operations. But it is also evident that there is much from the past experience that is also useful for present-day conditions.

About the Author

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Notes

1. *Voyennaya mysl'*, No. 11, November, 1964, FDD 924, 20 June 1965.
2. *Tank and Mechanized Forces in the Offensive Operations of the Red Army: A Collection of Articles* (Voyenizdat, 1945), p. 72.
3. R. Ya. Malinovskiy, "The 20th Anniversary of the Iasi-Kishinev Operation and the Liberation by the Soviet Army of the Peoples of Southeast Europe from the Yoke of Fascist Occupation," *Voyennaya mysl'*, No. 7, 1964, p. 15.

Combating Strategic Reserves in a Theater of Military Operations[1]

Maj Gen Kh. Dzhelaukhov

The term strategic reserves is commonly understood to refer to opertional field forces of various branches of armed forces, formations, and units of arms, reserves of nuclear weapons and rockets, and various types of equipment, conventional armament, shells, and other material and technical means which do not have a definite operational function and are at the disposal of the supreme command of the armed forces of a country.

Along with the main forces and means mobilized at the beginning of a war, strategic reserves are located on the territory of a given country or neighboring countries and also immediately in the theater of military operations. In the latter case these reserves will usually consist of combined-arms and tank field forces and formations, and the units and formations of other branches and arms (aviation, artillery, engineer, motor transport, etc.) and can be designated for use, as a rule, in a given theater of military operations. These reserves may have stockpiles of nuclear weapons, rocket means, conventional armament, and other material.

Past world wars clearly demonstrated the importance of reserves in general, and in particular the importance of strategic reserves in a theater of military operations. For example, the German attack on Paris in 1914 failed because the German Supreme Command on the Western (French) Front did not have strong strategic reserves for reinforcing and developing the attack to the Marne River and parrying the strikes of the 6th French Army north of Paris. In 1942 the German Fascist command's lack of large reserves on the Don and in the North Caucasus during the battle on the Volga prevented them from quickly beginning an operation to liberate encircled groupings with strikes from without and from creating a solid defensive front to prevent the further exploitation of the success of Soviet troops in southwestern and western directions.

At the same time, past wars have shown that large operational and strategic reserves have had a decisive effect on the outcome of an operation or campaign. For example, in Picardy in 1918 the defending Allied troops had 32 divisions in the first and second lines of defense and 18 formations in the reserve of the armies and front. During the operation the Allies were reinforced by 43 divisions, enabling them to halt the German

offensive.

Large strategic reserves, promptly delivered and deployed in the vicinity of Moscow in 1941, defeated the German Fascist tank assault groups threatening the flanks of the Western Front and then supported a general counteroffensive of Soviet troops near Moscow. There was a similar situation during the battle on the Volga. In the summer of 1942 our Southwestern and Voronezh fronts, having suffered heavy losses, could not withstand the enemy offensive. Owing to timely measures taken by the Stavka of the Supreme Command, the Stalingrad and Don fronts were reformed and the Southwestern Front was restored through the use of strategic reserves. The presence of large strategic reserves in the vicinity of the Kursk Bulge in the summer of 1943 made it possible for the Soviet Army to repel strong thrusts of attacking groupings of German Fascist troops north of Belgorod and in the vicinity of Ponyra and, after a brief operational pause, launch a counteroffensive and victoriously conclude the summer campaign of 1943.

In certain operations of past world wars the relative strength of strategic reserves was extremely high. For example, in the aforementioned operation in Picardy they comprised 86 percent of the total strength of the divisions originally at the front. Their relative strength was particularly great in several operations in the Great Patriotic War. In the battles on distant approaches to Moscow on 1 October 1941, there were approximately the same number of divisions in the six armies of the Reserve Front as there were in armies operating on the Western Front. During the first 6 months of the war the air forces of the Western Front received from the reserve of the Supreme Command reinforcements amounting to more than twice their original number of aviation regiments.

Thus the experience of past wars and especially World War II shows that inflicting losses on troops operating on a front does not necessarily achieve victory since the presence of large strategic reserves in general and in the theater of military operations in particular promotes the swift restoration of a strategic front of battle and usually brings about a certain equality in forces.

The presence of large reserves during offensive operations facilitates the intensification of efforts, swift and deep penetration into a defensive formation, the defeat of its groupings, and the achievement of the objectives of the operation.

Even without going into detailed research on the ratio of forces and means operating in a certain area of a given theater of military operations to the reserves brought into that area from the depths of a country, it is easy to see the completely logical tendency to increase the role of strategic reserves in armed conflict in the last war.

Have strategic reserves retained their importance in modern warfare? Isn't the aforementioned tendency to increase their role in armed conflict obsolete and unsuitable in our time?

In modern conditions, in various parts of the world and particularly in those near the socialist camp, the aggressive circles of imperialism have

created military blocs with armed forces numbering in the millions, constructed numerous military bases on their own and foreign territory, and are maintaining in full combat readiness strategic nuclear rocket weapons, atomic submarines armed with Polaris missiles, strategic and tactical avition, aircraft carriers and submarine strike forces, ground troops, and other means for armed conflict so that they can unleash a war against the countries of socialism and other peace-loving nations at any time, without deploying large additional forces and means.

Moreover, in the military doctrines of aggressive countries it is recognized that existing forces will be inadequate and that with the beginning of a war large reserves will be necessary for intensifying efforts, replacing losses, and carrying out various missions during the initial period of the war. These reserves will be created by mobilizing the forces and means in the depth of the continental part of a given theater of military operations (TMO) or by bringing them across the ocean from other continents. They may be used for reinforcing the first strategic echelon, for creating reserves in the theater of military operations, or for establishing a second strategic echelon to carry out subsequent strategic missions in a given TMO. Therefore, in examining the problems of combating strategic reserves we have in mind all large forces and means of the various branches and arms which will arrive in a given TMO with the outbreak of a war, regardless of their operational-strategic designation,

Socialist countries, carrying on a constant struggle against the threat of war and for the peaceful settlement of all disputes between nations, must reckon with the presence of aggressive, armed-to-the-teeth circles of imperialism. Therefore, the countries of socialism and especially the Soviet Union, in order to defend themselves and restrain an aggressor, must maintain in peacetime adequate and fully combat ready forces designated for repelling a surprise nuclear rocket attack by the probable enemy and delivering an immediate retaliatory strike. Also, Soviet military science considers that final victory over an enemy, if the imperialists succeed in unleashing a war, requires numerous strategic reserves of various designations.

The necessity for these reserves can be found in the very nature of nuclear war. The extensive destruction and heavy losses resulting from the use of nuclear weapons will disrupt the system of operational organization of troops in several theaters of military operations or strategic sectors. To prevent the enemy from exploiting this and destroying friendly groupings piecemeal it is necessary to quickly bring in reserves. At the same time the fast-moving nature of the development of offensive operations causes sharp changes in the situation, which in turn make it necessary to bring large strategic, as well as operational, reserves into the battle.

Intensifying strategic efforts by employing strategic reserves or the second strategic echelon is a most important factor in waging a successful struggle to achieve strategic objectives under modern conditions. As previously noted, strategic reserves in a TMO may be comprised of field forces and formations of the various branches and arms (ground, airborne

aviation, artillery, engineer, and others). They can be used in the following missions: launching a counteroffensive or exploiting success on main axes; relieving operational field forces and formations which have suffered heavy losses; reinforcing rocket artillery, tank, and aviation groupings; repelling thrusts and destroying large operational forces of the enemy; threatening flanks of attacking strategic groupings; reinforcing large airborne forces operating deep in the enemy rear area; operations on new strategic axes; and the achievement of other objectives.

To carry out these missions during armed conflict in a theater of military operations the belligerents use strategic reserves along with the wide employment of nuclear weapons. They try to maintain a superiority over the enemy or at least create a favorable correlation of forces by destroying reserves with nuclear strikes and isolating the enemy's strategic groupings in the TMO from the area and preventing the arrival of fresh reserves.

The problems of combating strategic reserves is not new. This can be seen in the experience of World War II. For example, one of the most important problems of the U.S. and British air forces in preparing for the Normandy operation in 1944 was the disorganization of communications in the rear area of German Fascist troops with the objective of disrupting the normal supply of materiel and reserves to German groupings located on the northern coast of France. The plan for Operation Overlord included strikes against railroad systems of France and Belgium within a radius of approximately 300 kilometers of the landing area and the destruction of railroad and motor vehicle bridges over the Seine and Loire rivers. This would disrupt the normal transfer of reserves to the German Fascist troops in Normandy. As a result of the air raids by the Allied forces, 24 bridges were destroyed on the Seine alone. During the landing and the following period of battle on the beachhead Allied aviation isolated the main areas of combat action from German reserves in the inner regions of France, from the east, and from the coast of the Straits of Dover.

However, there was still no organized and systematic combat with strategic reserves in World War II. The aformentioned missions were frequently accomplished in passing, with the achievement of air superiority and during operations designed to undermine the economic potential of the enemy.

The fact that combat with strategic reserves did not have a wide scope in World War II even though its role was recognized is explained, on one hand, by the lack of powerful strategic reserves on both sides in the theaters of operations in all phases of the war, and on the other hand, by the small numbers and relative weakness of strategic aviation among the warring nations and the presence of targets more important than the reserves. The main reason was the lack of means for delivering deep operational-strategic strikes.

It must be said that combat action against strategic reserves in theaters of military operations during World War II was of a sporadic nature.

Under modern conditions the boundaries of continental theaters of military operations have expanded greatly. As is well known, all continents are bordered by wide expanses of ocean and sea: for example, Europe is bordered by the Atlantic Ocean and the Mediterranean Sea; the Near East and the Middle East, by the Mediterranean Sea and the Indian Ocean; and Southeast Asia, by the Indian and Pacific oceans. Fresh forces will be brought in from remote areas of a given TMO and from outside by air and sea transportation. It is therefore completely logical that combat with enemy reserves will take place not only within the formal boundaries of a given TMO, but also far beyond its borders, on the ocean and in the air.

The destructive nature of nuclear war, the huge losses of personnel and materiel, and the wide scope of operations in the theaters of military operations increase the role of strategic reserves and make them an important factor in restoring forces or intensifying efforts in general. Moreover, modern means objectively create suitable conditions for independent operations against strategic reserves. The existence of nuclear rocket weapons of various designations, strategic aviation with high speeds and altitudes and increased carrying capacity, rocket-carrying naval forces, especially atomic submarines, modern radar and radioelectronic equipment for guidance, target designation, and accurate bombing has opened real opportunities for effective battle against strategic reserves at great depth, both in the theater of military operations and during their approach from remote areas or other continents.

In what direction can the battle against strategic reserves be conducted in continental theaters of military operations? What is most important, and, in general, is it a problem requiring special examination and solution, or can these missions be performed in the course of strategic operations in a TMO?

The most important elements of strategic reserves subject to decisive action are, in our opinion, first, combined-arms and tank field forces and formations, rocket nuclear weapons, and units and formations of other arms located in mobilization areas, concentrated in the depth of a given TMO, or arriving from another; secondly, reserve groupings during their movement to an area of military operations or their entrance into battle; and thirdly, stores of nuclear weapons, conventional armament, material, and technical supplies. In addition, there will be a complex of all types of transport from road junctions, airfields, and ports having great importance for shipping reserves to a given TMO.

Naturally, an effective struggle against reserves and the destruction of materiel and railroad objectives can be accomplished only when action has been taken against all objectives mentioned above, or at least against the decisive elements of strategic reserves which become very important at a given moment and the destruction of which will have the desired strategic result.

In a modern war the most important objectives in the reserves are, of course, nuclear rocket means which have not yet been brought into action, nuclear weapons depots, tank and artillery formations and units, and large

bases and depots of fuel, armaments, and ammunition. Under all conditions it is extremely important along with the destruction of nuclear rocket means, to destroy fuel depots, thereby paralyzing not only the movement of reserves, but also the groupings of branches of the armed forces operating on the front.

In selecting objectives for destruction from among the strategic reserves it is necessary to take into account their distance from the main area of armed conflict. It is one thing when these objectives are still located in the depth of the theater at a distance of 600-1000 kilometers or more (requiring 3 or 4 days to move them and bring them into the battle), and another matter when they are already in the zone of military operations and can be brought into battle within 24 hours. The closer reserves approach from the depth of the theater, the more intense will be the action against them. It is also necessary to keep in mind the geographic factor, system of communications, the presence of suitable means of combating these reserves, and the duration and objectives of strategic operations to be conducted in the TMO at a given moment. All these factors are closely interrelated and must be taken into account when making decisions on delivering nuclear strikes against enemy reserves.

Let us clarify these statements. High mountain ranges with a limited network of roads, large water barriers with few bridges, territories divided by seas within the theater—all these retain their significance as natural barriers even in modern conditions, with highly mobile combat equipment, and limit the maneuvers of troops and materiel from the depth of the theater. Reserves formed on the opposite side of natural barriers still have to overcome them before they can arrive in the area of military operations.

Under these conditions the proper selection of the objectives of strikes—in other words, the waging of an effective battle against reserves with the smallest expenditure of forces and means—will be of great importance. If the main strategic mission in a theater can be carried out in several days, then delaying the approach of the enemy reserves for that period of time will obviously ensure the completion of the operation. Consequently, the objective of action against reserves can be achieved by destroying sections of roads on passes through mountain ranges, bridges across large rivers, or ports for unloading reserves brought in by sea.

The availability of forces and means for combating reserves has an important influence on the selection of the objectives of strikes. If they are limited, it is possible to neutralize the reserves in succession, beginning with the nearest, and in certain cases to destroy only important road junctions and transportation objectives or to create zones of radioactive contamination on communications routes.

In theaters of military operations where the network of roads and railroads is poorly developed and where movement involves overcoming considerable natural barriers, troops operating in the TMO can be isolated from fresh reserves simply by destroying certain transportation objectives.

Sometimes, especially in sparsely populated and uninhabited theaters, the main means of transferring reserves from the depth is transport aviation. In these cases it is most important to destroy airfields, aviation fuel depots, equipment, flight control systems, and aircraft.

But combating reserves in continental TMOs is only a part of the overall battle against strategic reserves, since reserves can be brought in by sea and air transport. Thus, battle on ocean and air communications routes is a no less important part of combating strategic reserves.

The essence of combating strategic reserves in a theater of military operations will be, on one hand, the destruction of combat forces and means (field forces, formations, special units, and reserve nuclear and rocket means) and the destruction of various materiel reserves (armament, ammunition, and particularly fuel) and, on the other hand, the destruction of the complex of transport facilities and the disruption of main communications routes over which reserves are carried.

Action against strategic reserves on a wide scale became possible only with the appearance of a deep strike weapon, which at that time was bomber aviation. During World War II and especially during the Great Patriotic War, heavy bomber and frontal aviation periodically delivered strikes against deep enemy reserves in strategic areas or in TMOs in general. Such operations, however, were not systematic, since the main objectives of air strikes remained troop groupings, the tactical and operational reserves of the enemy.

Modern rocket-carrying and bomber aviation with its high tactical and technical characteristics is a powerful and reliable means of combating reserves in a theater of military operations. Its importance is especially great in action against reserves during their regrouping and in delivering strikes against small targets—nuclear weapons depots, fuel depots, headquarters, and others. Rocket-carrying aviation has a very important advantage in combating reserves in that it is able to destroy targets at a distance of several hundred kilometers, beyond the range of the active means of enemy PVO.

Operational and strategic rocket weapons have moved into first place as the most important means of combating enemy reserves in a TMO under the most varied conditions. Nuclear rocket weapons, which are unaffected by weather conditions and practically invulnerable to antirocket means, which can be employed in mass, are among the most reliable and important means in independent action against reserves in a TMO. In comparison with aviation, rocket weapons have a number of advantages and are unquestionably the decisive means in this action.

No matter how effective each type of action against reserves may be, during a war there will usually be a combined use of aviation strikes, rockets of various designations, and assault forces and detachments of various sizes. In land-sea theaters of military operations, naval aviation and submarines using conventional and nuclear weapons will also be effective in destroying strategic reserves, especially those arriving from other TMOs by sea. Special missions in combating reserves can be carried out by

air and naval landings, operations of separate detachments, and other means.

What is the objective of such action against strategic reserves and what results must be sought during its organization? No matter how systematic and powerful the strikes, it is difficult to count on complete annihilation of the reserves. Obviously, the objective will be achieved if the action seriously weakens the strategic reserves, preventing them from being used effectively and from having any noticeable effect on the entire course of armed conflict in a given theater. Another objective of action against reserves may be to deprive the enemy of superiority in forces in a certain strategic area of a TMO.

The experience of World War II does not give a complete answer to the question of how to annihilate or weaken strategic reserves. A consideration of the potential of modern weapons leads one to the conclusion that the annihilation of reserves can be accomplished by strategic rocket strikes and independent air and sea operations.

The deep and dispersed disposition of strategic reserves in mobilization areas and their considerable strength make it necessary to deliver a series of simultaneous or successive nuclear strikes. Strikes by rocket troops may be especially effective against large groupings of reserves in the depth of a TMO, when they are being unloaded from ocean or large sea transports or transport aircraft, or when concentrating in areas of impending operations. An extremely important condition for the effective use of nuclear rocket weapons is the conducting of continuous reconnaissance observation of the movements and concentrations of strategic reserves.

It is sometimes expedient to conduct air operations, with strategic aviation in close coordination with tactical aviation, for the destruction of strategic reserves in TMOs. The best results can be achieved by delivering strikes against troop columns moving toward the front line under their own power or on railroad or sea transports and by destroying stations and ports used for loading and unloading. Strikes against airfields on which troops and cargoes are being landed by transport aviation are also effective.

In a number of cases aviation may be the only active means of combating strategic reserves, especially when the number of nuclear rocket weapons is limited or when their use would be impractical. Thus, in continental TMOs air force operations to destroy reserves will be a logical and integral part of the armed conflict.

From the experience of World War II it is known that operations on enemy sea lines of communication included action against strategic reserves, since, in addition to the sinking of transport ships carrying cargoes of a general character such as raw materials, petroleum products, supplies, etc., ships carrying troops and combat equipment were also sunk. For example, in only 5 months (January-May) of 1943, 259 ships having a total tonnage of nearly 1,550,000 tons were sunk by German submarines in Atlantic and Arctic waters. Some of these ships were carrying troops.

Independent operations of naval forces or joint operations of the naval forces and strategic aviation to destroy ocean and sea lines of communications will also have a very important place in the system of combating strategic reserves under modern conditions. Action against ocean lines of communication is important for many reasons. Of interest in a given situation is the destruction of convoys of ships carrying troops and armament near a given theater of military operations or unloading troops at ports on its territory.

Since many countries located in continental theaters of military operations have ties with overseas territories and are to a large extent dependent on shipments of both materiel and formations and units of armed forces, action against these shipments, particularly on approaches to principal ports of a given TMO, is extremely important.

Rocket troops, strategic and tactical aviation, airborne troops, and, in theaters bordered by seas, naval forces and means may take part in joint operations to destroy strategic reserves. These operations can be conducted when the forces of front field forces and fleets are not occupied with the execution of independent and more important missions and, obviously, are not in the main theaters of military operations. Under these conditions, especially in remote and isolated TMOs, joint operations may be the natural and most typical means of combating strategic reserves.

Also of importance may be special operations in adjacent TMOs or strategic areas to divert the enemy's strategic reserves from the main TMO or strategic area. The joint operation of troops of the Southwestern Front and part of the forces of the Voronezh Front in the second half of December 1942 to destroy the 8th Italian Army in the central course of the Don River is an example. The thrust of the main forces of the Southwestern Front was made in a southwesterly direction, toward Morozovsk, to meet the worsening situation and destroy German reserves which could have been used to liberate the encircled grouping on the Volga. During this operation the German command threw four tank and four infantry divisions against the attacking troops of the Southwestern Front, divisions which were intended to be used in the liberation of encircled troops. The successful execution of this operation finally deprived the German command of the opportunity to render aid to Paulus' encircled grouping with a thrust from the west, weakened German pressure on troops of the Stalingrad Front from the Kotel'nikovo side, and also created favorable conditions for further offensive operations by Soviet troops in the Voroshilovgrad (Lugansk) and Voronezh areas.[2]

In the same way the thrust of the 7th and 6th Guards Tank Armies of the Second Ukrainian Front in January 1945 drew a number of German divisions from the Gron River along the banks of the Danube to Komarno. These divisions were to have developed an attack on Budapest in an attempt to liberate an encircled grouping there. Troops of the Third Ukrainian Front supported the thrust of the tank armies.

In a modern nuclear war the possibility of encircling large operational groupings and slowly liquidating them is considered unlikely but it cannot

be completely excluded. Other no less complicated situations which might require the aid of armed forces operating in adjacent TMOs or strategic areas are probable. Such operations against strategic reserves must therefore be considered possible under modern conditions.

Together with active means of combating enemy reserves there may be used less active means such as impeding maneuvers by destroying crossings and road junctions, creating zones of fire in forested areas having a limited network of roads, creating wide zones of radioactive contamination, diverting part of the reserve forces, and dispersing their forces to combat various assault forces, detachments, etc.

It must be remembered that in modern conditions the main commands of the warring sides will always try to have strong reserves and regularly rebuild them in theaters of military operations. Consequently, action against them will be of a constant nature and will require systematic strikes or a series of operations for their destruction.

From the ways of combating strategic reserves examined above, it follows that they can take the form of various operations and strikes of rocket troops and will be conducted, first, in the system of strategic operations in a given TMO (including ocean theaters), as an integral part, in the form of separate strikes with nuclear rocket weapons or special operations of air and naval forces, etc.; secondly, in the system of armed conflict in several TMOs in the form of strategic rocket strikes or separate individual or joint operations conducted upon the order of and under the direction of the supreme command, using strategic aviation, naval forces and means, and sometimes strategic rocket troops. The direction of such joint operations may in certain cases be delegated by the commander in chief to the branch which will have the decisive forces and means in a given operation.

Modern means of warfare have raised the role of strategic leadership still higher, not only as the main organizer of armed struggle in general, but as the principal organizer of separate operations for the destruction of enemy strategic reserves in TMOs. The military high command has a decisive role in preparing, planning, and conducting operations to destroy these reserves. For this purpose it will use primarily strategic aviation, but also ground and naval forces and rocket means operating in a given theater and strategic rockets. When this action is entrusted to the command of front field forces, forces at the front will be reinforced by the means of reserves of the strategic leadership, neighboring fronts, and sometimes, of naval fleets.

The organization of action against strategic reserves in modern conditions is an important problem of Soviet military art. Modern weapons and delivery systems have broadened the scope of military operations, made them extremely mobile and flexible, created new means and forms of combat, and required the military high command to give greater attention to the development of armed struggle in theaters of military operations. as a result, the role of large strategic reserves, which greatly influence the entire course of armed struggle in general and in TMOs in particular, has increased. Therefore combating strategic reserves in a theater of miltary

operations is an indispensible element of a modern war.

The comprehensive theoretical development of this problem will considerably enrich military art.

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Notes

1. *Voyennaya mysl'*, No. 11, November 1964, FDD 929, 20 June 1965.
2. *The Second World War, 1939-1945* (Military Publishing House, 1958), 395 pp.

Forward Detachments in Offensive Operations and Battles[1]

Col I. Vorob'yev

In the past, forward detachments were assigned to cooperate with the troops in developing an offensive. Their tasks consisted of a swift penetration into the depth of the defending troop formations, the capture of important objectives or positions which had to be held until the arrival of main forces, and, in a number of instances, discovery of the strength and formation of enemy forces. Clearly these were support missions of a particular type; however, their successful execution achieved an activated offensive, an increased depth of influence on the defense, and in some measure its disorganization.

In the preatomic period, the theory and practice in the employment of forward detachments underwent a considerable evolution. Modern conditions require a more critical interpretation and reexamination of the problem. The purpose of this article is to present a brief review of this question.

The idea of employing forward detachments was conceived long before World War II. However, in practice they were rarely utilized in the initial stages. In both the Civil War and World War I, they operated only sporadically in a few offensive operations. It may be said that these were random attempts which did not receive widespread theoretical and practical recognition at that time.

During the 1930's when the theory of deep offensive operations was thoroughly examined and a rapid development of aviation, tanks, and artillery took place, our theoretical thinking reached the obvious conclusion that it was necessary and purposeful to employ forward detachments.

Forward detachments were most widely used during the Great Patriotic War and especially after the Soviet Army switched to decisive offensive operations. In this case, the forward detachments (primarily tactical units) were employed in a relatively large number (one to two from each attacking division). In the concluding phase of the war, there was actually not one offensive operation which did not include numerous forward detachments of varied composition and purpose. For example, in the 1944 Crimean operation, 11 forward detachments were detailed from formations of the 2nd Guards Army first echelon alone. In the Lutsk-Rovno and Mogilev offensive operations, the 13th and 49th Armies each had eight such detachments operating in their zones. Corps and even army forward detachments were detailed and participated in many operations in

addition to the division forward detachments. For example, during the Manchurian offensive, there were three forward detachments in the 17th Army and seven in the 39th Army.

There has already been some summarization of experience in the employment of forward detachments presented in this journal and I will not repeat it. I only wish to point out that the practical experience convincingly demonstrated the increasing role of forward detachments. As the scope of offensive operations increased, the operations of forward detachments became more active and there was an expansion in the volume and purpose of their assigned missions. The more of these detachments that were active in the Army or frontal attack sectors, the greater was the support they gave to the advancing main forces.

It was for this reason that during the past war the dispatch of forward elements became the rule and they rightfully assumed their place in combat and operational formations of advancing forces. There were clear tendencies to increase the number of detachments (especially tactical), their composition, and their mobility. However, the conclusion was finally reached that the most logical composition of forward detachments included reinforced tank subunits, units, and formations, which had greater mobility and fire and striking power and consequently could achieve high operational results. It is sufficient to point out that such detachments frequently preceded the advancing division, corps, and army forces by 30 to 50 kilometers and were capable of executing the most varied combat and operational missions.

More decisive missions were assigned to operational forward detachments, which had a substantial influence on the development of army and front offensive operations as a whole. By seizing important operational objectives and positions at a great depth, while on the march, they disrupted the enemy's system for operational troop control and the cooperation between the enemy troops and the rear, and they partially prevented the maneuvering of operational reserves.

The widespread employment of forward detachments in the last war is explained primarily by the increase in maneuver, fire, and strike capabilities of ground force subunits, units, and formations, as well as the perfection of operational and tactical skill of our command cadres who understood that the more rapid, maneuverable, and dynamic the development of the offensive, the greater was the need to employ strong and mobile forward detachments and the more favorable were the chances of success in their missions.

Thus, widespread employment of forward detachments in offensive operations of the past war was a logical expression of the requirements of military art, which fully corresponded to the level of development of systems and techniques of warfare in the preatomic period.

In connection with the equipment of armies with missiles and nuclear weapons and other new battle systems, the complete motorization and mechanization of the ground forces, and the very significant increase in the ratio of tanks, all of which brought about drastic changes in the nature

and techniques of training and the conduct of combat and operations, there arises the question—of what significance is a current study of experience in the employment of forward detachments in the last war and how should this problem be solved under present conditions?

First we will consider the question from the viewpoint of the forward detachments' assigned objective.

In the past, as we pointed out, the forward detachments were primarily designated to execute missions to seize the most important tactical and operational objectives in the depth of the enemy's rear and hold them until the approach of the main forces, as well as to discover the formation and strength of the enemy.

Has this function of forward detachments now lost its significance? In my opinion, no; the performance of missions to seize profitable objectives and areas remains extremely important to success in an offensive even under present conditions. There is no need to prove the necessity for the timely capture of bridges across rivers, holding them until the arrival of friendly troops, or the seizure of a road junction, a mountain pass, or a defile in the course of a successfully developing offensive or pursuit. In addition to the fact that a swift penetration into the enemy's rear area even by small detachments will assist in containing the defender's maneuver, they will also hamper the enemy's employment of nuclear weapons, and in general will help to undermine the defense's stability and to achieve a high tempo of advance by the attacking forces.

It is true that the execution of missions to seize objectives in the enemy's rear is no longer the monopoly of forward detachments. Airborne forces can also fulfill this role very successfully, but their landing (parachuting) cannot be a very frequent occurrence and will be mostly limited to the most important sectors, moreover, the objectives of landing operations will usually be chosen at a relatively great depth in the enemy's rear. Direct support to the advancing groupings will, as before, be assigned to forward detachments.

Consequently, if we approach the forward detachments' role from this point of view, it would seem that there are no essential changes in their combat utilization. However, this is not the case. There is every reason to assume that under conditions of ever-growing maneuverability and dynamics of combat operations there will be an increase in the tactical and operational significance as well as in the ratio of operations by forward detachments. This is inevitable because in modern battles and operations the forward detachments will have to perform missions of seizing and holding important objectives and securing information on the formation and strength of enemy forces by operating more decisively, at greater depth than before, and in a very complex situation.

It appears to me that the general purpose of this employment in battles and operations must now be viewed primarily as *the ensuring of a more rapid and complete exploitation of nuclear strikes delivered by the advancing forces.*

It is well known that in modern conditions there has developed a certain gap in time between the execution of nuclear strikes and the entry of advancing forces into the area. There is great reason for the fact that progressive military thought is searching for possibilities to reduce that gap to a minimum. As we have noted, it is impossible to completely solve that problem by employing only airborne forces. An entire complex of actions is required and one of them is the employment of forward detachments.

There may be objections that all advancing forces in the first echelon must strive for maximum exploitation of nuclear strike effects. That is true. But even so, comparatively small, highly mobile and maneuverable detachments, which have been assigned concrete tasks, may broadly utilize intervals and gaps in the defense and, without engaging in combat with enemy forces, can much more rapidly reach the designated objectives and support operations of their main forces.

In addition to the above-cited tasks in seizing and holding areas and objectives, it seems to me that forward detachments may now successfully execute an entire series of other, for them essentially new, missions. One of their main tasks must be considered to be *the destruction of the enemy's nuclear systems*, especially the tactical systems. It is apparent that forward detachments could effectively destroy these systems. By rapidly penetrating into the depth, they may fairly inconspicuously and safely (because of the large "dead zone" of rockets) reach the immediate positional areas of rocket units (airfields for missile-bearing aircraft) and destroy or capture them. The detachments could be extremely effective against rocket units on the march while they change their positions. Execution of these missions is facilitated by the fact that rocket launchers are very vulnerable to fire from artillery, tanks, and even rifle fire, as reported by the foreign press. Large forward detachments possessing their own nuclear weapons may be used not only to capture and hold objectives but also to destroy *individual, small advancing enemy reserve groupings*, and to destroy his large control points and communication centers. This may be accomplished independently or in coordination with airborne forces and with support from nuclear weapons and aviation of a higher command. This, of course, does not mean that the forward detachments will supplant the operations of first echelon units of the advancing troops. I am comparing the forward detachments' capabilities with those of the past and considering their expanded range of missions which, in a number of cases, may now exceed the scope of a supporting role.

I believe that forward detachments may be directed also at the *destruction of individual enemy PVO groupings*, in particular surface-to air missiles, antiaircraft artillery complexes, control and guidance posts, as well as fighter aircraft at airfields, and especially those which employ nuclear weapons, including those for use against ground targets. Finally, the detachments may succesfully destroy enemy rear objectives from the march, in particular the nuclear weapon stores and missile assembly bases.

The planned development of favorable conditions for effective nuclear weapon employment against enemy groupings must also be con-

sidered as a new mission for forward detachments. For example, by seizing crossings, road junctions, communications, and important positions, they may force the defending forces, their approaching reserves, and missile units to concentrate, thus creating a favorable target for nuclear strikes.

We see that there now exists a greater volume and variety of tasks to be assigned to forward detachments. In my opinion the greatest increase will be in the ratio of large forward detachments.

It seems to me that on the basis of previous war experience it would be reasonable to adopt the term "operational forward detachment."

At the same time, the role of tactical detachments has not been decreased. In developing an offensive on a broad front, at a great depth, and in separate sectors, the operations of one or two large forward detachments do not eliminate the need for detailing a number of tactical detachments for the purpose of performing various missions in support of the advancing formations. Moreover, as compared with the past, forward detachments may now be dispatched by separate tank and motorized rifle units and in a number of cases by separate groupings operating along different axes.

Thus it may be assumed that under modern conditions the overall number of forward detachments will be increased. It is believed that they will be employed simultaneously or consecutively, but with various targets, tasks, and along various axes of the troop offensive.

The armament and technical equipment of troops is now such that practically any combat-ready motorized rifle or tank formations, units, or subunits may always be employed as a forward detachment without special training. Therefore, there are now none of the difficulties which were encountered in the past war in designating the composition of forward detachments. True, in the final period of the war, as we stated before, they frequently included tank and mechanized units and formations. However, as a rule, these were few and therefore it frequently occurred that the forward detachments (especially those in combined-arms field forces and rifle formations) represented a composite group of rifle, artillery, and other subunits which had to be provided with motor transport. Much time was spent in training such detachments.

The type of troops (tank or motorized rifle) most favorably employed in forward detachments depends on their missions and concrete requirements of the situation. If, during the offensive, it is necessary to cross a series of large water obstacles or cross over expansive areas of difficult terrain, it is more expedient to detail motorized rifle units reinforced by tanks. Forward detachments of tanks possessing great striking force, are more effective in destroying the enemy and more decisive in seizing and holding his objectives.

In determining the composition of forward detachments of units and subunits, which are equal in mobility and maneuverability to the main forces, there may be some doubt whether the forward detachment can break away from the main grouping and fulfill its mission. I note that this

circumstance is sometimes cited as a primary argument which supposedly proves that forward detachments have now become obsolete and lost their role in modern dynamic operations.

But if we turn once again to the experience of the last war, we are easily convinced that even then the dispatch of forward detachments was dictated not so much by the various degrees of mobility of units and formations (although this played a certain role), as by the desire to increase the speed of advance and to increase the depth of simultaneous action against the defender along important axes, primarily there where the most favorable situation was developing.

There is no doubt that the more mobile the forward detachments, the more opportunities they will have for successful operations. This has been fully confirmed by the practice of employing forward detachments in rifle divisions, rifle corps, and combined-arms armies during the last war. However, the possibility and expediency of employing forward detachments is in no way lessened if they are equal in mobility to the main forces of advancing troops. To confirm this fact, I cite the experience of tank, mechanized, and cavalry corps and tank armies. All their troops had almost equal mobility, nevertheless they dispatched and operated forward detachments which more often than not were successful in performing the assigned missions.

How was this achieved? First, they made prompt use of favorable conditions in which the detachments could rapidly break forward, choosing favorable axes for their actions; second, such breakaway actions were given special support, as the detachments were pushed forward by destroying the counteracting enemy units with long-range artillery fire and strikes by support aviation, especially attack aviation. To a large degree this was also made possible by the circumstance that the offensive was being waged methodically and according to plan. The main forces advanced in a continuous unbroken front.

Also of great significance was the skill of the forward detachment commanders in finding the most effective methods for rapid penetration into the enemy's depth of defense, bypassing his strong points and resistance centers and swiftly reaching and seizing the designated objectives. The forward detachments usually did not become tied up in extended battles with the enemy, but exploited the intervals and gaps in his combat formations through extensive use of bypass maneuvers.

In modern battles and operations, there are even more favorable objective prerequisites and factors for a swift breakaway of forward detachments from the main forces and the successful execution of their missions.

First, when the troops of both sides are operating on separate axes rather than on a solid front (as before), there inevitably will be large intervals in the combat and operational formation of defending troops, in the absence of continuous defensive positions and zones, and there will be a considerable dispersion of units and formations in both frontage and depth which will be favorable for the forward detachments.

Second, the employment of nuclear weapons permits a rapid and decisive breakup of any defense and the creation of large breaches and intervals through which forward detachments may rapidly penetrate to a great depth by exploiting the results of nuclear strikes.

I would like to draw attention to the fact that it is now possible to dispatch forward detachments immediately after a nuclear strike against the enemy in the very initial stages of operation and battle, even prior to commencing the offensive with first echelon forces; whereas in the last war they operated, as a rule, during the course of a breakthrough of the tactical defense by attacking troops and in the operational depth. They were not dispatched before this time because the main defense zone was usually strongly fortified and solidly occupied by enemy troops and fire systems.

Nuclear weapons have created favorable conditions for all advancing troops, including forward detachments, for operating at high speeds and for defensive execution of deeper and more complex missions than before. In the past, when forward detachments which had broken away from the main forces encountered strong points and resistance centers in their path, they were forced to bypass them, which delayed the speed of advance; in a number of cases they were required to dig in at the positions reached and to hold them until the arrival of the main forces. Now, the enemy may be hit by missile and aircraft strikes, both nuclear and conventional, in support of forward detachments and at the request of their commanders. This action provides even better chances for the success of forward detachment operations. At the same time, the availability of more perfected artillery and tanks in the forward detachments increases their capability to execute missions in a decisive manner.

Certainly, it is still required that the forward detachment have high mobility and maneuverability (this must be considered when they are detailed), but it is no less important to see that they have as much firepower and striking force as possible. In this regard it seems to me that *it would be expedient in a number of cases to attach tactical missile subunits to large detachments designated to perform such missions as the destruction of nuclear attack systems or large control points, or the routing of enemy reserves*. This would undoubtedly increase their combat capability and independence.

Inasmuch as the need for forward detachments, as cited above, has grown considerably, they may frequently be a permanent element in the combat formation of advancing groupings.

It appears to me that because of the continuity and high pace of a modern offensive we can no longer limit ourselves to retaining the same forward detachments throughout the whole battle or operation, as was done before. They have to make repeated breakaways from the troops (after the performance of successive missions), which presents certain difficulties. Therefore it is obvious that it is now necessary to rotate forward detachments by replacing them with newly designated detachments.

It must be assumed that the nature of operations by forward detachments may change considerably as compared to the past. For example, in

addition to the usual operations of seizing and holding important objectives and positions in the rear of the defending army until arrival of the advancing forces, they may also employ other operational techniques, including so-called *raiding operations*. Basically, these operations consist of assigning to each detachment not just one but several objectives, located at various depths. Such tasks should be assigned in consideration of each detachment's capabilities. Such raids may be especially effective when performed by large detachments. It should be noted that similar operations were employed in some cases during the Great Patriotic War. For example, in the Manchurian offensive operaton, forward detachments from the 6th Tank Army conducted relatively extended raiding operations, breaking away from the main forces by 60 to 80 kilometers and more. However, at that time these were exceptions and tactical forward detachments did not conduct such operations.

Under modern conditions it appears that any forward detachments could operate in this manner, exploiting the results of nuclear strikes and cooperating with airborne forces.

By exploiting nuclear weapon and air strike results, the forward detachments are more capable than before of wide maneuvering and swift advance, without engaging in extended battles with the defender. In addition, when nuclear weapons are employed there is an opportunity to act more frequently by advancing to the designated objective along the shortest route with the aim of seizing it rapidly. The availability of forward detachments facilitates a great dispersion of advancing forces in depth.

I would like to direct attention to the fact that considerable difficulties may also be encountered in forward detachment operations. As distinguished from the past, these detachments may be subjected to nuclear attacks by the defenders and they may encounter "nuclear barriers," zones of destruction, and radioactive contamination of terrain along their path. Therefore, they must now frequently execute missions in very complex situations. This particularly applies to their actions in meeting engagements, when each side will strive to seize and hold the initiative and achieve its goals by a decisive offensive following nuclear strikes.

It might be assumed that, in conducting a meeting engagement after the forces have deployed from the march, there is no need to detail forward detachments, at least until the enemy has ceased offensive operations. In my opinion, such an assumption is unfounded, as forward detachment operations in such conditions will only facilitate the achievement of success. Moreover, the existence of advance units sent out on a march in anticipation of a meeting engagement does not preclude the necessity of dispatching forward detachments, since their aims and operational techniques are very different. In particular, the advance units, as an element of march security, have a basic mission, i.e., to warn and in some measure to protect the main forces against a surprise enemy attack, and to prevent enemy reconnaissance penetration. Therefore, upon meeting with enemy security units they attempt to destroy or contain them. Forward

detachments, on the other hand, must evade combat through maneuver and, as rapidly as possible, reach their designated objectives to destroy or capture them. Of course, both advance units and forward detachments must always coordinate their operations.

To be successful in crossing sectors of large-scale destruction, flooded areas, or areas of radioactive contamination, the forward detachments must be equipped with radiation and engineering reconnaissance devices and engineering equipment which permits a rapid clearing of routes, river crossings, etc., but without overloading them so that mobility will be reduced.

Forward detachments must cross river lines independently or in cooperation with airborne forces. Operations should not be limited to seizure and holding of crossings and bridgeheads, as it was done during the past war, because the enemy can deliver nuclear strikes and destroy the detachment. Therefore, if the situation permits, it is necessary that only a portion of the forces be left behind to hold the captured bridgehead or crossing, and the main body of the detachment must rapidly penetrate as deeply as possible. If the forward detachment links up with an airborne force they must join their efforts to operate even more decisively, including the delivery of surprise attacks against the enemy with the aim of destroying him on the opposite bank. Sometimes the forward detachment will have to cooperate with an amphibious landing force when the offensive is conducted in a coastal sector.

In the past war there was hardly any need to concern oneself with cooperation between forward detachments and airborne or amphibious landing forces. Now that necessity will frequently arise. In determining the procedure for cooperation between landing forces and detachments, there must be an attempt to see that their actions are always coordinated as to missions, time, and place, and coordinated with nuclear strikes against the enemy.

In regard to cooperation between forward detachments and reinforcements, it should be organized in such a way that the necessary assistance with nuclear weapons, supporting aviation, and by the advancing forces themselves may be given to each forward detachment. I want to especially emphasize the role of aviation, which, just as in the past, is the most important and frequently the only means capable of supporting forward detachments. Aviation is called upon to conduct reconnaissance to discover the nature of defense of the objectives to be seized, to carry out strikes against advancing reserves of the defender and his nuclear systems which might be used against the forward detachments, as well as to cover the detachments from the air. To maintain uninterrupted cooperation with aviation, it is desirable that the forward detachment commander have the constant services of an air force representative equipped with communication means.

The successful performance of missions by forward detachments depends to a great degree upon thorough and comprehensive support of their operations. Primary attention is devoted to organization of recon-

naissance with the aim of discovering those nuclear attack systems and enemy reserves which could be used against the detachments and also for the purpose of discovering zones of radioactive contamination. At the same time, the nature of the objectives designated for capture, the intervals in the defender's combat formation, and the degree of terrain passability along the routes of the detachments' operations, must be determined ahead of time. Reconnaissance data must be transmitted promptly to the commanders of forward detachments; thus appropriate communications facilities are necessary, including direct communications with reconnaissance aircraft. The forward detachments themselves must be used as one of the sources for obtaining reconnaissance data on the enemy and terrain along their axis of operation.

Forward detachments require reliable cover against enemy air strikes. This is because they are operating at a distance from the main forces and therefore, as a rule, are outside the PVO zone created by air defense systems of the advancing forces' main grouping. In this regard it appears that the detachments must possess their own forces and systems, both for reconnoitering an aerial enemy and for repelling his attack at both low and medium altitudes. Cover for the detachment by fighter aircraft will be provided according to plan of the higher echelons.

There is a complex problem in the organization and implementation of control over forward detachments, especially if several detachments are operating at the same time. Consideration must be given to the fact that the commander cannot personally observe their actions and that control must be effected through use of a map. The relatively great distance to the forward detachments and the possibility of frequent and drastic changes in the situation in the sector of their operations certainly requires that uninterrupted and reliable communications with them be maintained. Clearly, the best variant would be the organization of communications with each detachment on radio channels. Mobile communications systems, primarily aircraft and helicopters, may also be widely employed.

In conclusion, I may note that unceasing military technological progress and the ever-increasing complexity in the nature of offensive operations are creating the need for further theoretical study of problems of the employment and operations of forward detachments, as well as for systematic, practical tests conducted during combat training.

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Tactics (1966);
Combat Actions Under Special Conditions (1967);
Combat Actions at Night (1970);
Tactics in Combat Examples: Regiment (1974).

Notes

1. *Voyennaya mysl'*, No. 4, April, 1965, FDD 957, 6 April 1966.

The Infliction of Deep Strikes[1]

Maj Gen Kh. Dzhelaukhov

The capabilities of strategic nuclear rocket and other military means allow us to extend the principles of deep combat and deep operation to the conduct of modern combat actions in the depth of a theater of military operations. This article examines one of the most important principles of deep operation, namely, the infliction of strikes against the most remote objectives in the system of the operational-strategic organization of the enemy.

For deep attacks in modern conditions, one must understand the effect of means of armed struggle against important objectives of the enemy located in the depth of a theater of military operations, the destruction of which ensures the achievement of definite operational and strategic goals.

The infliction of deep strategic attacks became possible only with the appearance of modern long-range means, especially nuclear rocket weapons, making it possible to strike, in a short period of time and very effectively, large formations of the armed forces of the enemy country and to demolish its economic centers. The performance of such important missions undoubtedly exerts a very substantial influence on the whole course of combat in a given theater of military operations. In this sense, deep attacks obviously are an integral part of contemporary strategic operations, and the effect on objectives of the enemy located throughout the entire territory of the theater of military operations should be examined as a new feature in the theory of modern military skill.

Striving for the defeat of the enemy in great depth is a characteristic feature of armed struggle of all times: to carry out successfully combat missions and achieve complete destruction of the enemy in a short period of time has always been sought with the aid of deep attacks. In various ages, the means of inflicting deep strikes and their scope depended on the degree of development of weapons and combat equipment, and on the political and strategic goals in a war.

Without going into a careful analysis of such an occurrence in past wars, we emphasize that in the course of World War II attacks on elements of the combat organization of the enemy basically consisted of joint efforts of artillery, infantry, and partially aviation, and were limited to narrow tactical scales. The degree of simultaneous effect on the combat forma-

tions of the enemy and the size of the breakthrough were limited by the extent of the front defensive zone and did not exceed 7-10 kilometers.

However, in the final stage of World War I, there appeared long-range means of armed combat—tanks and combat aircraft which possessed potential fire and attack capabilities to affect at an operational depth the disposition of the enemy.

In the period between the world wars, as a result of the further development and improvement of the means of armed combat, the creation of motorized and tank formations and units, the appearance of special-purpose aircraft (bomber, attack, fighter, etc.) and also of airborne landing forces, the possibility arose for the theoretical development of the principal conditions of deep combat and operation on a modern, for that time, technological and material basis, as well as for the practical realization of these conditions in the system of combat and operational training of the troops and staffs.

The increase in the long-range capability of artillery and aviation and the appearance of powerful armed tank formations and operational field forces able not only to break through the tactical zone of defense, but also to expand this gap, move into an operational area, destroy the reserves, staffs, and rear troops, and complete the rout of a large disposition of the enemy, led to a qualitatively different phenomenon and introduced new content into the theory and practice of operational art. These means of armed combat provided the possibility for the simultaneous overwhelming of the enemy, that is, the breach of his tactical zone in a short period of time and the destruction of the entire system of the operational organization of defense. Tanks and aircraft, by virtue of their combat capabilities, surpassed tactical levels and made it possible to penetrate the operational formation of the enemy. The evolution of arms and combat equipment and the use of masses of tanks, aircraft, and airborne landing troops outside the limits of the tactical formation of the enemy allowed deeper strikes of operational significance.

As a result, it became possible in the course of World War II to conduct important operations with the infliction of deep attacks. As the experience of World War II, especially the Great Patriotic War of the Soviet Union, testifies, such attacks on the operational organization of the enemy, carried out by mobile tank and motorized and mechanized troops in cooperation with aviation and airborne landing troops, acquired a wide operational scope.

It is quite natural that such actions in operations of the two world wars of the prenuclear period were still not able to lead to the simultaneous and effective defeat of the operational-strategic organization of defense of the enemy in a short period of time. In connection with this, in the course of operations, the overwhelming and destruction of the principal formations of the enemy on an operational scale were carried out consistently, step-by-step, although at insufficiently high pace and extended in time to quite a few days.

From this important position came the following. For the time being, the defense was breached in complete tactical and operational depth, and the surrounded operational formations of the enemy were destroyed, but in the end they succeeded in bringing up strategic reserves and reserves from passive areas and creating a defense on a new line.

As the experience of the last war shows, the attacker was in a position to shatter thoroughly the operation of the enemy and penetrate his position on a wide front and in great depth. But the achievement of the transformation of operational success into strategic success demanded the execution of a series of consecutive in-depth operations.

This can be explained by two basic circumstances: in the first place, the buildup of the efforts of the attacker by introducing fresh reserves could not continue unbroken, the consequence of which was the slackening of the pace of attack and its tapering off; in the second place, the longest-range weapon of that time—bomber aviation—even by its most effective employment with the use of heavy bombs, could not radically solve the problem of crushing important reserves and destroying objectives in the rear of the enemy. As a result, a breach of strategic scale, in the presence of undefeated important strategic reserves and objectives in the rear area, could not be carried out in a short period of time. An operational pause came, and the necessity of a new breach of the defense of the enemy arose in the organization of the next operations.

In this way, means of armed combat in the course of World War II and in the prenuclear period made it possible to carry out the crushing of formations of the enemy in the operational sphere and thoroughly destroy his operational organization. Such a struggle required a certain time and great efforts on the part of the attacker. The crushing of strategic formations of the enemy, as a rule, could be accomplished as a result of the simultaneous or successive conducting of a series of extended operations by the front field forces.

Further postwar development of science and technology has led to the creation of contemporary means of armed combat—nuclear armaments and their carriers—above all ballistic and cruise missiles of various functions with colossal destructive capabilities and unlimited range of operation.

Nuclear rocket means of a strategic and operational-tactical designation, strategic and tactical aviation, and submarines and surface ships which have nuclear and conventional means of armament are capable of a wide radius of operation and can carry out attacks on various remote objectives of the enemy country located in the depth of a theater of military operations.

In connection with this, natural questions arise: how do these long-range and destructive means of armed combat influence the character and scope of contemporary operations? What does the utilization of such forces and means of attack on distantly located objectives introduce into the theory of military art?

In order to better explain the essence of these questions, we will

restrict the limits of the analysis to the limits of the theater of military operations, since in the unfolding armed combat in it [the theater], the military qualities of all types of armed forces can obviously be shown more fully and completely.

First of all we will examine the function of deep attacks, that is, with what goals they can be carried out. We remarked above that such attacks of an operational and strategic character are an integral part of contemporary strategic actions conducted in a given theater of military operations.

Such armed force can be directed toward carrying out missions in the destruction of nuclear rocket means of an operational and strategic designation, the crushing of large formations of armed forces, the destruction of important economic objectives and large control posts, and the defeat of strategic reserves located in the theater of military operations. Consequently, the infliction of deep attacks solves important problems on the road to the achievement of the final goals in modern operations in the theater of military operations.

Deep attacks are not uncoordinated, chance attacks on separate objectives of the defender, but coordinated actions of various types of armed forces according to a unified plan directed toward the solution of specific operational and strategic tasks within the limits of the theater of military operations. But most important in understanding the content of the phenomenon being examined is the strategic result, that is, the achievement of the strategic goal.

What are the bounds, in other words, where is the closest boundary of disposition of the objectives of the defender beyond which attacks on them can be considered deep? Obviously, some kind of constant criterion in this question is impossible. Everything depends on the theater of military operations and the specific conditions of the operational-strategic situation. The main influence on this will be exerted by operational and strategic factors, namely, what operational or strategic significance for the whole course of the armed struggle on the theater of military operations will the suppression (crushing, destruction) of a particular objective of the enemy have. For example, the destruction of formations of strategic and tactical aviation or the crushing of important reserves of defense located in the theater of military operations and having an operational designation, regardless of their distance, can qualify as deep attacks as long as definite operational and strategic goals are achieved by them.

Nevertheless, to understand the essence of deep attacks and in the interests of planning an operation, it is obviously advisable to specify their distance. We agree to consider that the forward (closest to the attacker) boundary of such attacks can be the closest limit of activity of operational-tactical missiles and frontal aviation. Such a recommendation is based on the fact that the indicated means of armed combat are first in the arsenal of means for inflicting deep attacks of an operational scale, and that with them one can implement the important missions over the entire length of the operational organization of the defender.

We will examine now the objectives of deep attacks. In the interest of

facilitating the operational-strategic evaluation of a large number of heterogeneous objectives, it is advisable to group them by corresponding features and put them in the following classification groups.

The first group is nuclear means of a strategic designation. In this is included ballistic rockets of a strategic class, atomic rocket-carrying submarines, strategic aviation based in a given theater of military operations, and also naval bases for atomic rocket-carrying submarines, storehouses of nuclear armaments, and posts for the control and guidance of strategic nuclear means.

The second group includes nuclear means of an operational and operational-tactical designation, including tactical and carrier-borne aviation, which operate in the bounds of a given theater of military operations, cruise missiles and various ballistic missiles and airfields for basing, storehouses of nuclear weapons, and posts for the control of these means.

The third group includes large formations of ground forces; strategic and operational reserves, including also those transported by railroad, automobile, and naval transportation; storehouses of arms, combat equipment, and fuel; and also naval bases in the theater of military operations and control posts of operational and strategic level.

The fourth group includes airfields of fighter-interceptors, complexes of antirocket and antiair defense, important radiotechnical centers, and centers for control of PVO forces and means.

The fifth group includes important military-industrial objectives, administrative-political centers, transportation centers and ports, and centers of state administration.

It is quite understandable that such a classification and grouping of objectives is conditional and changeable. In the course of armed combat or at the beginning of it and in different theaters of military operations, by the force of a series of circumstances—political considerations which complicate the strategic situation and others—the groups of objectives indicated above may change places in the degree of their importance: objectives of the third group switch to the second or even first group, and vice versa.

Besides this, the indicated objectives should be examined and classified by the degree of their danger for the attacker. Thus, the launch position from which 10 minutes ago a strategic rocket was launched does not represent an immediate threat, since the firing of another missile requires a certain period of time. And although strategic rockets are regarded as the most important objectives, in the given case the launch position will be less dangerous than other objectives which could inflict immediate strikes. An airfield of strategic aircraft with bombers which have just landed is just as important an objective for attack, but it is less dangerous than a similar airfield with aircraft ready to take off carrying nuclear arms.

Besides that, objectives grouped similarly can prove to be closer to the attacker or farther from him (correspondingly more or less dangerous) and located in the direction of supplementing the main efforts of strategic formations or in directions where secondary missions are carried out.

Objectives of a deep attack can vary also in the degree of their vulnerability. for example, airfields, formations and reserves, openly placed rocket installations, combat ships at base and on raids, other stationary objectives, and also junctions of roads and various industrial plants are easily vulnerable. Rocket launch installations in hard sites, storehouses of nuclear weapons, control posts in hard shelters, and submarines and surface ships at sea are not vulnerable objectives.

Having accepted the introduced classification of objectives according to their importance, degree of danger, and degree of vulnerability under conditions of their correct evaluation, it is necessary also to determine the time of attack, that is, to establish priorities for inflicting deep attacks. This is especially necessary due to the limited quantity of means for this.

Due to the limited possibilities for inflicting deep attacks, it is expedient to begin with the objectives most dangerous to the attacker.

The solution to the given question should be reached in various ways, based on the conditions of the situations created.

Theaters of military operations are not limited just to land, but take in, as a rule, a significant area of the ocean, and therefore the concept of deep attacks should be applied also to objectives which operate in the water section of a given theater of military operations. It is known that naval forces not only wage combat on the ocean, but above all will inflict strikes on objectives on the land part of the theater of military operations. Thus, rocket-carrying atomic submarines and rocket-carrying surface ships are basically designed for attacks on military and economic objectives in the theaters of military operations. Similarly designed are, for example, attack aircraft carriers with assault aircraft based on them. Along with destroying naval targets, deck aviation is widely used for inflicting strikes on objectives on dry land. This is shown by experience of World War II, numerous postwar training exercises, and especially the villainous bombing of North Vietnam by carrier-borne aircraft of the U.S. 7th Fleet.

It follows from this that all rocket and carrier-borne forces which operate in the sea area of a given theater of military operations, and also important sea transports and convoys with troops and supplies, are objectives of deep attacks.

For determining the depth of attacks on objectives of the enemy on the sea, it is necessary to consider the radius of action of the weapons of the rocket-carrying submarines, ships, and naval aircraft of the defender. In any case, along with the destruction of objectives in the rear area of the continental theater of military operations, it is advisable to destroy also objectives on the sea to that distance from the seacoast from which the strike means of the enemy naval forces can hit the rear area of the attacking side.

The classification of objectives examined above facilitates their evaluation and promotes the correct organization of combat against them. However, as we can imagine, the planning of deep attacks demands the grouping of objectives not only by their related features and affiliation with a general classification group, but also according to the regions with

the most important objectives. It is known that, within the limits of the theaters of military operations, very diverse objectives which belong to different groups are located in specific regions. For example, in a region where strategic aviation is based there can be storehouses of nuclear arms, fuel, ammunition, and equipment, and also important industrial centers, including plants for military production. In these regions there will be a large quantity of air defense forces and means. Such diverse objectives can also be found in other regions of the theater of military operations.

Continuing our discussion on the given question, it should be said that in the principal regions for basing tactical aviation there are usually various control posts and storehouses of nuclear ammunition and fuel for supporting the combat actions of tactical aviation. Here reserves are formed or troops are concentrated after the completion of marches on railway or ship transports, and also various forces and means of air defense covering military and economic centers can be located.

Therefore, to organize combat against such objectives of the enemy and to plan deep attacks of operational-strategic significance, in all probability it is advisable to divide the territory of the theater of military operations into several regions with the most important objectives. In each such region there will be some group of main objectives (for example, a base of strategic aviation or vast reserves, or important industrial centers), and along with them other less important objectives. Altogether in such regions there can be scores of very different objectives, from among which the most important will be selected.

The grouping of objectives by region, in our view, facilitates the planning of military operations, the use of different forces and resources for inflicting deep attacks, and the organization of cooperation between them. In every region or group of regions important objectives can be destroyed or attacked by one or another type of armed forces.

We will examine the possible forces and means which are used for inflicting deep attacks. It is obvious that such attacks on the most distant objectives of the enemy will be carried out with the use of the long-range forces and means of all types of armed forces. The most effective means are the strategic ballistic rockets, which possess a great radius of operation and powerful destructive force. In accordance with their destructive characteristics and combat capabilities, it is advisable to use strategic rockets against stationary ground objectives (economic centers, important military bases, including missile bases, installations of the armed forces, etc.), which are located on the continental part of the theater of military operations.

The next most important means of making deep attacks is strategic aircraft capable of destroying stationary and mobile objectives. Because of such combat capabilities, they can obviously be especially effective against strategic reserves, rocket launch positions, and combat ships and convoys. Strikes of aircraft here can be carried out independently or in cooperation with operational and strategic rockets and rocket-carrying submarines.

Strategic aviation is also effectively used for the destruction of airfields for strategic and tactical aviation in a given theater of military operations, various control posts of operational-strategic significance, storehouses for nuclear arms, and important junctions of roads and other important objectives. In certain conditions of a strategic situation (for example, with limited resources of nuclear weapons and the necessity to hit a large number of mobile objectives), aircraft will be the most important mobile force in the hands of the high command for making deep attacks.

For attacking objectives of the enemy which operate from the sea, it is advisable to use heterogeneous forces: atomic missile submarines, naval missile-carrying aviation and surface ships, and armed long-range means. The indicated forces, in the limits of their radius of operation and in accordance with their combat capabilities, can carry out attacks on objectives on the sea, and also on coastal objectives of a given theater of military operations, for example, on naval bases, ports, formations of troops located near the coast, and in its depth.

In the course of armed combat, operational-tactical missiles and frontal aviation can also be widely used for inflicting deep attacks in a theater of military operations. One must suppose that within the bounds of their range they will be the most effective means of attack at medium distances.

However, the content of modern large-scale operations cannot be limited just to attacks of nuclear and other fire means. In the course of their conduct in the theater of military operations, airborne and naval landing forces of an operational designation will also often be used. The actions of such landing forces in the deep rear area of the enemy can prove to be most effective, especially after the infliction of nuclear attacks on objectives in the regions of the impending landing of troops and during activity in the rear area of the enemy of various armed formations. Attacks by the forces of the landing troops against reserves, operational-strategic control posts, and separate withdrawing formations brings great disorder to their ranks and can substantially reduce the degree of resistance of the defense.

Attacks on remote objectives in a theater of military operations will also be carried out by the fast and deep break-in by attacking formations of land forces, expecially tank formations and field forces which operate in operational depth in cooperation with large airborne and naval landing forces. The rapid advance of combined-arms formations and field forces, the commitment to combat of second echelons and large reserves, the breaking up of defense formations, and the deep penetration of attackers into his position deprives the enemy of the possibility of systematically using his means of combat of operational significance, mainly because of the necessity to shift his rear area and because of the time lost in bringing these means to a state of combat readiness. All this breaks the system of operational organization of the enemy and facilitates the achievement of his complete rout.

Thus, in contemporary war, action on deep objectives of defense in the course of armed combat in the theater of military operations will be carried out by weapons of long-range action (ballistic rockets, aircraft, and naval forces) that can bring about the most substantial results, and also by deep penetration into the enemy rear area by airborne landing troops, naval landing troops, and field forces of the ground troops. In other words, deep attacks are carried out by the combined efforts of all kinds of armed forces.

The action of the indicated forces and resources will be coordinated by place and time and conducted with the consideration of combat characteristics and capabilities of all forces which carry out attacks on objectives of the enemy in the depth of the theater of military operations. In coordinating such attacks and in the organization of precise coordination between the heterogeneous forces and resources participating in the making of the deep attacks, a decisive role belongs to the strategic command echelon which plans and conducts strategic actions in the theater.

This echelon, taking into consideration the importance of the solution of the tasks for making deep attacks, will determine objectives of such attacks and the priority of their attack, plan deep attacks, allocate the objectives among the selected forces and means, set the time (timetable) of making the attacks, and also organize cooperation and control.

We will examine one more condition. Are such operational-strategic forms of deep attacks independent elements of strategic operations conducted in a given theater, or do they represent only part of other forms of military operations (for example, part of the operations of the appropriate branches of armed forces)?

As has already been mentioned, deep attacks on objectives in a theater of military operations are a constituent part of operations which are conducted in a given theater in accordance with basic principles of deep operation. We have also established that all types of armed forces take part in making deep attacks.

Attacks which are carried out by strategic rocket means are a constituent part of the first nuclear rocket attack.

As regards attacks of strategic aviation and naval forces, the operations of airborne or naval landing forces, and also deep attacks carried out by frontal aviation and operational units of the land forces, they form a constituent element in the action of the appropriate branches of armed forces and are conducted by different methods.

The infliction of deep attacks in modern conditions is a qualitatively new proposition in the theory of military art. Only with the development of nuclear rocket weapons and other long-range weapons has it become possible to conduct, in a short period of time, direct and very effective deep attacks and achieve results not only of operational, but also strategic significance and thus facilitate the performance of the main strategic missions in the theater of military operations.

The idea of deep attacks and its practical realization in the course of armed combat have undergone a definite evolution. At the end of the

World War I, attacks on the enemy were limited to tactical scales; in the course of World War II, such attacks already had an operational and, in a number of cases, even strategic scale and were carried out within the limits of a deep operation; in modern conditions—if nuclear arms are used—attacks can be carried out in the whole depth of the theater of military operations within strategic limits. In other words, deep attacks of modern means of armed combat make it possible to widen the scope of operation and acquire operational as well as strategic scales, both in types of objectives and results of attacks, and also in the range (depth) of effect, that is, in the targets reached by the infliction of deep strikes.

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Note

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The Growing Role of Airborne Troops in Modern Military Operations[1]

Col K. Andrukhov and Col V. Bulatnikov

The use of airborne troops, as is known, constitutes a unique method of attack in which the maneuvering and movement of troops is carried out in the air in transport aircraft.

The origin of the theory and practice of the use of airborne troops of various scales is connected with the development of means of aerial combat and, accordingly, means of attack.

Military science has been consistently resolving over a period of centuries one of the main tasks, that of ensuring the correct correlation between strike (fire) power and mobility of troops. The appearance of a more powerful type of weapon each time has brought into being new troops, whose maneuverability corresponds to a certain degree with the firepower of this weapon.

The creation of means of armed struggle which ensure the overwhelming of the enemy not only at the front, but in the deep rear, required the use in attack of those forces which could quickly utilize the results of the fire effect. The basis for their creation was established in accordance with the degree of development of aircraft. They became airborne troops. Since then it has been possible to carry out the idea of "vertical envelopment."

Airborne troops were used on a large scale for the first time in World War II (if one does not consider the maneuvers during the prewar years). This was the time of the origin of the combat airborne troops. Even then, however, the airborne troops gave considerable help to the attacking troops. In certain instances, they independently carried out vast operational and even operational-strategic missions. For instance, in May 1941 the German Fascist airborne troops seized the island of Crete. In early 1942, Soviet airborne troops prohibited the departure of enemy troops and the movement of his reserves on the Western Front in the region of the city of Vyaz'ma.

It must be stated, however, that during the past war, landing forces were used only occasionally, and the missions which they were given consisted largely of capturing and holding bridges and river crossings, helping in the landing of amphibious troops and the overcoming of sectors of an area difficult to pass on the part of the attacking troops, and carrying out various diversionary operations.

How can one explain such a modest role of the airborne troops during the past war?

Undoubtedly not by the fact that there was no need to transport large groups of troops by air to the deep rear. There was, of course, such a necessity. The main reasons were that the enemies at that time did not devote sufficient attention to the development of airborne troops and did not have sufficient potential to carry out vast landing operations. This involved primarily the absence of powerful means of destruction and of military transport aircraft with the necessary tactical-technical qualities.

During the postwar period, the theory of the use of airborne troops developed continuously, and the practice was improved.

The equipping of the Armed Forces with nuclear weapons constituted a basis for military-theoretical thought to decide on the necessity of using airborne troops more broadly in military operations. Such conclusions were engendered by the capability of the nuclear weapon, in resolving the main tasks, to reliably lay the path for aircraft to the deep rear of the enemy and to overwhelm and destroy him in the regions of the landing, as well as by the necessity of utilizing more quickly the results of nuclear strikes for the complete destruction of enemy groupings.

Essential changes in the development of theory and practice of the use of airborne troops were determined by the appearance of new aircraft with greater speed, range, and load capacity, as well as by the more modern airborne landing equipment. While the aircraft previously used for airborne landing permitted the dropping mainly of personnel with light armament, during the postwar period, military transport aircraft and airborne landing equipment have appeared, with the help of which it has become possible to land not only personnel, but also motor vehicles, weapons, and various types of heavy cargo.

The aircraft pool of military transport aircraft has increased sharply. Civil aviation has become a powerful reserve for it.

The creation of the helicopter has increased the possibilities for landing airborne troops from the personnel of regular ground troops who have not been trained in airborne landing. And this, in turn, has helped to resolve certain serious problems. Whereas with the parachute method of landing the troops were greatly dispersed after their landing and their combat efficiency remained low for a certain period of time, the troops delivered to the landing region in helicopters are ready to go into combat immediately.

The process of vast development of military transport aircraft and helicopters is continuing steadily in all countries of the world. The resolution of such problems as basing aircraft at unpaved airfields and areas of small sites, the creation of aircraft with vertical take-off and landing, and the further development of equipment will permit the design of new, more economical military transport aircraft for basing at unpaved airfields. As a result of the installation of engines which have a low relative expenditure of fuel, the flight range of these aircraft and their load capacity will increase. As is known, in a number of countries aircraft are now being

created which have considerable load capacity and rate of flight range.

Medium military transport aircraft with a load capacity of up to 20 tons which are designated for delivering troops and combat equipment by parachute and landing have also undergone some changes. They have a great flight speed and can land in an unpaved area.

Military helicopters are being broadly developed simultaneously with military transport aircraft. According to reports of the foreign press, helicopters are being developed in the United States with a speed of from zero to 500 kilometers per hour.

In view of intensification of air defense, the new flying apparatuses used to transport personnel are better equipped with means of combating antiaircraft weapons on the ground, as well as the enemy in the air.

In the opinion of specialists, means and methods of landing troops should be improved in such a way as to ensure the least vulnerability of planes (or helicopters) in the air, the dropping of troops in subunits with their weapons, combat equipment, and supplies; and the continuous material-technical supply of the landing troops carrying out lengthy combat operations.

In this connection, many foreign military researchers are interested in the possibility of carrying out landings using containers. This is mentioned in a number of foreign military journals. The main significance consists in the fact that the troops making up a group or platoon are dropped from aircraft in containers along with the group weapons, means of communications, ammunition and a minimum amount of other combat equipment, and the necessary supplies. The containers must be hermetically sealed and adapted for drops from aircraft flying at great speeds (more than 1,000 kilometers per hour) and at great altitudes (up to 24,000 meters). The container may be equipped with devices to reduce the speed of drop and the gliding. This will ensure its landing at the specified point.

It is felt that implementation of the idea of landing troops and cargoes in containers will permit us to abandon flights of aircraft in mass combat formations at low altitudes and speeds in the process of dropping airborne forces. This will decrease the vulnerability of aircraft to enemy air defense means.

It is easy to conclude from the above that henceforth combat operations of ground troops will be conducted to an ever-greater extent with the use of the air zone and will become considerably larger in scope and varied in content.

The desire to achieve a high degree of mobility is also expressed in the adaption of combined-arms formations for landing and in their intensified preparation for transfer by air. The military leaders of the United States and other countries feel that in connection with expansion of the range of missions of the airborne troops, as well as with the increase in the potential of transport aircraft means, regular ground troops should also be extensively used as airborne forces. Therefore, in recent years the American command element, for the purpose of achieving high mobility of formations and units of the Strike Command and other strategic forces, have

dealt more intensively with questions of organizing the transfer of troops by air over great distances. For this purpose, a series of training exercises have been conducted: Big Lift, Delaware, Queen Release, etc. Along with international transfers, much attention is being devoted to the transfer of troops by air within one or two theaters of military operations, mainly in Western Europe. In order that the regular ground troops may be used successfully as airborne troops, special airborne training has been included in their program and instruction.

For the purpose of increasing mobility, ground troops are being extensively equipped with aircraft. This is seen in the fact that in 1965, after more than 80 large-scale field exercises and war games were conducted, in the process of which the combat effectiveness of an airborne and a regular infantry division were compared, the first American airmobile division was formed. Included in its armament are 428 helicopters and 6 aircraft which can transfer simultaneously one-third of the combat units of the division. The remaining units can be transferred by transport aircraft or by other sorties of helicopters of the division.

After studying the condition and prospects for development of a material-technical base which determines the scale of airborne landing of troops, one can assume that it has increased sharply in comparison with that which was at the disposal of the belligerent armies in World War II.

However, this is only one aspect of the matter. No less important is that fact that the use of airborne troops in military operations is increasing considerably not only on the strength of new technical potential, but also in connection with the changed nature of armed combat.

To achieve success, the troops must develop their attack along the entire depth of disposition of the enemy simultaneously on the land and in the air.

The deep rear constitutes the sphere of operations of large-scale airborne troops, the chief missions of which will be to seize and destroy strategic objectives. To carry out missions of an operational and tactical nature, operational and tactical airborne troops can be dropped and landed. The tactical troops here, in connection with the small depth of landing and the short flight time, will undoubtedly be more widely used.

Having seized, mostly following nuclear strikes, the key objectives and regions in the rear of the enemy, the strategic, operational, and tactical airborne troops paralyze the enemy by means of their active operations. This will permit not only resolution of the problem of the fastest use of the results of nuclear strikes throughout the entire depth, but also an increase in the speeds of attack of troops and a decrease in the duration of military operations on the whole.

It should be stressed that an aerial attack cannot end with the one-time use of landing troops. The dropping and landing of aerial troops will be carried out not only at the beginning of military operations, but also in the course of them and even on completion of them. Only this type of attack will permit the achievement of the goals set.

The growing role and scales of use of airborne troops are also making

a definite imprint on the organization of their combat operations. Above all, attention should be paid to the fact that the landing of troops in modern conditions is an extremely complex matter. This is explained mainly by the qualitative and quantitative increase in means of counteraction against flights of airborne troops. This is why the importance of careful organization of landing is increasing to a large extent.

In our opinion, in modern conditions the person responsible for the use of a particular airborne landing will evidently be the commander who organizes the military operations on the appropriate scale. If, let us say, it involves a large-scale airborne landing, its application will be a function of that commander to whom is entrusted the leadership of military operations in this theater. This will permit the most purposeful use not only of airborne troops, but of other forces and means. This requirement is also fully applicable to the operational and tactical airborne troops.

Precise cooperation of all forces and means in the course of the training and the use of airborne troops will have an extremely important role. The essence of cooperation consists of ensuring coordinated operations for the most successful flight, transfer of troops to the designated region, and completion of their missions.

Because nuclear weapons constitute the chief means of destroying the enemy, the main aspect of cooperation now becomes coordination of the forces of airborne troops with nuclear strikes, troops attacking from the front (in operations in a coastal direction, with the navy and amphibious landing forces), and also with the forces which protect the airborne landing from enemy action.

Various forces and means participate in preparing and carrying out the landing and in supporting the airborne troops. Their organization here can be quite varied. Each link of this organization carries out a portion of the overall mission. It is very important to organize cooperation in such a way that the combat characteristics and potentials of all forces and means are skillfully combined and that the weak aspects of some are mutually compensated for by using the strong aspects of others. Particular attention should be given to the fact that in preparing and carrying out a landing, the forces and means which participate in it or which support it may be located at a distance of tens, hundreds, and even thousands of kilometers from each other.

The peculiarities of attack by air, particularly its great range in distance and high speeds, call for certain adjustments in the content of operations for the purpose of thorough support of a landing, and make greater demands for speed and timeliness of their fulfillment. This concerns above all those instances where aerial landing is conducted at a great depth.

The main goals of thorough support of the airborne troops are to create the most favorable conditions for the fastest ascent of the troops into the air, an unhindered flight to the necessary region, and the timely utilization of the results of nuclear strikes, as well as to maintain the combat efficiency of the landed troops and make it difficult to use nuclear

weapons and other forces and means against them.

Such a form of support as reconnaissance has a particularly important role in the use of airborne troops. Along with fulfilling those missions which it must perform in the ground attack, it must reveal the air defense system of the enemy along the entire flight course of the airborne troops and in the landing regions, as well as determine the possibility of the landing of airborne troops and their organized entry into battle.

The struggle against enemy radioelectronic means is acquiring great importance. This type of support during attack by air can influence to a considerable degree the successful overcoming of the air defense of the enemy and his failure to use means of nuclear attack.

Other types of support also have characteristic features. Their consideration will permit the more successful use of airborne troops.

Changes are also possible in leadership of the activities of the troops. In this case, it is kept in mind that at the present state of development of means and methods of armed struggle, an attack by air can be carried out by only a certain portion of ground troops. Therefore, in the process of preparing for and conducting a general attack, two strongly pronounced groups of forces and means are formed. One group consists of troops which attack on the ground, and the other, of troops which attack by air. The greatest difficulty in commanding the troops arises when these conventionally separated groups are located at a great distance from each other. Such a situation can be present both in preparing for an attack and in carrying it out. Considering this, it is evidently necessary to appoint a commander and to assign the corresponding command element to command the troops carrying out the attack by air and those supporting the attack.

The transport of troops by air to the enemy's rear area, although extremely important, is only a portion of the mission. After the drop (or landing), the troops must be able to conduct highly maneuverable, mainly offensive operations for the purpose of completing the destruction of the enemy after the nuclear strikes have been inflicted. To do this, they should have the appropriate means of combat and movement.

Everything that has been discussed above concerns conditions of nuclear rocket warfare. However, airborne troops are also widely used to conduct combat operations with conventional means of destruction.

We take the liberty of asserting that in the future, the role of airborne troops in military operations of various scales, as well as the landing of airborne troops in general, will grow continuously.

The transfer of a greater and greater portion of ground troops by air in the course of offensive operations and battles does not merely constitute a quantitative growth of airborne troops. Obviously, in doing this, there will be a considerable expansion in the scope of their missions and a change in the composition, equipment, means of landing and support, etc. This, in turn, will lead to a change in the nature of operations (battles) and their principles.

For example, it is possible that troops attacking from the front will

break out into the areas of operations of airborne troops. In this case, in the organization of military operations, one of the primary questions is that of uniting the forces of troops attacking on the ground and the airborne troops.

In carrying out a mass landing (in dropping large numbers of airborne troops), this question can be resolved in a somewhat different manner. It seems to us that much attention should be devoted to unifying the forces of the landing troops themselves, which operate at a great depth and in a large area. An airborne force transported to the deep rear of the enemy must be able to conduct military operations without counting on linking up quickly with the ground troops. The force itself or in conjunction with other such landing forces will constitute a unique operational group and will carry out all the missions previously assigned to it or which arise in the course of military operations. To do this, the troops which constitute the force need the same qualities which are inherent in the troops attacking from the front: a high degree of maneuverability and the possession of all types of weapons, equipment, and material means necessary to conduct long-range military operations, both in conditions of the use of nuclear means by both sides and without such conditions. Only in this way will the dropping and landing of large numbers of airborne troops be of significance. It will justify the expenditure of the vast amount of forces and means which are needed to ensure landing.

Of specific interest to this regard are the statements of certain foreign military figures, in particular of the American colonel B. Rigg [sic], which were published in the September 1965 issue of the journal *Military Review*. The essence of these statements consists of the creation of so-called "kinestatic" troops which have "unusual mobility and firepower." These troops, just as airborne forces, in the opinion of the author, must penetrate deeply into the territory of the enemy and, after arriving in his deep rear area, must have "secondary mobility." What is meant by secondary mobility is the capability of the landed troops to inflict consistent strikes against many objectives, during which they move with the help of their organic aircraft. Transport means for this must be in four categories: an armed tactical transport aircraft for the hauling of combat units; a tactical unit; a transport aircraft for servicing the rear area; and an interceptor aircraft capable of covering troops from the air and suppressing ground targets. Through the combat operations of these troops, in the opinion of the author, an entire country or continent of the enemy could be seized in a short time.

Special attention must be given to the organization of reconnaissance. There is a demand for more detailed data on the enemy, the extent of his suppression, the radiation conditions, etc.

Colonel Rigg points out in the above-mentioned article that without an appropriate reconnaissance system, extended mobility and the capability of deep penetration into the territory of the enemy will be, to a certain extent, useless. Means are needed, in his opinion, which are capable of carrying out reconnaissance at long ranges, quickly, accurately, and in an

extended operational manner. He feels that artificial satellites, special rockets, and perhaps new, as yet unknown means, could serve as such means.

In carrying out a mass landing operation, all of its problems must be planned in a centralized manner. Take, for example, the question of protecting the flight of the troops. The struggle against air defense means will become consistently more complicated. Therefore, evidently, in the future, original corridors will have to be made through which the troops will be able to penetrate to the rear of the enemy. However, if such a possibility arises, then evidently, when necessary, several landing forces can fly through these corridors. If, let us say, a corridor has been made for the flight of a large airborne landing force, it can also be used for the flight of subsequent, small airborne landing forces,

This requires centralized and very careful planning of the use of nuclear weapons, the enlistment of various forces and means to make the corridors, and the distribution of time and altitudes for flight of the landing forces through them. It is especially important to determine correctly the expedience of each nuclear explosion, its force, time, and, what is most important, type, in order that the nuclear strikes do not preclude the overflight and combat operations of the landing forces.

Such centralized planning of the attack operations or, perhaps, of their main problems, it seems to us, is possible on the level of the theater of military operations. The operations of field forces will be planned on the basis of the overall plan.

The increase in the proportion of airborne troops also raises a number of problems in the field of organization of the armed forces, problems about which we have already spoken. They concern above all the determination of the most rational correlation in numbers and equipment of the troops which attack on land and by air, as well as in each organizational element (field forces, formations), and determination of the need for aircraft, means of transport on the ground, and other special equipment.

Thus, one can foresee that, in accordance with the degree of development and quantitative growth of means of landing operations, an ever greater number of the ground troops will be transferred by air in the course of operations, and the proportion of airborne forces will constantly increase.

To sum up, as the result of the process of constant development of means, forms, and methods of armed combat, attack by air will hold an ever-greater place in modern military operations.

Note

1. *Voyennaya mysl'*, No. 7, July 1966, FPIR 0475/67, 17 May 1967.

Coordination Between Aviation and Tanks[1]

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The problem of coordination between aviation and tanks in ground force offensive operations was elaborated on the eve of World War II on the basis of objective material and technical grounds. As a result of vigorous development, tanks, which had been made a new combat arm, and aviation, which had been transformed into an independent branch of the Armed Forces, became to an ever greater degree the leading forces of offensive. Coordination between them became the focus of attention of theoretical investigations and troop operational training in all major armies of the world.

Soviet military art made a particularly large contribution to development of the theory and practice of coordination between large masses of aviation and tanks.

An imaginative refraction of war experience through the prism of modern requirements will allow more complete representation of the possible organization of coordination between aviation and tanks in the future.

It should be kept in mind above all that ground force offensive operations conducted immediately after delivery of mass strategic nuclear strikes will be characterized by great spatial scope, high tempos, exceptional impetus, dynamic action, and intensity. The success of these operations will depend entirely on the coordinated employment of all forces and means. Of course, the role of branches of the Armed Forces and of combat arms is here considered to have essentially changed. Thus, strategic nuclear forces will have decisive significance within the framework of these operations, as will the operational and tactical missile troops, in which the main nuclear missile power of the ground forces is concentrated. With enormous power, long range of operations, and a capability for wide and flexible maneuver of fire, they will decisively pound the enemy with their crushing nuclear strikes, creating a thorough and abrupt change in the development of offensive operations. But along with the development of missile troops, there have also been radical changes in the combat capabilities of tank forces and aviation.

A proper determination of principles which can be made the basis of organization of coordination between tanks and aviation largely depends on a consideration of their capabilities.

Tank forces in a number of countries have come to have an incomparably greater striking power, mobility, and firepower than before,

thanks to a change in their tactical and technical characteristics, their outfitting with missiles, rocket-launching artillery, and antitank guided missiles, and improvement in instruments to control fire under any conditions. In addition, some types of tanks are adapted to cross underwater barriers by floating and along the bottom and are equipped with a system for antiatomic defense. With their powerful fire, high mobility, reliable armor protection, and great viability, tank forces are the main striking power of the ground forces. They are capable of quickly and effectively exploiting results of mass nuclear strikes and of successfully crossing vast zones of radioactive contamination, destruction, and inundation.

Strong tank groupings, designed for operations at high tempos on main axes of attack, can make marches several hundreds of kilometers long in a short time without refueling; enter meeting engagements from the march without any pause; and deliver powerful, precipitate, and deep blows against an enemy. Advancing day and night without interruption, they are capable of quickly breaking away from the rest of the attacking troops and, operating along isolated axes, of deeply penetrating into the enemy disposition, hammering his major reserves, and crossing any water barriers from the march. Tank forces can independently attack in the rear of a defending enemy in coordination with aviation and airborne landing forces.

On the whole, tank forces and aviation have an important role in the successful attainment of the goal of deep offensive operations. It is not by chance that modern ground forces have an enormous tank force.

Tactical *aviation*, which has been transformed into jet aviation, has also become unrecognizable. Its basic features have increased greatly during postwar years. It possesses supersonic speed, high ceiling, considerable radius of action, and, especially important, is a carrier of nuclear weapons. The majority of aircraft are also armed with air-to-air and air-to-ground missiles. Intensive adoption of various radioelectronic navigational devices, armament, and bombing systems, as well as means of protection against jamming has greatly increased the reliability of aircraft navigation and the accuracy of hitting targets. Aircraft with high maneuverability are capable of simultaneously detecting and destroying any enemy objectives, including those which are of small size and are mobile, and including as well nuclear missiles and troop groupings on the march.

All these qualities permit aviation to offer tank forces the most effective aid in dynamic, transient, and deep operations and to more successfully overcome the resistance of enemy PVO forces and means. By maneuver it can support a timely buildup of efforts in any areas. Air formations and units jointly with operational and tactical missiles have the capability, through a wide employment of nuclear weapons, to literally clear a path in a short time for tank groupings to swiftly penetrate into the operational depth of a resisting enemy. Aviation is the force which is best capable of "leading" behind it the most important tank groupings in offensive operations. There has also been an incomparable increase in its

capabilities to drop large airborne landing forces, which, in accomplishing their missions, can give much assistance to tank forces which have considerably broken away from the other attacking forces.

Thus, the effective employment of tank forces and aviation, jointly with nuclear missiles as the main means of destruction, is the guarantee of success in modern offensive operations.

In the prenuclear period, coordination between aviation and tank forces was most often organized only in the interests of attacking tanks in order to create the most favorable conditions for their execution of combat missions. The main concern of commanders and staffs was employment of air strikes coordinated in time and place with the operations of tank groupings. The latter could only accomplish limited missions in the interests of aviation, since the effectiveness and range of their means were not great. Now much has changed: the qualitatively new status of tanks and aviation has not only influenced the nature of this coordination, but has greatly complicated its organization in a technical, time, and spatial sense.

In a modern offensive operation, neither tank forces nor aviation acting in their interests will be able to successfully accomplish a single mission without coordination in the field of organization of continuous and effective *reconnaissance*. The fundamental power of enemy missiles and air and tank forces will be directed throughout the entire operation primarily against enemy tank groupings rushing into the enemy rear area. If these enemy forces are not discovered and destroyed in time, they will not hesitate to fall upon tank formations and units which have broken forward. The successful advance of these tank elements may be disrupted or considerably delayed. Although the reconnaissance capabilities of tank forces have increased, they cannot detect all important enemy objectives in a timely and complete manner. It must be taken into account that reconnaissance must now be conducted to a very great depth, probably right up to and often beyond the disposition of operational nuclear missiles. Aviation, of course, has the greatest capabilities for detection of such means. Therefore in principle, perhaps, it can be considered that one of the possible variations of coordination in reconnaissance can be organized in approximately the following manner. At the beginning of an attack, tank forces conduct reconnaissance with their own forces to the depth of disposition of enemy tactical nuclear missile means, as well as of his tank groupings and operational missiles nearest the front. They detect to this very same depth the location of surface-to-air missile batteries and battalions which may counter aviation and deliver strikes, including nuclear ones, against tank units and formations. It is evident that aviation will have to reconnoiter all the remaining deeper objectives.

We know that missile troops are capable of preparing and delivering nuclear strikes and then of changing positional areas in a very short time. Consequently the time factor takes on decisive importance. The primary role of aerial reconnaissance stems from this. Judging from the military press of various countries, there is a clearly evident trend toward the con-

duct of high-speed reconnaissance using pilotless reconnaissance aircraft with television or radar equipment on board. Aviation can only support tank forces with timely information on the enemy by wide use of the entire complex of modern photo and radiotechnical means, which permit rapid and accurate transmission of reconnaissance information directly from the aircraft simultaneously to the command posts of tank and air forces. Therefore, it is normal for air and tank staffs to strive to exchange reconnaissance information obtained from any channels and to coordinate operations of their reconnaissance elements and forces. It is believed that without this it is impossible to make the proper decisions for effective employment of tank and air formations and units. Precise organization of coordination in obtaining reconnaissance information and timely exchange of collected information is the necessary basis for coordinated operations in execution of all other missions.

The organization of coordination *in delivery of nuclear strikes* is a completely new function of commanders and staffs. Here it is necessary to allocate objectives against which it is advisable to deliver nuclear strikes by missiles and aviation.

Many specialists of various countries believe that aviation, as the most long-range and maneuverable means, is best directed toward the destruction of objectives situated in the enemy operational depth, and also toward the destruction of small and mobile targets. It is most suitable to deliver missile nuclear strikes against area targets in the immediate operational and tactical depth. Effective exploitation of the results of these strikes requires very precise coordination of the place and time of delivery of nuclear strikes by aviation with operations of tank forces. It is not precluded that surface nuclear bursts can be planned against *deep* objectives, but it must be very well planned as to what kind and where (along the path of tank forces), inasmuch as this may create zones of radioactive contamination, destruction, inundation, and fires.

It is considered best for the commander of tank forces to decide all questions of nuclear weapons employment immediately within the zone of advance tank groupings to the depth of missile range. He will probably have to determine the target, types, methods, and time of delivery of nuclear strikes, both for his own missiles and for the carrier aircraft operating in the zone of advance.

Aviation missions for delivery of nuclear strikes beyond the range of tank force missiles will evidently have to be assigned by the commander in charge of the entire operation.

A new mission requiring coordination of efforts of tank forces and aviation is the constant *battle against nuclear missile means of the enemy,* which will be well concealed, reliably protected by PVO forces, and will frequently be moving. The effectiveness of an attack by tank groupings, and consequently the development of an operation on the whole, will depend largely on the success of this battle.

Analysis of the nuclear missile means available to the armed forces of developed countries indicates that tank forces are fundamentally capable

of independently combating atomic artillery and tactical missiles situated in launch areas. Nuclear missile means of the defender will frequently have to be destroyed by tank forces and aviation simultaneously and jointly. To this end their commanders and staffs will have to delimit precisely and in detail by whom, when, by what means, and against which objectives strikes will be delivered. Judging from material published in the military press, tank forces in a number of instances will be able to destroy tactical nuclear means of the opponent by means of their tactical airborne landing forces, which naturally will require the coordinated employment of all forces: landing forces, air units, and forward detachments of tank forces rushing to link up with the landing forces.

However aviation, of course, has the greatest capability to combat nuclear missiles. Its chief merit lies in the ability to independently reconnoiter and at the same time immediately destroy, even using conventional fire means, any operational nuclear missile means, including those on the move. Specialists of many countries believe that it is most suitable to employ fighter-bombers to combat these objectives. One of the methods of their operations might be a free "hunt" by small groups of aircraft specially assigned for this purpose.

The procedure for coordination of aviation and tanks in destroying nuclear missiles and the allocation of their efforts will vary in each specific instance. They may operate at the same time or at different times, independently or jointly, in the same or in different areas (zones), and may employ only conventional or nuclear means, or both simultaneously. All this requires timely and thorough agreement of problems of coordination.

As before, tank forces require reliable air defense. It is particularly difficult to organize this when there is a considerable separation of tank groupings from the remainder of advancing forces. At this time (in distinction from the initiation of combat operations) the density of surface-to-air missile troops will be reduced. Surface-to-air guided missiles will not be able to support a continuous PVO zone through the entire range of required altitudes as a result of unavoidable losses and frequent displacement. Individual sectors and axes will form which are not protected by surface-to-air missiles (SAM) and which opposing aircraft can use to deliver strikes against tanks. Therefore, fighter aviation will play a large part in protecting tank forces in the offensive. It can be used to destroy the air enemy on distant approaches to tank forces and in those areas which are not protected by SAM fire. There is no doubt that fighter aviation on combat air patrol can provide reliable cover for tank groupings operating in the operational depth.

Tank forces in their turn can assist aviation by considerably easing its battle against a certain portion of the enemy PVO forces and means in the zone of advance to the depth of the range of its means of destruction. With missiles, long-range artillery, and swift strikes, tank groupings can destroy antiaircraft batteries and battalions and points for control and guidance of aircraft and missiles. Under specific conditions, neutralization of the PVO system in the aircraft flight zone by tank forces may precede the beginning of aircraft operations and make them subsequently easier.

These are the features of the organization of coordination between tank forces and aviation in their joint execution of missions inherent in all phases of combat operations conducted under any conditions.

Now let us examine the characteristics of coordination in executing those missions which tank forces and aviation will have to accomplish only in individual phases of an offensive.

Frequently at the beginning or in the course of an offensive, tank groupings will have to *complete the destruction of large opposing forces.* In this instance it is probably best to concentrate aviation efforts so as to first of all inflict defeat on opposing forces on axes of main attacks by tank forces by means of mass strikes of nuclear and conventional weapons. This will allow creation of unique corridors in their operational and combat formation. Taking advantage of them without delay, tank forces can rush forward, break the enemy into individual groupings, and complete their defeat by attacks against the flank and rear. The success of these operations will depend entirely on speed and precise coordination in delivery of air and tank attacks. Tanks must attempt to immediately exploit the results of strikes by aviation and its efforts to provide a timely buildup of fire, thrust, and maneuver.

The outcome of meeting engagements will also largely depend on the effectiveness of anticipatory nuclear and air strikes. Under these conditions aviation is called upon to play an exceptionally large role. It can quickly and accurately detect an enemy grouping on the march and determine its main forces and main missile means by establishing continuous surveillance over them. This enables it and the tank forces to subsequently deliver effective anticipatory strikes against these forces. Aviation can first strike the most distant and important objectives, primarily the mobile ones, of advancing enemy forces. These objectives may be operational and tactical missiles on the move, tank columns on the march, and major points for control of troops and enemy tactical aviation. Fighter-bombers can deliver very effective assault strikes against these objectives, employing conventional and nuclear weapons. Bomber aviation can also be used to destroy such small objectives as crossings and bridges on routes of advance of enemy forces, which will cause their accumulation and will allow effective delivery of nuclear strikes against them.

Fighter-bombers can operate subsequently against the enemy. Consequently, the coordination of aviation and tanks before initiation of a meeting engagement may be of an operational nature. With the approach of an enemy and initiation of a meeting engagement, it is acceptable to have joint operations of aircraft and fire means of tank forces against him in one area. At this time, operational coordination will develop into tactical coordination. In organizing this coordination, of prime importance will be coordination of the sequence and time of delivery of air and missile strikes and a precise determination of altitudes and flight sectors of aircraft, since it is more suitable for aviation to deliver strikes following the missiles in order to better overcome the PVO system.

Thus aviation will create favorable conditions for successful opera-

tions by tank groupings in a meeting engagement.

In the course of an attack tank forces will inevitably have to force a number of water barriers from the march. Success in a forced crossing will be provided by timely advance reconnaissance and timely destruction of enemy nuclear delivery forces and means.

During the approach of tanks to large rivers, when the main mass of their fire means is still on the move and incapable of reliably striking the enemy, aviation will be the basic means for his neutralization.

With the beginning of a forced crossing of a water barrier by forward detachments of tank forces, fighter-bombers operating on call can deliver strikes first of all against enemy tactical missile means and also against those enemy troop groupings which attempt to counterattack the tank forces immediately during the forced crossing. In all probability the mission of fighter aviation will consist of providing reliable cover to sectors of the forced crossing. Bomber aviation at this time can be directed toward isolation of sectors of the forced crossing from an influx of fresh forces and fire support from the depth by operating against approaching reserves, bridges and road junctions on routes of their advance, and enemy operational missiles. This will ensure forcing of the water barrier by main forces of the advancing tank forces.

The need for timely and decisive pursuit of a withdrawing enemy will arise quite frequently during an offensive. Tank forces capable of successfully operating in the presence of considerable zones of destruction and radioactive contamination of the terrain are called upon to play a special role in accomplishing this important mission. At the same time, the decisive operations of aviation will be of great importance. The high tempo of movement of withdrawing and pursuing forces and consequently, the rapid change in areas of disposition of strike objectives during this period require the widest use of aviation combat operations.

To avoid total destruction, the withdrawing side at the very beginning of pursuit of its forces will direct its nuclear missile means, particularly the long-range ones, against tanks which have broken through. Therefore the main efforts of aviation may primarily be directed at destroying these very nuclear missile means of the withdrawing enemy to deprive them of the capability to deliver nuclear strikes against the tank groupings in determined pursuit. Time will play a special role in this. Therefore it is naturally more suitable to use fighter-bomber aviation in accomplishing this mission. Judging by everything, it is advisable to employ fighter-bombers using the "free hunt" method. Fighter-bombers can detect in a timely manner and successfully destroy enemy missile installations by making uninterrupted flights in areas of presumed location or deployment of nuclear missile means on the flanks and in the rear of withdrawing forces.

Continuous aerial reconnaissance plays a large role throughout the pursuit. In addition to accomplishing ordinary missions, it is capable of detecting probable avenues of troop withdrawal, reconnoitering roads, and setting up zones of destruction, inundation, and radioactive contamination of terrain. Timely information on all this is greatly needed by

tank forces.

Operating against withdrawing columns with wide deployment of conventional means of destruction, aviation is in a position to considerably disrupt their planned withdrawal and inflict heavy losses on them.

Strikes by operational and tactical missiles will be delivered at this time against major road junctions along routes of withdrawal as well as against airfields. In this case missile strikes are not precluded against withdrawing troops which have massed, particularly while they are passing through various defiles.

During pursuit, aviation is capable of continuously observing detected enemy reserves in order to discover preparations for counterattacks and counterthrusts in a timely manner. By striking reserves on distant approaches or counterthurst groupings which are massing, aviation in coordination with operational missiles can not only greatly weaken resistance, but at times can generally disrupt the counterattacks and counterthrusts by the withdrawing side.

As the experience of the last war shows, forward detachments and airborne landing forces find widest employment in pursuit. Operating ahead of the main forces, they are the first to exploit results of nuclear strikes and to move to key areas on routes of enemy withdrawal. They are capable of seriously disorganizing operations by a withdrawing enemy, and it is natural that the enemy will immediately "take aim" on them, attempting to destroy them as quickly as possible. Therefore, attacking forces will do everything to increase the viability of forward detachments, and again the precise coordination of aviation and tanks acquires particular importance in this regard. It is evident that in a majority of cases forward detachments and airborne landing forces will have to be continuously supported by fighter-bombers. Groups of fighter-bombers which fly out periodically will have to strike enemy groupings advancing to destroy both landing forces and forward detachments, as well as nuclear missile means, which can deliver nuclear strikes against them. Landing forces and detachments also need cover from air strikes, inasmuch as their capability to organize their own PVO will usually be limited.

Judging from the experience of World War II, tank troops which are in swift pursuit of the enemy can give much assistance to aviation in the execution of an airfield maneuver by having forward detachments capture airfields and by moving airfield service units along with the first echelon of tank forces. In a number of instances a portion of their engineer forces and means can also be assigned for the most speedy restoration of captured airfields.

On the whole, joint operations of tanks and aviation will be accomplished primarily within the framework of operational coordination based on an allocation of strike objectives and a synchronization of the strike delivery time. In addition, a certain portion of the fighter-bomber forces used in support, for example, of airborne landing forces, forward detachments, or individual tank units and formations, are capable of ex-

ecuting their own missions in tactical coordination with them.

Successful coordination of aviation and tanks depends largely on a well-planned procedure for mutual recognition and target designation, which must create the most favorable conditions for precise departure of aircraft to the assigned area and for rapid and unerring location of objectives for delivery of strikes. Considering the modern speeds of aircraft. it can be expected that for designation and consequently for recognition of advancing tank groupings when there is visual contact, it is possible to use signal flares and colored smoke, which proved themselves well in the last war. It will be necessary to use special apparatus under complex meteorological conditions.

Radio and illuminating and tracer shells can be employed for target designation in addition to the aformentioned means.

Accomplishment of precise coordination of aviation with tanks will undoubtedly require preplanned organization of a control system over those air units and formations used in support of tank forces. The most effective use of aviation and most rapid concentration of its efforts in the interests of tanks is possible only through its centralized control.

In the course of the war, in the interests of a more massed and flexible utilization of aviation and a better organization of its coordination with tank forces, it was necessary to reject the prewar recommendation for organic aviation. All aviation became concentrated at the front level in its air army (sometimes in several armies), which was centrally controlled by the front commander. It is evident that under specific conditions this principle remains in force even now.

It may also be assumed that, as in the past war, it will be necessary to assign to tank forces air representatives with the power of independently calling up aircraft and redirecting them at the request of the tank force commander.

This article has raised and examined only a few of the questions on this subject. The authors do not pretend to an exhaustive disclosure, which attests to the need for further, more complete, and more thorough research into this important problem.

Note

1. *Voyennaya mysl'*, No. 8, August 1966, FPD 0761/67, 7 August 1967.

Military Geography at the Present Stage[1]

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The changes that have come about in the theory and practice of military affairs have required a new approach in evaluating military-geographic factors, and in determining the targets and missions of military geography, whose role has increased in modern conditions.

As is known, military geography, which is a branch of military science, studies the state of political, economic, and natural conditions and the military capabilities of various countries in addition to the extent to which theaters of military operations and separate areas are developed and supplied from the point of view of their influence on preparation and on the conduct of armed combat.

The experience of past wars shows that political factors and, first of all, a favorable political situation are the most important requisites for success in armed combat. The true purposes of Soviet politics, the moral-political unity of the Soviet Union, the strength of the Soviet rear area, a high overall military-economic potential, and also the existence of serious contradictions in the capitalist world were the determining factors in the victory of our people over the most powerful imperialist state in a military sense, Fascist Germany, during World War II.

Political factors and the fact that both warring sides have nuclear weapons exert the main influence on the course of the war as a whole and also on the conduct of its basic operations. This is explained first of all by the fact that a modern world war, if the imperialists unleash one, will be a struggle between two opposing social systems in which the belligerents will pursue their own decisive political ends.

The political situation in modern theaters of military operations which involve enormous land areas is characterized by the great complexity associated with a sharp aggravation of class, national, and other antagonisms; the emergence of new forms and methods in the political struggle between progressive and reactionary forces; and by the existence of various military-political and economic blocs and alliances. All these factors require military geography to select, out of the numerous and varied information, that data about the political situation which could help the strategic leaders carry out the most important missions in a particular theater of military operations and, first of all, to determine the most expedient methods for conducting armed combat, to establish priority targets for destruction or seizure, and to detect advantageous axes and areas for troop operations, in addition to making acceptable prognoses on the

capability of the state or coalition of states located in the theater of military operations to continue the war when certain areas are knocked out of action or captured.

In particular, in order to determine the capability of the enemy country or coalitions to bear the burdens of a nuclear war, it is important, first of all, to study in depth and analyze the intensity of the aggravation of the class antagonisms, the alignment of political forces, the presence of progressive or reactionary parties and organization and experience, the authority of the government, and the policy followed by it.

Accurate knowledge of the political environment permits one to select also the most advantageous axes for offensive operations. We know that favorable political conditions are a factor that makes for bold and resolute combat operations by the troops, and they make it possible to conduct them deep in the rear of a country at a stepped-up pace, landing airborne troops in the enemy deep rear area for action against key enemy targets, detailing fewer forces to guard rear areas, and effective utilization of local resources; and, in general, favorable political conditions facilitate the achievement of success with fewer forces. As the experience of past wars shows, operations conducted in areas where the overwhelming majority of the population sympathizes, in most cases, with the offensive army, the latter is strengthened while the morale of the enemy army is significantly weakened. Many operations conducted by the Soviet Army during the concluding stage of the Great Patriotic War confirm this theory.

Operations conducted in enemy territory, on the other hand, require great numerical superiority and make it necessary to devote attention to guarding bases, rear areas, and communications. It is known that the United States maintains an enormously well-equipped army in South Vietnam. Although they have multiple numerical and absolute military-technical superiority, the Americans are not in a position to gain victory. The United States is forced to use more than half of its troops to guard rear area targets, mainly because the political situation in the country is extremely unfavorable to them.

Not any less important is the task of making an analysis of the political situation in order to determine specific measures for carrying out party-political work among the troops and local inhabitants. For this purpose the study ought to ascertain the class, national, and religious makeup of the inhabitants, their mode of life and traditions, and also the force and authority of the various political and social organizations and their leaders.

It is necessary to make an evaluation of political conditions in the theaters of military operations in cooperation with an evaluation of other military-geographic factors and, first of all, economic ones.

The reasoning is explained by the fact that the economic structure, and industry particularly, is the basis of a state's military power.

In modern conditions, the role of the economic structure, including scientific and technical achievements, is sharply increasing in the task of creating a powerful armed forces and in insuring the vitality of a state as a

whole.

An analysis of economic factors under nuclear warfare conditions is conducted for the following: in order to detect the economic potential of countries or coalitions for producing the means for armed combat (first of all, nuclear and rocket weapons and antimissile defense means); to determine the vitally important economic regions, industrial and scientific technical centers, and their role in supplying the needs of war; to establish the weak and vulnerable points in the enemy economy, the level of its endurance and mobility, and, finally to explain the conditions for using local resources to supply the troops and to reinforce our own economic resources.

In order to arrive at scientifically founded conclusions to these problems, it is necessary to analyze, carefully and thoroughly, all branches of the economies of both the individual countries and the coalitions as a whole. In this study, particular attention should be devoted to the heavy industrial branches and, first of all, to electric power, fuel, radioelectronics, special military industries, and to the branches and subsidiaries of all of these industries. It is important to establish in the same way the capacities, geographic distribution, weak and vulnerable points of these branches, and the extent of their participation in armament production.

The most important task is to correctly determine economic objectives and targets and vulnerable points, and to deliver strikes to those targets where it will lead to disorganization of the enemy economy. The objective is not to turn the large economic and industrial regions into a heap of ruins (although great destruction, apparently, is unavoidable), but to deliver strikes which will destroy strategic combat means, paralyze enemy military production, making it incapable of satisfying the priority needs of the front and rear areas, and sharply reduce the enemy capability to conduct strikes.

In order to accomplish this, it is necessary to thoroughly evaluate economic conditions in theaters of military operations and establish the importance of each economic region or industrial branch in the production of the decisive means for armed combat and for the functioning of the country's whole life; the availability of resources for production capacities and military production; the ability to switch other industrial branches over to the production of those products whose supply diminishes as a result of strikes; the time of manifestation of the effect which strikes have on the course of armed combat; the vulnerability of a target and the number of forces and weapons necessary to destroy it and enemy capacity to reconstruct the target.

A very complex mission is determining the capacity of a country's economy to survive attack. In order to arrive at scientifically founded conclusions on this problem it is necessary to analyze the extent of industrial concentration and, first of all, of those branches which insure the operation of the country's entire economy. To be analyzed are such things as the presence of reserve capacities, protected factories and "back-up" plants engaged in the production of the most important kinds of industrial prod-

ucts, especially weapons of mass destruction; the organization of cooperation and specialization in industry; the system of organizing transport communications, electric power, and water supplies; the presence of raw material reserves, materials, and equipment and their storage places and vulnerability; preparatory measures for reconstructing demolished targets and for raising the economy's ability to survive attack (dispersal of the most important plants, the construction of defense installations, organization of air defense systems, creation of emergency electric power and water supply installations, reserves, etc.); conditions for the evacuation and dispersion of industrial enterprises and for transferring them under cover. It is important also to analyze the "mobility of the economy" and its properties to rapidly adapt itself to conditions of nuclear war.

The destructive nature of modern warfare, the difficulty of transporting material means from the depth of a country, and the great vulnerability of rear area organs make it necessary to devote serious attention to a study of the possibilities for acquiring local resources in theaters of military operations. For this purpose, it is very important to determine which targets and enemy economic regions should be left intact or rapidly reconstructed and used in the interests of strengthening the economic potential of our own country and for supplying the troops. It is important also to determine which, what, where, and in what quantity the local resources can be stored and used in the interests of the troops. It is important also to determine the conditions for acquiring or using local resources (the presence of electric power and transport means, manpower resources, transport capability, etc.).

Troops' modern technical equipment demands that a comprehensive study of natural conditions also be made in more depth than has been previously undertaken. An evaluation of natural conditions is now necessary, first of all, from the viewpoint of their influence on using weapons in armed combat, on defending troops and rear area targets against nuclear missile weapons, on creating zones of destruction, flooding, and radioactive contamination.

It is important here not only to determine the regions most subject to destruction and flooding, but also the nature and scale of the probable destruction, the existence of objects which favor the troops' defense (ravines, woods, passes, caverns, excavations, mines, quarries; their length, depth, and capacity). It is important also to determine the regions where the extent of injury to the troops increases (flat unbroken ravines, narrow valleys, canyons, passes, plots of terrain with steep slopes that are subject to landslides, avalanches, and rock falls). Knowing these things permits one to determine the most opportune axes for operations by the troops' main forces, to detect disadvantageous regions for conducting operations and conditions for using the present troop organization in these operations to determine targets (crossings, passes, sections of roads, and hydraulic installations) which would sustain the greatest destruction and are likely to be captured before the approach of the main forces and also to clarify a possible decrease in the area of operations, the volume and

nature of work which must be conducted in order to insure the troops' advance.

Under conditions of a nuclear war, the nature of soil analysis is significantly changed. If before World War II and in the course of it, soils were studied principally from the point of view of their influence on the practicality of using combat equipment and transport means and also on the conduct of engineer operations, it is now exceptionally important to determine their influence on creating induced radiation, on the degree of the terrain's radioactive contamination, and on the nature and parameters of shock waves from nuclear explosions, and the dimensions of their funnel clouds. In connection with this, it is necessary to know not only the physical but also the chemical composition of the soil, geological and hydrographic conditions. It is known that different soils also have different levels of induced radiation in their chemical composition. When there is a large quantity of powdered particles in the soil, the effect of radioactive fallout sharply increases. During its movement along radioactively contaminated terrain, the radioactive dust can cause great injuries to the troops.

Soils with shaley and stony bottoms increase the seismic influence and displacements of flocculent layers of rock and are conducive to creating induced radiation. Vegetation, especially arboreal vegetation, changes the soils' influence on radioactive contamination and on transmitting shock waves and displacements. A high bedding of ground waters in the soil exerts an influence on the conduct of engineer operations and on the durability of engineer installations.

In evaluating climatic conditions, it is particularly important now to study according to season and day such elements as wind, rainfall, humidity, and cloudiness. These elements exert an important influence on using weapons of mass destruction, first of all, on the diffusion of a radioactive cloud in the atmosphere and on the dimensions of its traces on the terrain. It also exerts an influence on the force and range of thermal radiation.

The significance of making an early analysis of the vegetation covering has increased. This study is made not only from the point of view of camouflage capability and procurement of building materials and fuel, but principally from the point of view of determining its defense properties against nuclear weapons, napalm, and other modern combat weapons, in addition to determining conditions for setting up zones of radioactive contamination and for spreading fires. In order to arrive at correct conclusions on the influence of vegetation upon combat operations, it is now necessary to know more precisely than before the area of the forest tracts; the predominant species of trees; the height and thickness of the trees; whether there are roads, passes, clearings, undergrowth, shrubbery; the nature of the relief and hydrography in the region of the forest tracts; and the camouflage potential of the forests (with regard to dispersed troop positions); and their distribution in the zones of troop operations and accessibility.

The significance and substance of the analysis of problems related to

equipping theaters of military operations have changed. It is known that before World War II the fundamental elements for preparing territories were communication means, engineer fortifications, communications, naval bases, and an airfield network. Now new elements have sprung up, such as missile and military air bases, bases for antimissile and antiaircraft defense, fixed guidance bases, etc. Now it is impossible to correctly solve problems related to using nuclear and other kinds of weapons without knowing the specific condition of these preparatory elements in the system of theaters of military operations. A particularly thorough study should be made of conditions for deploying missile weapons, bomber aircraft, and missile-carrying submarines. In evaluating information on missile and military air bases, it is particularly important to have precise knowledge of their exact locations, the extent of defense fortifications, dispersion, and camouflage; the existence of underground aircraft shelters for the airplanes; the condition of the navigation system; the nature of the surrounding terrain (relief, soil and vegetation); the most vulnerable elements of the bases and the extent of their air defense protection; in addition to determining the capacity of the bases to supply electric power, water, and necessary reserves.

In determining capabilities to deploy naval forces, the necessity arises to establish the nature and volume of work which will be done in the interests of missile-carrying atomic submarines, surface missile ships, and attack aircraft carriers. It is necessary also to ascertain the extent to which separate elements of the bases are dispersed, the existence of underground and underwater staging and guidance areas, and the most vulnerable targets. In order to make a correct evaluation of the antimissile defense system, a study is needed to determine the existence and the location of antimissile bases and radar systems (radar range perimeters, control posts, and centers) and their capability to make a rapid search for targets and guide active antimissile defense means. An analysis must be made also of the antimissile defense system's vulnerability, the endurance level of the bases, their capability to operate when their energy and water supply as well as communications are disrupted. In analyzing the air defense system, one should establish the antiaircraft guided missile base dispositions, interceptor aircraft airfields, extent of their survivability, concealment, and vulnerability.

Under conditions of a nuclear war, the system for controlling forces and weapons, especially strategic weapons, acquires exceptionally great significance. A disruption of the control over a country and its troops in a theater of military operations can seriously affect the course of events and, in difficult circumstances, can even lead to defeat in a war. Thus, areas deserving special attention are the following: knowing the coordinates of fixed operations control centers and the extent of their ability to survive; the presence of mobile command posts and automatic information processing centers; the communication lines' level of development and, first of all, that of underground and underwater cable, radio-relay, ionospheric, and tropospheric communication lines; field communication

networks and duplicate communication lines; communication centers and the extent of their facilities, dispersion, and vulnerability.

At the present time, other elements for supplying the territory, particularly communication means, have not lost their significance. Without a sufficiently well-developed and appropriately prepared road network, timely mobilization cannot be carried out, troops cannot be concentrated and deployed in the theater of military operations, an antinuclear defense maneuver cannot be executed, forces and weapons cannot be regrouped on a new axis in order to press home the attack at high speeds.

It is now important to determine not only the density and capacity of various kinds of communication means, but also their ability to survive an attack, e.g., readiness of the rail transport means to change from electric locomotive to diesel thrust or the capability to rapidly reconstruct bridges and other important targets. To do this, the most important transport targets must be exposed, the probable reduction of the roads' capacity must be determined in a situation where they are knocked out of action, and it also requires determining measures which are taken to raise communication means' ability to survive an attack. It is necessary to know how securely the deep rear is linked by communications with regions where the troops are deployed; also the possibilities for moving with safety under cover along the main roads and, in particular, the conditions for going around or bypassing road junctions, bridges, narrow areas, and vulnerable parts of the road; conditions for fueling and repairing combat and transport vehicles and the existence of communications along the main routes; the stability of bridge crossings at major river boundaries. Also deserving great attention is an analysis of the less vulnerable and mobile kinds of transport capabilities, i.e., automobile, pipelines, and aircraft.

A new factor in theaters of military operations requiring analysis is the nuclear mine field which is created to conceal the most important zones and targets. The breadth and depth of a nuclear mine zone, the density and power of nuclear mines, the location and depth where they were laid, nature of the relief, of the soil, and of the wind systems in this area are all problems which present the greatest interest. Knowing the power of nuclear mines and the depth at which they were laid and nature of the soil and climate allow one to make a correct forecast of the possible demolition and contamination of the terrain. It is important to determine the regions and borders which are most favorable for setting up nuclear barrage barriers and to determine likely targets for nuclear strikes and possible zones of destruction, flooding, and fire.

In conclusion, we should discuss the necessity for conducting an early and thorough analysis of the above-mentioned and other military-geographic factors in the interest of exposing conditions and peculiarities for conducting combat operations within the limits of these strategic and operational axes. Knowing these factors and having a thorough evaluation of them can, in addition, allow one to establish the troop organizational structure which is most suitable for the particular military-geographic con-

ditions. An early analysis will also allow one to purposefully train troops in conformity with conditions in the forthcoming regions for their operations, to determine the tactical-technical requirements for producing armament, combat, and secondary equipment for the most specific and difficult theaters of military operations, in addition to choosing a system of measures for eliminating or reducing the adverse influence of military-geographic factors in conducting armed combat.

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Note

1. *Voyennaya mysl'*, No. 11, November 1966, FPD 0730/67, 27 July 1967.

Some Questions on Coordination of Branches of Armed Forces in Major Operations[1]

Col M. Skovorodkin

Soviet military doctrine considers that victory in a modern war can be achieved only by the combined efforts of the armed forces. Despite the decisive role in war of strategic rocket troops, they are not able to assume all the numerous and varied tasks arising during the course of armed combat. From this there arises an objective necessity for the combined application in war of all branches of the armed forces. This conclusion is universally recognized and finds reflection in the military doctrines of all major armies in the world.

The stated principle applies not only to war in its entirety, but also to major strategic operations and even more so to operations carried out by individual branches of the armed forces.

Modern branches of armed forces have at their disposal great capabilities for realizing coordination among themselves. Thanks to the appearance in their armament of new long-range weapons there has occurred, if it can be so stated, an "invasion" of other branches of the armed forces into spheres which earlier were the "monopoly" of only one of them. Therefore, although in one or another sphere (land, sea, air) the application of one particular branch of the armed forces predominates, other branches also participate here with it.

Effective performance of strategic and operational missions by the combined efforts of field forces and formations of various branches of the armed forces requires unification of their actions by a single concept and plan, as well as organization and constant maintenance of coordination.

The problem of coordinating forces and equipment both in the war as a whole as well as in individual operations is derivative, depending primarily on the general character of the war. Nuclear warfare has radically changed our ideas about the aims of military actions as well as about the methods and means used to attain them. It has also made it necessary to formulate and resolve the problem of coordinating branches of the armed forces in a new manner.

In the past war the main role belonged to the ground troops, which used conventional weapons of destruction. Other branches of the armed forces, as a rule, were used to support their activities. The same situation also prevailed in individual operations carried out in the continental theaters, including those in which field forces and formations of several

branches of the armed forces participated.

In the main, nuclear warfare operations have a different character. The major strategic scale of the operation, carried out in the continental theater of military actions, is primarily a "nuclear" operation in which the main role is played by strategic nuclear forces. Other branches of the armed forces whose role in the operation changes substantially use their nuclear weapons and operate on the whole to accord strictly with the strike of the strategic forces.

In large-scale strategic operations the main objective of armed combat is directed not only against enemy armed forces on the battlefield as was the case in the past, but also against his deep rear area, his economy and system of government control, in other words, against everything which determines the viability of the government. In connection with this, the quantity and variety of missions carried out by the armed forces are increasing and their relationship and proportionate weight are changing.

The space simultaneously encompassed by military actions and operations is increasing sharply. Whereas in the past it did not, as a rule, extend past the line of combat contact of belligerents farther than the nearest operational depth, presently a major operation conducted in the theater of military operations in fact at once encompasses its entire depth. In the process the deep rear area is subjected not to incidental, but systematic powerful influence.

The time factors in operations also have changed. Main missions for decisive destruction of the enemy are being carried out as a result of the use of nuclear weapons in very short periods of time computed in tens of minutes and hours. The main destruction of the enemy is carried out at the very beginning of an operation with a powerful massive nuclear attack. In the future, forces carrying out an operation will only complete the rout of enemy groupings subjected to an atomic attack and occupy his territory. Consequently the procedure for accomplishing missions assigned in an operation to troops has changed radically, and the operation itself is developed at very high tempos, ceaselessly and to a great depth.

Even such a cursory review of certain peculiarities in the operations of a nuclear war graphically show that without a thorough understanding of its character there can be no correct understanding of the essence of modern coordination of forces and equipment or of the procedure and methods of its organization and implementation.

The most important distinctive peculiarity of modern operations is the massive use in them of nuclear weapons which are the main means of destroying the enemy. In connection with this, the coordination of forces carrying out the operation is also now reduced, in the main, to coordinated use by them of nuclear weapons and to the same kind of coordination in the use of its results. This is, in the main, a new situation determining the basic makeup of modern coordination of all branches of the armed forces.

The increase in the number of enemy targets available for destruction

and the increased variety of missions carried out in an operation complicates extremely the distribution of targets among troops of the various branches of the armed forces. Essential requirements of this distribution are the most effective application of nuclear weapons, reliable and immediate destruction of the most important enemy targets, action to insure the possibility of the rapid and complete use of the results of atomic attacks, elimination of mutual obstacles in the actions of various branches of the armed forces, and securing the seizure of main areas in enemy territory in a short period of time.

Whereas formerly during sequential defeat of the enemy the main attention was devoted to coordinating actions of groupings advancing more or less uniformly along different axes, at present the first and foremost requirement is the coordination of actions of these groupings with forces carrying out attacks in depth or operating in the enemy deep rear area.

The simultaneous defeat of the enemy along the entire depth of his dispositions, the fluidity of combat actions, the high tempos of advance, and the actions of troops along axes without, as a rule, close lateral contact between them sharply increases the importance for precise coordination in the application of troops and equipment by branches of the armed forces with respect to time. The complexity of this coordination, requiring extremely careful and detailed calculations, becomes even more evident when consideration is given to the various capabilities by branches of the armed forces in the preparation for carrying out attacks, and also in using their results. On the strength of what has been stated, carefully organized and continuously maintained coordination now has even more influence on the course and outcome of operations than formerly.

What should be understood by coordination of branches of the armed forces? What is included in this concept?

In our viewpoint coordination between operational field forces and formations of branches of the armed forces must not be reduced merely to their rendering mutual assistance or supporting the actions of one another. Coordination is first and foremost the combined and reciprocal accomplishment by troops and equipment of branches of the armed forces of the main mission in an operation. The main purpose of coordination is not the creation of favorable conditions for actions by any particular branch of the armed forces (this is achieved incidentally), but the coordinated destruction of the enemy.

In general, coordination by branches of the armed forces can be defined as the coordination of objectives, place, time, and methods of operations and the application of their efforts for accomplishment of missions assigned to them and for achieving common objectives of the operation. The main essence of coordination is the coordinated execution of nuclear attacks by all branches of the armed forces and the most effective use of the results of those attacks for completing the rout of the enemy in short periods of time.

Proceeding from such an understanding of the essence of coordina-

tion, the objective of its organization can be correctly defined. It will consist of the most effective use of troops and equipment for the destruction of the enemy, the purposeful determination of targets for nuclear strikes between branches of the armed forces, the coordination of time and procedure for carrying them out, linking nuclear attacks and the actions of forces using their results, and in stipulating measures to insure maintenance of uninterrupted coordination in the course of the operation.

The organization of coordination begins during formulation of the decision on the operation. The main thing in it is the correct determination of objectives and tasks for major units in the branches of the armed forces and the coordination of the procedure for their attainment or fulfillment. The process of organization continues during the working out of the operational plan and plans for the combat employment of branches of the armed forces as well as during assignment of missions to the troops.

In a large-scale operation, which itself consists of a system of operations on a lesser scale, the coordination of field forces and formations of branches of the armed forces can be organized in stages (common operational missions), and within them—according to the most important individual missions, which in distinction from common operational missions (nearest, farthest) can be called specific missions (some of them have the greatest significance). Such missions include, for example, fighting against the enemy means for a nuclear attack, destruction of enemy airborne landing forces, forcing of water barriers, repulsing attacks of enemy air-space weapons, etc. In carrying out these missions at every given moment there participate not all, but only a part of the troops and equipment involved in the operation. Some of the missions mentioned are carried out only on a part-time basis, others are carried out by troops for the duration of the entire operation. Considering the importance of any one of these missions, coordination of troops and equipment involved in its accomplishment can be especially organized to provide for its most effective accomplishment.

In connection with the fact that an operation of strategic scope represents, as stated above, a system of interrelated operations, there can be a somewhat different approach to the structure (procedure) for organizing coordination in major units of branches of the armed forces in such an operation. It can be considered that the organization of coordination in a large-scale operation includes, firstly, organization of coordination in each of the operations by major units of branches of the armed forces (carried out by them jointly or in coordination with other branches), and, secondly, the coordination of operations (combat actions) of branches of the armed forces among themselves. In such an approach the areas for the organization of strategic and operational coordination are clearly limited.

Strategic coordination between major units of branches of the armed forces is attained by the coordination of their efforts during accomplishment of common strategic missions. Its organization consists of, first, the coordination of efforts of all other branches of the armed forces with the nuclear rocket attacks of strategic rocket troops and, second, in the coor-

dination of operations of ground troops, the air forces, the navy and combat operations of PVO Strany troops among themselves. It provides for coordination in the actions of strategic groupings of branches of armed forces primarily in regard to the objective and to a lesser degree in regard to time and place. Strategic coordination is organized by the highest command planning the major operation and supervising its conduct.

Operational coordination consists of coordinated actions of operational field forces and formations of various branches of the armed forces, jointly carrying out one or several interrelated operational missions. It is the most completely manifested within the framework of an operation by branches of armed forces and is normally organized by the commanders of appropriate operational field forces on the basis of instructions from the superior command. The most important problems of operational coordination can be resolved directly by the superior command.

In defining the main substance of coordination between field forces and formations of the various branches of the armed forces in an operation, we pointed out that it consists of coordinated delivery of nuclear strikes and the most effective use of their results. In accordance with this, the organization of coordination should insure first and foremost the attainment of these two main objectives.

To insure the coordinated delivery of nuclear strikes it is necessary to establish the common objective for the delivery of those strikes and to determine the degree of participation of each branch of the armed forces in its achievement. And in accordance with this there should be a correct distribution among resources in the branches of the armed forces of areas and objectives of destruction with nuclear weapons; the time and procedure for delivery of nuclear attacks should be coordinated and measures organized to insure the application of forces and resources and their rendering of mutual assistance to one another.

The basis for allocation of areas and objectives of destruction is the quantity and character of enemy targets and the capabilities of resources assigned for their destruction. Among the main factors to be considered in categorizing enemy targets are their importance, distance, dimensions, stability, and degrees of protection and mobility. The capabilities of friendly resources are based on such factors as combat readiness; the range, capacity and speed of coordination; maneuverability; the capability for overcoming target covering forces; accuracy of strikes; and also the quantity of delivery vehicles and nuclear ammunition.

Targets designated for destruction by resources of any particular branch of the armed forces can be located in regions where other branches of the armed forces are not carrying out attacks or in regions where the enemy is defeated by the combined resources of several branches of the armed forces. Both methods of allocating objectives have positive and negative sides. Thus, in the former it is simpler to organize coordination among resources of the various branches of the armed forces and in the latter more favorable conditions are created for carrying out attacks by several of them (for example, aviation operating in one region immediate-

ly following attacks by rocket troops can considerably weaken the enemy air defense system). Probably in practice both of these methods will be used in combination. Important objectives, independent of their location, should be designated for destruction by resources which in the actual situation will be able to accomplish the mission most reliably and in short periods of time. In the first instance this requirement applies to objectives representing a direct threat to friendly troops (for example, enemy nuclear weapons).

It is most desirable to double the destruction of the most important objectives using resources of either a single or various branches of the armed forces.

Objectives are distributed among the various resources in such a manner as to exclude the possibility of creating mutual interference in carrying out the attacks. This applies especially to rocket troops and aviation. For the latter, targets for destruction and the routes to them are selected on the basis of the immediate danger of rocket attacks and the radiation situation in the air which they may encounter.

Coordination of the time of nuclear attacks carried out by resources in the various branches of the armed forces is based on the determined operational decision for the order of target destruction and the capability (in regard to time) of the resources—the nuclear weapon carriers. In the process it is necessary to consider also the interests of the troops making use of the results of nuclear attacks.

It is especially complicated to coordinate the time for the combined delivery by several branches of the armed forces of massive nuclear attacks in which the maximum amount of allocated resources in used in what is probably a short period of time. This complexity is explained by the fact that resources in the branches of the armed forces require different time periods to bring them to readiness, variations in time for completing launches or flights, and various durations of flight to the target. In order to insure the more or less simultaneous delivery of strikes by all assigned resources (or by several of them), accurate and very complex calculations are necessary, as well as strict compliance with assigned schedules for getting ready and carrying out the attacks.

Coordinating the time of nuclear attacks is accomplished with consideration of the influence of the effects of nuclear attacks of certain resources on the delivery of attacks by other resources. Thus, aviation can appear in areas of nuclear rocket attacks a certain time after the explosions when the radiation situation in the air becomes safe for the aircraft crews.

In the course of an operation the time for delivering nuclear attacks is coordinated so as to insure their concentration not sporadically, but at the time required for systematic influence on the enemy throughout the entire operation. Required for this purpose are the timely move of nuclear weapons personnel and equipment, the early assignment of missions to them, and the constant presence of responsible personnel.

The second major objective in the organization of coordination consists of insuring the most effective use of the results of nuclear attacks.

Under the latter in a large-scale operation reference is made first and foremost to attacks carried out by strategic nuclear means. They can paralyze vital activities of an enemy government, destroy important economic centers, wipe out means of nuclear attack and troop concentrations, destroy the system of control, neutralize the air defense system, etc. The use of the results of these attacks falls more in the operational rather than the tactical category. This means that formations and units of branches of the armed forces will not proceed directly into the area of each nuclear attack made by strategic forces, but will strive to make maximum use of the favorable situation created in enemy dispositions for completely routing him as quickly as possible and seizing the territory.

The organization of coordination should insure the fastest possible transition of field forces and formations to active operations and the conduct of the latter at the very highest tempos. The main point is to deprive the enemy of the possibility of clearing up the effects of nuclear attacks inflicted on him and to prepare for carrying out counteractions. Therefore it is desirable to reduce to a minimum the possible intervals between carrying out nuclear attacks and the initiation of active operations by forces and means using their results. In connection with this, the timely prediction of the radiation situation which can be encountered on the axes of operations by field forces and formations acquires great importance.

The ground troops play a very responsible role in the use of the results of strategic nuclear attacks. Making use of the physical and moral neutralization of the enemy by these attacks, they strive to penetrate as quickly as possible into the depths of his dispositions and accomplish the rout of surviving troop concentrations.

The results of nuclear strikes delivered against the deep rear area of the enemy can be used with the most effect by airborne landing forces. But for this it is necessary to plan in advance and to organize many measures insuring their timely landing and coordination after landing, primarily with strategic rocket troops and with aviation.

The actions of the air forces are planned in such a manner that they too can use the results of strategic nuclear strikes, especially those delivered by rocket troops. Aircraft flights to targets of destruction and strikes against those targets are carried out with the minimum possible break in time after the strikes of rocket troops, in the course of which the enemy will not be able to repair the damages caused by the latter to his air defense system.

Similar requirements apply also to planning the actions of forces and resources (other than strategic) of naval units participating in the operation.

The organization of coordination between field forces of branches of the armed forces also insures mutual use of the results of nuclear strikes delivered by friendly operational-tactical resources. Thus, ground troops will make maximum use of nuclear strikes delivered in the sectors of their operations by aviation and naval forces. In their turn, for their operations air and naval units will use the favorable situation created by the nuclear strikes of the ground troops. We are not considering the question of the

use by each branch of the armed forces of the results of nuclear strikes delivered by its own resources, as we consider that outside the scope of the present article.

In the interest and with account taken of the requirements for the most effective use of the results of nuclear strikes against the enemy, the axes and regions are defined, the time of actions by field forces and formations in branches of the armed forces is calculated in detail, and measures designed to reduce probable enemy counteractions are selected. The successful use of the results of nuclear strikes is possible only when there is firm control of field forces in branches of the armed forces, uninterrupted information between them, and when they have direct contact at various levels.

The planning of coordination between field forces and formations in branches of the armed forces in an operation is carried out with anticipation of the conditions under which it will be conducted and its probable development, and it is based on accurate calculations of the combat capabilities of friendly forces and resources as well as those of enemy forces and resources.

It is desirable that the developed system of coordination take into account various versions of troop actions in order to give it greater vitality and flexibility. It is especially important to provide in advance for the possibility of reassigning troops and equipment in branches of the armed forces to the accomplishment of other missions in cases where the main forces assigned to accomplish such missions are knocked out of action or will not be able to act for other reasons.

The developed system of coordination should constantly be refined as changes occur in the situation, both prior to the beginning of the operation as well as, and especially, during its progress.

Implementation of coordination organized between field forces of branches of the armed forces during an operation is primarily a matter of strict and precise fulfillment by each of them of assigned missions. But the situation right at the very start of an operation can change to such an extent (in comparison with the assumptions), that in literally the first minutes and hours of an operation it will be necessary to make substantial revisions in the planned procedure of actions by branches of the armed forces, to include also in the organized coordination between them.

The need for such revisions, especially in the first operations, is brought about first and foremost by the various conditions for their initiation. It is not ruled out that during a sudden initiation of an operation not all troops and equipment in the branches of the armed forces will be ready for the immediate launching of attacks. This will require a certain redistribution of efforts with the aim of concentrating them on the defeat of the most important enemy targets. Such a redistribution will be accomplished more successfully if its possibility has been foreseen in advance and the commanders of major units in branches of the armed forces have been oriented in this regard.

But the most substantial changes in the organization of coordination

may have to be made after the mutual exchange by belligerents of the first nuclear attacks. The situation as a result of these attacks will change radically. Many enemy targets against which attacks were planned may turn out to be completely destroyed for various reasons, whereas at the same time a number of new important targets will be revealed. It is possible that there will be serious losses in troops and equipment in branches of the armed forces. Individual areas both in friendly as well as in enemy territory will turn out to be contaminated, flooded, and engulfed by fire. Much destroyed will be in them. In very short periods of time it will be necessary to analyze the developing situation, assign missions to remaining combat-ready units for the immediate destruction of surviving or newly discovered important enemy objectives, to take measures for the rapid liquidation of the effects of enemy nuclear attacks, and to clarify troop missions.

In this period, of greatest importance will be organization for the rapid transition of field forces and formations in branches of the armed forces to active operations, using the results of nuclear attacks launched against the enemy. It may become necessary to change earlier planned operational directions, objectives, and time intervals for the actions of forces and resources. Because of the losses sustained and the existing radiation situation, the directions of advance of ground troops may be changed. As a result of the neutralization of enemy air defense systems changes may be required in the operational directions and time intervals of the air forces. Complete discovery of enemy naval concentrations will call for clarification of change in areas and objectives of naval actions. Losses of air defense forces and resources will require the execution of maneuvers and other measures for the purpose of restoring air defense systems and clarifying questions in regard to coordination between PVO Strany troops and air defense forces and ground troop and naval resources.

An especially complicated situation can be created if the groupings of the armed forces designated for the conduct of an operation sustain major losses as a result of enemy nuclear attacks. The command in charge of the operation and the commanders of operational field forces in branches of the armed forces there are required to take immediate measures for restoring combat capability in the formations and units suffering the losses; for combining them into individual detachments and groups and for working out their comprehensive maintenance and support with the resources of superior commands. With the limited amount of personnel and equipment remaining after enemy nuclear attacks, successful continuation of an operation will depend to a decisive degree on great aggressiveness and coordination in their actions. Such aggressiveness and coordination is the main concern of command at all echelons in this most responsible period of the operation.

Unexpected and drastic changes of the situation can also frequently occur during the further conduct of an operation right up to its very completion. In each case they will force the command leading the operation to clarify former or assign new missions to field forces and formations in

branches of the armed forces correspondingly to restore or organize on a new basis coordination between them. All this work consists of redistributing efforts; clarifying or changing directions, areas, and objectives of actions; directing certain forces and resources to use the effects of actions for the success of others; insuring mutual assistance between them; restoring lost contacts and disrupted communications; etc.

Thus at the beginning of an operation, coordination is clarified or newly organized. The organization and maintenance of coordination is an uninterrupted process of command activity in the control of forces and equipment in the dynamic and quickly changing situation of a modern operation.

An important condition of successful implementation of coordination is reliable direct contact between field forces of various branches of the armed forces. This contact is necessary to them, first, for detailed coordination of actions during joint accomplishment of missions and, second, for the constant mutual exchange of information.

The success of combined actions depends directly on the mutual knowledgeability of jointly acting field forces and formations about the missions of each of them and the conditions under which they are being accomplished. In the process it is important to emphasize that such knowledgeability refers not only to current, but also to planned actions. The ground troop field force commander, for example, can make the correct decision on taking a number of measures requiring a comparatively long period of time for their preparation and accomplishment (dropping of a parachute force, introduction of a second echelon of the reserves into an engagement, etc.), only when he can clearly visualize the probable course of events in his area of operations in the immediate future. And for this it is necessary for him to know well not only the forces and probable nature of enemy actions, but also the missions which will be accomplished in the field force sector of operations and in adjacent regions by other branches of the armed forces.

Consequently, the information which jointly acting field forces and formations are constantly exchanging will include information on the situation in the sector, region, or on the axis of their actions, as well as information on assigned missions and data on adopted decisions.

Of course, to some degree, especially on important questions, the information described above will be received by field forces in branches of the armed forces from the superior command echelon. More detailed and, most important, constant information can be insured by direct contact between them. In addition neither should one rule out the possiblity that disruption of contact between them will make it possible to insure coordinated actions within the limits of the overall plan of operation to which commanders undoubtedly will be dedicated.

Forms of contact between field forces in branches of the armed forces can be varied. One of them is maintenance of constant communications using communications equipment. The exchange of operational groups represents a higher form of contact. In the process such groups can be as-

signed various functions—from strictly informational to the authority to assign missions to subordinate troops and facilities. And, finally, the creation of joint control posts may be considered the highest form of contact. Between branches of the armed forces carrying out uninterrupted coordination over the duration of an entire operation, as a rule, contact is established at various levels right down to the tactical level. Such contact can take place, for example, between ground troops and aviation or between ground troops and the navy.

The great urgency of the problem we have touched upon is obvious. It is determined by the objectively developing necessity for the accomplishment of most important strategic and operational missions, as a rule, by the joint efforts of all or several branches of the armed forces. At the same time, no less evident is the exceptional complexity of this problem caused by the great variety of means contained in modern branches of the armed forces and, what is most important, the leading role in nuclear warfare of strategic rocket troops with whose actions the application of all other forces must first and foremost be coordinated. Both one and the other require the most concentrated attention of theoreticians and practical personnel in the military field to the stated problem, on whose correct solution success in a nuclear war will so greatly depend.

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Note

1. *Voyennaya mysl'*, No. 2, February, 1967, FPD 0018/68, 9 January 1968.

Trends in the Use of Aircraft in a Nuclear War[1]

Mar Avn S. Krasovskiy

The radical changes which have occurred in the postwar years in the armed forces of developed countries have confirmed once again the stability of the Marxist-Leninist thesis on the revolutionizing role of military equipment and means of conducting war in the development of all aspects of military affairs.

As a result of the vast qualitative leap in development of the armed forces, military equipment, and means of destruction, there has been a sharp increase in the spatial scope of armed struggle on the ground, at sea, and in the air; the resoluteness, intensity, and speed of combat operations have increased; and there has been an increase in the importance of the factor of time, surprise, and the necessity of constantly reducing in every way possible the periods for bringing the troops into combat readiness.

The slightest delay in operations will now have a negative effect on achievement of the goals of armed conflict and it can lead to nonfulfillment of the missions and to great losses of troops, combat equipment, weapons, and material-technical and other means.

Nuclear weapons constitute a very important means of destruction. They will be used above all by strategic rocket troops. The course and outcome of an armed conflict depends on the success of operations of this branch of the armed forces.

However, aircraft also have an important role in the actions and combat operations of the ground troops and the navy. Moreover, aircraft are able to carry out a number of missions more effectively than other branches of the armed forces. For example, through highly accurate rocket or bomb strikes, they can put out of operation very important fixed targets without destroying the entire objective, and they can also successfully suppress many mobile and highly maneuverable targets.

The status and prospects for development of aviation equipment and weapons exert a vast influence on trends in the use of the air force. At the present time, the aircraft of almost all countries have sharply increased their mobility and maneuverability and their capability to inflict certain strikes of colossal power against both previously designated objectives and against targets detected in flight.

Judging by reports of the press of various countries, new vast successes in radioelectronics have created conditions for building search and strike systems of various purposes and instruments for night television

reconnaissance with the use of lasers. Circular-scan and side-looking radars, radiotechnical and radio intelligence equipment, infrared instruments, and other radioelectronic equipment have taken a particularly large step forward in this matter. Technical achievements have decreased the dependence of aircraft on weather conditions.

From the materials published in the press of many countries, one can draw the conclusion that the time is not far off when military aircraft will appear with flight speeds of 5,000-6,000 kilometers per hour. This will decrease considerably their vulnerability to various air defense means and will expand greatly the possibility of penetrating to the objectives of the operations.

It is true that those same publications indicate the constant improvement in air defense means. However, judging by everything, the effectiveness of their countermeasures against strikes of aircraft concedes a great deal at the present time to the success of using aircraft which have long-range rocket weapons with very great explosive power.

It is also important to note that there continues to be a further improvement in helicopters and rotary-wing aircraft capable of serving as a reliable means of increasing mobility of ground troops on the field of battle. Information published in various countries gives the impression that in the next few years S/VTOL aircraft will become broadly used. It is not difficult to imagine that such aircraft will have a very high degree of maneuverability and will be able to be based in a dispersed and camouflaged manner. This will undoubtedly enhance their chances of survival.

We must also consider the appearance of orbital space aircraft which combine the characteristics of aircraft and space ships. Judging by the statements of military specialists of Europe and America, such aircraft will open completely new perspectives to aviation.

The intensive improvement of aircraft equipment and weapons has engendered a sharp growth in the combat potential of air units and, along with the other indicated factors, has predetermined considerable changes in the use of aircraft, including changes in the principles of their utilization and methods of carrying out missions, organizing coordinated action, control, and all types of support.

In a nuclear war, aircraft are capable of carrying out successfully the following basic missions: carrying out aerial reconnaissance in any theater of military operations in the interests of all branches of the armed forces and of the war as a whole; destroying the means of nuclear attack of the enemy on land, in the sea, and in the air; destroying objectives which have strategic and operational-tactical importance; jointly with the forces and means of air defense protecting the troops, fleet, and rear area objectives from strikes from the air; protecting the ground troops; combating the transfer of the enemy on air, sea, and ground routes of transport; and landing airborne troops and supporting completely their operations in the rear area of the enemy.

Besides the above, aircraft have a large number of other missions involving the destruction of nuclear rocket means of attack of the enemy

and his mobile facilities, the number of which now, as is known, has increased by several times. We can include in such missions, for example, target designation for ground troops, submarines, and surface ships which use rockets against mobile objectives, guidance of the strike forces against mobile targets, control of the results of the strike, execution of the functions of communication, etc.

Thus, considering the importance of the missions carried out by aircraft in conditions of nuclear war, it is quite logical to consider that the role and importance of aircraft in it are quite great. To carry out successfully the missions in a short time, aircraft have acquired the capability of using nuclear rocket weapons of colossal destructive force. In this connection, in conditions of nuclear war, the nature of massing one's efforts has changed. It will be achieved now namely by increasing the power of the weapons, and not by increasing the amount of aircraft allotted to destroy the objectives.

Firm control based on rigid centralization and accurate coordination of place and time of nuclear rocket strikes of small groups and even of single aircraft flying along various courses will ensure a high degree of concentration of forces of aircraft, as well as success of their operations.

We will examine in more detail the specific features in carrying out certain missions which are most typical for the aircraft.

Aerial reconnaissance is capable in short periods of time of examining with relatively small forces vast regions of land, sea, and ocean, and providing the command element with reliable information necessary for the correct and thorough evaluation of the situation. One of the more important tendencies of air reconnaissance at the present time is to reduce in every way possible the time for transmitting reconnaissance data.

Judging by the materials published in the press of various countries, one of the ways of implementing such a trend is the organization and conduct of aerial reconnaissance with the use of instrument methods (radiotechnical, television, and photographic reconnaissance), which greatly enhance the possiblities of receiving accurate data on varied sites of the enemy. Being introduced and utilized more and more broadly here are various technical means designed for speeding up the processing and transmission of reconnaissance information to the interested parties directly from on board the aircraft in flight.

We should distinguish in particular the high degree of effectiveness of using side-looking radar for aerial reconnaissance. The crew of a reconnaissance aircraft equipped with such a set can obtain data on a particular enemy facility without entering the zone of his air defense.[2]

Due to the increased amount of air defense means in the armed forces of all countries, penetration of reconnaissance aircraft into the rear areas of the enemy has become considerably more difficult. Their previous methods of operation are very often not effective now.

As is noted in the foreign military press, one of the planned tendencies in organizing and conducting aerial reconnaissance is closer and closer coordination in time and routes of flights of reconnaissance aircraft with

sorties of rocket carriers, bombers, and fighter-bombers in order to utilize to the maximum degree the results of suppression of enemy air defense means. In certain conditions, it is also proposed to carry out aerial reconnaissance by the principle of immediate destruction of the detected objective by the reconnaissance aircraft itself or in accordance with its data by aircraft which are on duty in the air. Also included are special measures for the purpose of reducing the counteraction of the forces and means of air defense against reconnaissance aircraft.

In connection with the increasing volume of reconnaissance missions, all branches and arms of aviation must, along with carrying out their specific functions, constantly carry out aerial reconnaissance. Because not all aircraft can be equipped with the special technical means that reconnaissance aircraft have, the crews of fighters, fighter-bombers, and bombers must be prepared to carry out reconnaissance visually and be able to identify correctly well-camouflaged, small objectives. Of course, this requirement is also completely valid in regard to the crews of reconnaissance aircraft, because in certain cases not even the most modern equipment can replace man, who is capable in flight, according to indirect indications, not only of detecting a particular objective but of determining its importance and quickly making a decision concerning further operations.

The struggle against means of nuclear attack on the ground, at sea, and in the air constitutes a very important mission of the air forces in operating in any conditions regardless of which means are used by the aircraft for their destruction. A large portion of this struggle can consist of strikes against enemy aircraft, his rocket means, surface ships, weapons storage bases, etc. The operations of antisubmarine aircraft in seeking and destroying submarines will be widely employed here.

Aircraft of all arms and branches will be used to destroy those objectives which cannot be destroyed by various surface-to-surface rockets, and above all for operation against small and mobile targets. Such objectives on the ground can include mobile or newly equipped multipurpose rocket launchers, control and guidance posts, etc.

The struggle against enemy aircraft plays a particularly great role. The destruction of an opposing air grouping in a particular theater can decrease considerably its nuclear potential. The levels of this struggle far exceed the operational, not to speak of the tactical limits. It is no accident, therefore, that the military press of many countries devotes much attention to it. It is felt that one of the main tendencies in this struggle is the timely destruction and suppression of aircraft at airfields. Using modern means of destruction, the aircraft independently and in coordination with rocket troops are capable in short periods of time of inflicting such destruction on the opposing air grouping that its combat ability is sharply reduced or the enemy is deprived of the aircraft's ability to carry out active combat operations. For this it is necessary to use large forces of aircraft which can operate at distances where the enemy aircraft are based. Particularly accurate coordination of strikes against airfields, air depots, and

control posts are needed here.

At sea, the most important targets will be the rocket-carrying submarines and surface ship strike forces. Their detection and destruction constitutes a primary mission above all of naval aviation. Having a considerable radius of operation and utilizing modern means of detection of sea targets, naval aviation is capable of quickly finding and effectively destroying rocket-carrying submarines and large surface ships. Undoubtedly success in carrying out this mission depends to a large extent on accurate coordination of the operations of aircraft with the operations of other forces of the navy, especially with submarines.

The necessity of combating submarines and surface ships should be viewed as one of the most important trends in the use of aircraft forces in modern conditions.

Taking into account the increased power of means of nuclear attack and the considerably increased combat potential of aircraft, it is considered in the armies of the leading countries of the world that the greatest successes in combating means of nuclear attack can be achieved when they are destroyed not only in the air and on the sea, in the launch position, at the airfields, at the bases, and at the depots, but also at the places of their production.

Operations against strategic and operational-strategic objectives can be carried out by long-range rocket-carrying aircraft. The most acceptable forms of their use can be, for example, aerial operations (conducted simultaneously with operations of other forces) which permit maximum utilization of the results of nuclear strikes of other branches of armed forces, above all strikes of strategic rocket troops, as well as quick suppression of the effects of a group of very important objectives. In carrying out such operations, it is possible to suppress to the greatest extent the means of air defense, and thereby to ensure the best conditions for penetration of the aircraft to the rocket launch areas.

The strikes of strategic rocket troops and the operations of aircraft against objectives of the deep rear area of the enemy make it possible to disorganize the system of state and military control and to paralyze the economy of the opposing side. This leads to the situation in which assignment of missions to aviation, just as control of its operations, become the prerogative of the higher military leadership.

The protection of troops, naval forces, and rear objectives from strikes from the air does not lose its importance in conditions of conducting nuclear war. A leading role in carrying out this mission belongs to the antiaircraft rocket troops and the special fighter interceptors, although the use of troop and frontal forces and means of PVO is not excluded. Fighter aircraft, acting in close coordination with antiaircraft rocket troops, are still considered by military specialists of all countries to be a reliable "shield" capable of repulsing strikes from the air against troop and rear area objectives.

Fighter aviation, just as antiaircraft rocket troops, has its qualities which must be widely taken into consideration in order that the fighters

and antiaircraft rockets complement one another in the best way.

Particularly valuable characteristics of fighter aviation are its great radius of operation, high degree of maneuverability, and multiple opportunity for repeated use and redirection in the air. Skillfully utilizing these qualities in organizing the protection of troops, one can reliably intercept aerial targets at great distance from the protected objectives. This is very important in those cases where the opposing sides are using nuclear weapons, because in destroying the carriers and the means of destruction close to the protected objectives, the mission of protecting them is not yet carried out.

Fighter aviation is now considered to be the most maneuverable means of combating the aerial enemy at the distant approaches to the protected objectives.

We must approach the organization of protection of the troops and rear area objectives here in a new manner in order to oppose more reliably the strike forces of enemy aircraft. It is proposed, for example, that in using a large number of small groups of fighters on a broad front, a "screen," as it were, be created from them.

Success in the struggle against the air enemy will depend to a large extent on the organization of close coordination of the aircraft and the antiaircraft rocket troops. This undoubtedly requires, in particular, integration of the command posts and possible unification of the system of control of their operations. The general tendency in using fighters is to expand and "stratify" their zones of operation in altitude to the lowest and highest possible altitudes up to entry into the stratosphere.

Support of the ground troops involves above all the fighter-bombers, which will operate directly in the interests of the formations of ground troops against objectives located in the tactical and close operational depths. A very important assignment of the fighter-bombers will be aircraft support of the troops, and the main objectives of its operations will be nuclear rocket and fire means, tactical reserves, control posts, tanks, and motorized infantry of the enemy on the move and in areas of concentration.

Of especially great importance here will be aircraft support of ground troops in meeting engagements with the participation of large groupings of tanks and motorized infantry. They will operate against enemy reserves moving forward and at the same time destroy bridges and water barrier crossings. This will result in the forced massing of troops against which strikes not only of aircraft, but of operational-tactical rockets, will be effective.

Military specialists of various countries are more and more persistently expressing the desire to have special aircraft which operate directly with the ground troops. In their opinion, such aircraft should have not only a great combat effect, but should have a strong effect on the morale of the enemy, as was the case, for example, in World War II with dive bomber operations.

The increased effectiveness of air weapons makes possible reliable

destruction of concentrated and small objectives with a relatively small detail of air forces. This is why, in the course of operations of ground troops, aircraft will operate mainly in small groups and as single aircraft. This facilitates flight at great speeds, permits the broad utilization of low altitudes to suppress the counteraction of air defense, and, in the end, promotes the effective destruction of the targets. Moreover, in operations with small groups of aircraft and single crews, a broad maneuver of forces is insured and conditions are created for their redirection.

For example, at the training exercises Big Game, Lafayette, and Indian River, the support aircraft, as they are called in the United States, were used individually, in pairs, or in flights. They destroyed conventional targets immediately after their detection or they carried out missions in putting out of operation control posts located among the ground troops. Operations here were carried out, as a rule, from low altitudes (sometimes less than 100 meters).

Since the main tendency in the use of aircraft for supporting ground troops is the transition toward operations by small groups of aircraft against objectives detected directly in flight, questions of control of the forces acquire special acuteness. It is quite evident that in a quickly and sharply changing situation, an important role may be played by control posts equipped with radioelectronic equipment and located in the battle formations of the ground troops.

The struggle against transportation by the enemy on air, sea and ground routes constitutes one of the chief missions of armed conflict on the whole. Because it is necessary to destroy a large number of transferring targets in carrying it out, a large number of aircraft must be used for this.

The foreign press publishes information to the effect that the United States Air Force in a number of cases in training exercises and in the war in Vietnam expends more than one-half of its efforts isolating a battle zone and not permitting the flow of enemy reserves or the supply to him of various material means.

It is evident that in modern conditions, the struggle against transportation must be carried out in such a way as to disrupt simultaneously the sea, railway, motor vehicle, and air routes of the enemy. This mission can be successfully carried out through the joint efforts of all branches and arms of aviation.

Most effective in the struggle on the sea lines of communication are rocket-carrying aircraft capable of reliably destroying tankers and freighters and of destroying transports, troops, and cargoes in the ports where they are loaded and unloaded and in crossing the sea.

Undoubtedly, of the broadest use (above all in coastal regions) in combating shipping are the operations of all branches of aviation jointly with the forces of the navy, and above all with the submarines, especially in inflicting strikes against convoys. In organizing operations of various forces against one ship grouping at sea, it is always necessary to try to use them simultaneously. This will force the enemy to disperse his forces in repulsing various strike groups.

In the continental theaters, a special role belongs to the struggle against motor vehicle transportation, which will depend to a large extent on well-organized cargo reconnaissance. In detecting the mass shifting of troops, equipment, and supply cargoes by motor vehicle transportation, air strikes must be inflicted immediately. In a number of cases, combat missions on a so-called "free front" can constitute a particularly effective method of operations of bombers and fighter-bombers.

Distribution of the objectives of operations among the various forces and arms of aviation in the struggle against transportation depends above all on the possible depth of penetration to the rear of the enemy by aircraft of various types. Bombers, which have a large radius of operation, will destroy those targets which are at a great distance from the front line. Fighter-bombers will be able to destroy troops, equipment, and supply cargoes sent to the front somewhat later than the bombers.

In the struggle in the air lines of communication of the enemy, Soviet aviation accumulated considerable experience during World War II. It disrupted delivery of cargo to the German Fascist formations around Stalingrad and it successfully blocked from the air the enemy troops at the Korsun'-Shevchenkovskiy, Breslau, and other operations.

At the present time, the question is being raised not only about disrupting the supply of individual groups of troops by air, but about completely isolating a region of operations and preventing flights of transport aircraft from the rear area to the front. It would seem that considerable forces of aircraft would be needed to carry out such a mission over a long period of time.

However, in the struggle against air transportation, important results can be achieved by inflicting intense nuclear rocket strikes on the airports, bases, and storage areas, as well as by suppressing radiotechnical means of control of aircraft in the air and means of navigation support to the flights.

The use of airborne landing troops in operations and their thorough support are inconceivable without the broad participation of military transport aviation, as well as of combat aircraft of all branches and arms of aviation. It used not only to drop and land airborne landing troops but also to transport troops for long distances.

In conditions of a nuclear war, aircraft will be the most mobile force in implementing complete support to the troops, and above all to groups which have broken out into the operational depth of the enemy or which find themselves for some reason isolated from the main forces. They are capable of delivering to them quickly everything necessary to carry out combat operations and also to evacuate the wounded and sick. Aircraft, helicopters, and rotary-wing aircraft will be most broadly used in carrying out these missions.

The use of military transport aviation in the interests of combat aviation increases the maneuvering capabilities of the latter and permits the constant supply of air units with ammunition, fuel, and other material means.

Thus, in a nuclear war, aircraft will play an extremely great role. Possessing specific qualities and capabilities, only they will be able to carry out a number of very important and complex missions. Characteristic of modern aircraft are strikes of colossal capacity which can be inflicted by small groups of carriers and even single aircraft at great distances from the objectives of an operation. A very important mission of military theory is the constant improvement of the principles and methods of using aircraft.

About the Author

Krasovskiy, Stepan Akimovich (b. 1897), Marshal of Aviation, Professor. Marshal Krasovskiy joined the Soviet Army in 1918. He graduated from the Zhukovskiy Military Air Engineering Academy in 1936. Krasovskiy was an underofficer in the Czar's army, but joined the Red Guards after the Revolution. He fought in the Civil War. After participating in the Winter War with Finland, Krasovskiy became commandant of a military aviation school in the North Caucasus, then took charge of Air Force schools in the North Caucasus Military District. By June 1941, he was commander of aviation for the district. He took part in most major campaigns of World War II. In the postwar period he commanded the aviation of the Far Eastern, Moscow, North Caucasus, and Belorussian Military Districts. From 1956 until 1968 Marshal Krasovskiy was commandant of the Gagarin Military Air Academy. He has written his autobiography, *My Life in Aviation*.

Notes

1. *Voyennaya mysl'*, No. 3, March 1967, FPD 1224/67, 26 December 1967.
2. Side-looking radar sets of the type SLAR are widely used by the American pilots in Grumman OV-1C aircraft in the aggressive war in Vietnam (according to the journal *Military Review*, No. 8, 1966, pp. 72-77).

Determining the Correlation of Forces in Terms of Nuclear Weapons[1]

Maj Gen Engr-Tech Serv I. Anureyev

The Communist Party considers the strengthening of the defensive might of the USSR a sacred duty, a most important function of our state, and an international obligation for insuring, together with other socialist countries, the reliable protection and security of the entire socialist concord. The party additionally directs special attention to the development and all-round strengthening of the economic and military potential of our country, as well as to the moral and political potential, the high level of which is directly connected with the nature of our socialist structure, with the leading role of the party in communist construction and with its activities in the upbringing of the individual in this new society.

All of these potentials played a decisive role in the victorious defense of the socialist state, in the course and outcome of the wars which it was called on to wage. The influence of the economic, military, and moral-political potentials on the course and outcome of war was demonstrated with special force during the years of the Great Patriotic War. The indicated potentials are not fixed; they are changing constantly, especially during the course of a war, and constitute the basis for the correlation of forces of probable adversaries.

From a philosophical point of view the correlation of potentials is characterized by the correlation of the measure of potential of the one side and the other. In this connection, measure is understood as a philosophical category, that is, the correlation between quantity and quality, which determines the relative stability of the subject (in the present instance—of the potential). It should be noted that philosophers do not indicate that operation which it is necessary to apply to the potentials of the sides in order to determine the required correlation. Usually the question of the correlation of potentials, for example, of the moral-political potential, is limited to formulations such as "the potential of such and such a side is higher," "the potential is very high or low," etc. Of course, such an evaluation provides a general idea of the superiority of one side over the other for the given potential; however, it cannot be considered as concrete or exhaustive.

From a military point of view the correlation of potentials of the forces on each side is determined by a concrete relationship of the quantity

of similar types of combat means or forces, and in the process it is expressed by a definite number which indicates how many times greater the forces or means of one side are as compared with the other. In this there is used an elementary operation of division: the division can be applied only in the form where the quantity of combat means or forces of one side are divided by the quantity of the same types (approximately the same type for rough calculations) of means and forces of the other.

Such an approach for the determination of the correlation of forces has been used in the military field for a long time and retains its effectiveness for the same types of means today. However, the use of this kind of approach alone in determining the correlation of forces, in which consideration is not given to the huge quantity of parameters especially characteristic of the moral-political qualities of personnel, the organizational capabilities of command cadres, the qualitative factors of armament, means of control and support, and the enemy opposition—is obviously insufficient.

In this article an attempt is made to approach the question of determining the correlation of forces with consideration not only of quantitative, but also of qualitative indicators. Of course, far from all qualitative indicators can be considered at the contemporary level of the development of mathematical methods. It is especially difficult to evaluate quantitatively the influence on the correlation of forces of the moral-political factor and the organization and volitional qualities of command personnel. However, even now consideration can be given to the qualitative factor of armament and military equipment, the influence of the systems of control and of the various types of support, and also of enemy opposition.

Without considering the problem in its entirety, we shall consider, first, the correlation of forces of nuclear weapons on a strategic scale. For this purpose we shall use the appropriate method applicable for the approximate evaluation of the correlation of these forces of the sides in those most important types of military actions such as strategic nuclear strikes and major operations in the theaters of military operations. Second, on the operational and tactical scale we shall consider the methods which take into consideration the greatest quantity of factors influencing the conduct of operations and battles.

The correlation of forces can be defined as the relationship of the combat capabilities of groupings of armed forces of the sides participating in the operations or combat actions at the given moment. Since in the course of military actions the combat capabilities are changing continuously, the correlation of forces is a function of time.

The methods of determining the correlation of forces should be such as make it possible with their help not simply to compute the correlation of forces after any particular stage of combat actions, but also to prognosticate this correlation and utilize it as a most important criterion which can be applied to judging the success of actions planned. In the process consideration should be given to the most important qualitative and quantita-

tive parameters, specifically to:

—the quantity of combat means of the sides;
—the destructive qualities of the weapons;
—the vulnerablity of combat means at launch;
—the vulnerability of combat means during flight, during movement on land and on sea;
—the quality of the control systems for troops and weapons;
—countermeasures of the sides with radioelectronic equipment;
—all types of support of the combat actions of troops.

In addition to the above, the correlation of forces under such a definition depends first and foremost on the plan of the operation (combat actions). In the process not only the correlation of forces in the course of combat actions (at any particular stage), but also the initial correlation of forces depends on the timely realization of the plan of operation (combat actions).

Of all the plans of an operation, the most expedient will be the one which places the greatest significance on the correlation of forces along the most important operational directions at the decisive periods in the development of the operation. Especially distinctive is the correlation of forces after the exchange of the first nuclear strikes. Having determined the correlation of forces after the first nuclear strike (taking into consideration enemy countermeasures) under different conditions for carrying it out, an evaluation can be made of the optimum variant of the first nuclear strike in terms of the value of the correlation of forces.

However, even in this case it is still not yet possible to see the kind of computing methods which can be used for determining the correlation of forces. A most important promising method here will be the method of mathematical modeling. Having a mathematical model of combat actions which takes into account to a sufficient degree both quantitative and qualitative factors, it is possible to determine the correlation of forces as a relationship of the combat capabilities of the groupings of armed forces of the sides.

The most successfully realized models are those of combat actions of air defense troops in which are determined the combat capabilities of the groupings of air defense troops with consideration of a sufficiently great number of qualitative indicators.

For illustration we will give an example of the calculation of qualitative indicators for determination of the correlation of forces in tanks. On the basis of a simplified Lanchester model this correlation can be computed according to the formula

$$x = \frac{N_1}{N_2} \sqrt{\frac{P_1 n_1}{P_2 n_2}}$$

where x = the correlation of forces in tanks;
N_1; N_2 = the quantity of tanks of the sides
P_1; P_2 = the probability of destroying tanks with one shot;
n_1; n_2 = the maximum rate of fire of tank guns.

For convenience, we will assume that the sides have 100 tanks each. The first side has tanks with weapons stabilized in two planes, so that $P_1 = 0.6$, $n_1 = 4$ rounds fired per minute, and the second side does not have stabilized weapons, and therefore $P_2 = 0.1$. We will assume that the maximum rate of fire of n_2 is 2 rounds per minute.

As a result of the computations we find

$$x = 3.5.$$

In the example considered the quantitative correlation of forces in tanks is equal to unity. With the calculation of quality this correlation is equal to 3.5. It is understood that measured against the scale of a formation or even a unit, the correlation will not be 3.5, but somewhat less. Even such an elementary example shows the importance of an approach to determining the correlation of forces as a relationship of the combat capabilities in the means of the sides.

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One of the most important features connected with the application of nuclear weapons is the possibility of a sharp change in the correlation of forces. Skillful planning of offensive operations and their successful realization have always led to a change in the correlation of forces to the advantage of the side which has prepared carefully for the operation. However, it was not so sharp, so spasmodic, as it could be with the use of nuclear weapons.

A sharp change in the correlation of forces to one's own advantage can be achieved by means of the mass application of nuclear weapons with the simultaneous repulsing of a sudden attack by the air-space means of the enemy, and in the process with the compulsory condition of the optimum distribution of nuclear weapons carriers against enemy targets. First and foremost a rational distribution of nuclear weapons is required against so-called active and passive enemy targets.

Active targets are primarily the nuclear means and the most important means which insure the effective application of nuclear weapons. Passive targets include the military-economic and administrative-political centers, and also other targets which are not directly involved in the application of nuclear weapons.

It would appear to be evident that in order to obtain a favorable correlation of forces to one's own advantage, maximum efforts must be directed against the nuclear means of the enemy, that is, at the struggle against active targets. However, the development of modern carriers of nuclear weapons, especially of ballistic missiles, has led to a sharp improvement in the combat readiness primarily of the strategic nuclear forces, as a consequence of which the struggle against them at the time of launching becomes even more difficult. Under these conditions the important enemy targets during the accomplishment of tasks for changing the correlation of forces in one's own favor become the various supporting systems and primarily the control systems. Additionally, a most important

factor which makes it possible to accomplish the task of changing the correlation of forces in one's own favor is antiair defense (antimissile and antispace).

What should be comprehended under correlation of forces in terms of nuclear weapons? In our viewpoint, as has already been stated, the correlation of forces in nuclear weapons is the relationship of the combat capabilities of the sides in terms of inflicting nuclear strikes, with consideration of enemy countermeasures. Therefore, when determining the combat capabilities of the sides in terms of nuclear weapons it is necessary to take for comparison targets of the same type which have the same radius of destruction when subjected to a single round of nuclear ammunition. Considering that the area of destruction from the shock wave is approximately proportional to cube root of the square of the TNT equivalent, the following expression can be used to describe the correlation of forces in terms of nuclear weapons:

$$\lambda = \lambda_0 \frac{\sum_i \sqrt[3]{\mu_{in}^2} \cdot W_{in} \cdot W_{in^3}}{\sum_j \sqrt[3]{\mu_{jn}^2} \cdot W_{jn} \cdot W_{jn^3}}$$

$\lambda_0 = \sqrt[3]{\frac{Q_H^2}{Q_P^2}}$ = the initial correlation of forces in nuclear weapons

(Q_H = total TNT equivalent of Side H) (our)
(Q_P = total TNT equivalent of side P) (enemy);

$\mu_{in} = \frac{Q_{in}}{Q_H}$ = portion of TNT equivalent delivered by i-type delivery vehicle of side H (our);

$\mu_{jn} = \frac{Q_{jn}}{Q_P}$ = portion of TNT equivalent delivered by j-type delivery vehicle of side P (enemy);

W_{in} = probability of i-type delivery vehicle of side H overcoming enemy defense;

W_{in^3} = probability of nondestruction of i-type delivery vehicle of side H on the ground;

W_{jn}; W_{jn^3} = same values respectively, only for side P.

Thus the correlation of forces in nuclear weapons depends on such important parameters as the initial correlation of forces in such weapons, the distribution of nuclear weapons among the various branches of the armed forces; the effectiveness of the antiair (antimissile) defense of the sides; the tactical-technical characteristics of the nuclear weapons delivery vehicles; protection and mobility of the nuclear means of the sides; the combat readiness of the nuclear means of the sides; the systems for control of the troops and combat means; the plan of nuclear strikes (distribution of nuclear means over enemy targets).

It is important to keep in mind that the initial correlation of forces, represented as the relationship of the total area of destruction of the sides by a nuclear weapon against the same type of target, is approximately proportional to the relationship of the amount of TNT equivalents available to the sides. This is one of the most important parameters, but it is far from the only parameter value by which the correlation of forces can be judged. The main factor in accomplishing tasks for changing the correlation of forces to our own advantage is the effective application of nuclear weapons, that is the obtaining of such values for parameters as can bring about the maximum correlation of forces after nuclear strikes.

The distribution of nuclear weapons among the various branches of the armed forces exerts a direct influence on the correlation of forces. This influence is expressed quantitatively by the coefficient, which can be called the coefficient of distribution of nuclear weapons.

It is entirely evident that in the distribution of nuclear weapons among the various branches of the armed forces and, within them, among the various carriers, it is necessary to proceed on the basis that the greater the probability for a given type of carrier to overcome the enemy defense and the greater the probability of destroying an enemy target, then the greater should be the coefficient of nuclear weapon distribution. As to the correlation of forces after the nuclear strike, it will depend not only on the distribution of one's own nuclear means, but also on the distribution of nuclear means among enemy carriers. Obviously, here arises a gaming situation with the matrix of the game consisting of the coefficients for the distribution of the nuclear means of the sides.

The probability of overcoming the enemy defense is one of the decisive parameters influencing the relationship of forces, which means influencing the effectiveness of the nuclear strikes and, overall, the successful resolution of the tasks in the war. The greater the probability of overcoming the enemy defense with one's own carriers and the lesser the probability of the enemy carriers' overcoming our defense, the more advantageous to us will be the correlation of forces after the nuclear strike. If the struggle against the carriers of nuclear weapons at the point of launch becomes difficult, a decisive influence on the correlation of forces will be shown by the correlation in probabilities of the carriers' overcoming the defenses of the sides. Consequently, it is necessary to use all possible means to increase the probability of overcoming the enemy defense. The correlation of forces in one's own favor can be changed by improving the

tactical-technical characteristics of one's own carriers and strengthening the antiair (antimissile) defense.

The probability of destroying carriers at launching is also an important parameter exerting a great influence on the correlation of forces after the nuclear strikes of the sides. The lesser the probability of our carriers' being destroyed at launch, then the more favorable will be the correlation of forces in our favor. But the very probability of destroying the carriers depends on a great many parameters, the main ones of which are: combat readiness of the carriers of each side, the degree of automated control of troops and combat equipment, the protection and mobility of the carrier launch facilities, the reconnaissance system, and the characteristics of carrier dispersion.

The combat readiness of carriers, determined by the interval of time from the moment the launch signal is received to the moment the carrier leaves the launcher, is an especially important factor influencing the probability of destroying a carrier at launch, and consequently, also influencing the correlation of forces. The shorter the time of combat readiness, then the lesser the probability of carrier destruction at launch. Combat readiness time depends both on the perfection of the carrier itself and its control system, and on the training of the personnel. It is known that present-day U.S. strategic missiles such as the Minuteman ballistic missile have a combat readiness time on the order of 1 minute. This is explained first and foremost by the perfected gyro-inertial control system in which use is made of gyroscopes with great service life. Such gyroscopes spin constantly in combat alert missiles, which makes it possible to eliminate the time for accelerating the gyroscopes. This example shows how the achievements of science and technology make it possible to reduce the probability of carrier destruction at launch. However, along with perfecting the tactical-technical characteristics of the missiles it is necessary to improve the methods of servicing and preparing the missiles at launch. It should be emphasized that great assistance in reducing the time periods for placing the missiles in an enhanced stage of combat readiness will be rendered by research in the field of queueing theory and the use of network planning charts.

The degree of automated control of troops exerts a decisive effect on the probability of carrier destruction at launch. We will consider the influence of the overall degree of automation on the correlation of forces. We note that it will be the same as the influence of combat readiness time: the more time spent on the control cycle (gathering information, processing it, making a decision, and transmitting it to the executors), the greater the probability of the carrier's being destroyed at launch and the lower the correlation of forces.

Thus the introduction of automated systems of control in troop units, and primarily in the strategic nuclear forces, makes it possible to reduce the time on the control cycle, and consequently, to increase the correlation of forces after the nuclear strike to our advantage.

The protection and mobility of carrier launch facilities also has a

great effect on the probability of carrier destruction. The greater requirement there is for extensive pressure to destroy the launch facility, then the less the probability of carrier destruction at launch (during multiple use of the carrier or during single use, but with the condition that the carrier is found at launch).

A similar influence on the probability of launch facility destruction is exerted by its mobility. The greater the mobility (the greater the speed of the launch facility or the more frequently it changes position), then the less the probability that the carrier will be destroyed at launch. For example, the U.S. Polaris missile on nuclear submarines can be launched from a submerged position. It is completely evident that the high mobility of submarines is combined with the difficulty of their detection. Aircraft carriers are also classified as mobile launch facilities.

The system of reconnaissance and its effectiveness are also reflected in the probability of carrier destruction at launch, and consequently, in the correlation of forces as well. In view of the special importance of this system its probability factor could have been introduced directly into the formula for the correlation of forces. However, in this article we shall consider that the influence of reconnaissance was considered beforehand in the expression of the probability of carrier destruction at launch.

The influence of the reconnaissance systems will be reflected in the probability of a correct response that the target is of a given type and on the accuracy of determining target coordinates.

These magnitudes will directly affect both the probability of carrier destruction at launch and other parameters as well. From this the course of deciding the effectiveness of reconnaissance means can be seen. Two tasks are differentiated—the internal and the external. The internal task consists of selection of those means of reconnaissance which will best solve the problem from the viewpoint of particular criteria probability of the correct response, accuracy of coordinate determination, operational efficiency of reconnaissance, and others. The external task consists of selection of that system of reconnaissance which will insure the greatest effect in combat operations.

Thus, having determined the correlation of forces after nuclear strikes while using different means of reconnaissance, but with one and the same plan of attack, we will give preference to those means of reconnaissance which will promote the greatest value of the correlation of forces.

As regards the characteristics of carrier dispersion, they exert a direct influence on the probability of carrier destruction at launch, and in the process this relationship is registered mathematically with sufficient accuracy. A small value of probable (average) error insures, with all other conditions being equal, a great probability of carrier destruction on the ground.

We have analyzed the qualitative relationship of the probability of carrier destruction at launch to the major parameters. For determining the correlation of forces it is necessary to know the analytical relationship of

destruction probability based on the studied parameters or to develop static models.

The troop control system exerts a decisive influence on the correlation of forces and on all magnitudes used in the formula. The quality of the control system and the degree of its automation have a direct effect on the coefficients for distributing nuclear means among the carriers. And, depending on the quality of the control system, the number of carriers capable of participating in the nuclear strike is also changed. With greater automation and a high quality of control system, the quality of carriers taking part in the strike is increased, and, consequently, the coefficient for the distribution of nuclear means will have a higher value.

If we have a more perfected control system, then this will exert an influence on the increase of the correlation of forces in our favor. It will also directly affect the probability of the nuclear weapon carriers' overcoming the enemy defense.

An automated and more perfected control system insures better surmounting of the enemy defense, selection of optimum courses of travel, the best combat formations of the carriers, optimum arrangement of strikes, the echelonment of means, and other measures.

The control system will exert an exceptionally effective influence on the probability of carrier destruction at launch. It will be reflected primarily in the time of the control system, in combat readiness, the probability of a correct response, accuracy of coordinate determination, and other parameters. Special mention should be made about the influence of equipment. The measures applied for combating enemy radioelectronic means worsen the quality of his control system, which leads to a decrease in the coefficients for distribution of nuclear means, a reduction in the probability of surmounting the defense, and an increase in the probability of enemy carrier destruction at launch. Well-organized measures for combating enemy radioelectronic equipment will lead to a sharp increase in the correlation of forces in our favor. This task can be resolved in reverse order, that is, by applying the value of the correlation of forces to evaluating the effectiveness of measures (and means) in the struggle against enemy radioelectronic means.

A most important factor influencing the correlation of forces is the optimum distribution of nuclear means in terms of enemy targets. It should be acknowledged that the best variant of a nuclear strike is the one which insures the greatest correlation of forces in our favor after the strike is delivered. Evidently, it can be considered (although it is difficult to prove mathematically) that the maximum correlation of forces in terms of nuclear weapons is a condition which is necessary and sufficient for an optimum nuclear strike. For this reason, when planning nuclear strikes on enemy targets during combat operations, it is necessary to proceed on the basis of the following principles:

—select great values of coefficients for the distribution of nuclear means for those carriers which have the greatest probability of overcoming the enemy defense;

—for the strike select the enemy targets which have the greatest probability of being destroyed at launch.

It should be noted that questions of optimizing target distribution for nuclear means fall into the category of complex military and mathematical problems. Special difficulties are corrected with the selection of criteria of effectiveness according to which it is necessary to produce the optimization.

In our opinion, the correlation of forces, understood as a relationship of the combat capabilities of the sides, can be a successful criterion for evaluating the effectiveness of nuclear weapon employment.

Let us dwell on scientific problems connected with resolving the task of determining the correlation of forces in terms of nuclear weapons. Among them can be included: the operational-strategic description for the model of combat operations of nuclear forces, and also the mathematical elaboration of the model for evaluating the effectiveness of nuclear weapons.

The operational-strategic description for the model of combat operations is not simply the presentation of principles of military art and strategy, applied to a particular form of combat actions. It should include the assigning of a mission; initial information on the forces and means, on the methods of actions, and other data required for functioning and form of distribution of output information. Additionally the operational-strategic description should be formalized to the maximum extent so that mathematical methods can be effectively applied.

One of the urgent tasks of our time is the training of specialists capable of successfully solving "linking" problems; in other words, conversion of the tasks of military art into formalized language, the language of mathematical logic, with subsequent application of computer methods.

The mathematical elaboration of a model for the evaluation of the effectiveness of nuclear weapons is connected with selection of the type of model (analytical, statistical), consideration of a definite group of parameters, consideration of chance and uncertainty, and observance of the condition of "equivalent accuracy" of the results at all stages. The model should be realized in acceptable machine time and deliver results in a form convenient for analysis.

In its application to the determination of the correlation of forces this model should certainly be a multistep one, in which the enemy operates actively and reasonably. Appropriate steps in such a model are as follows. The first step: modeling of the attack of carriers of one side in surmounting the antiair (antimissile) defense of the other. As a result there is ascertained the mathematical expectation of the number of carriers overcoming the enemy defense. The second step: taking into account the combat readiness of the enemy nuclear means, the effectiveness of reconnaissance, the control system, and the strike variant, a determination is made of the enemy losses in terms of nuclear means, and also the damage inflicted on other targets. The third step: the undamaged nuclear means of the enemy overcoming the antiair (antimissile) defense. At this step a determination is made of the mathematical expectation of the number of undamaged car-

riers at the enemy launch facilities which have overcome our defense. The fourth step: taking into account the combat readiness of nuclear means and the effectiveness of the control system of our side, a determination is made of our losses of nuclear means, and also of the damage inflicted on other targets.

Knowing the initial quantity of forces and means and having determined the losses, it is possible to compute the quantitative correlation in terms of the same types of means, and having realized a model for different variants of the beginning of military operations, to establish the correlation of forces for each of the variants. Such a model can provide complete numerical values for those coefficients which are introduced in the expression of the correlation of forces in terms of nuclear weapons.

It appears to be expedient to study also a less common case for resolving the problem of correlation of forces when each of the sides has two types of nuclear weapons carriers: ballistic missiles and aircraft.

Let us assume that the probabilities of overcoming the antimissile defense of the sides with ballistic missiles are equal to unity, the probabilities of overcoming the antiair defense with aircraft are equal to 0.7 (for both sides); the coefficients of nuclear weapon distribution: for ballistic missiles—0.6, and for aircraft—0.4 (for both sides).

If in the example being considered by us we take various values for the probabilities of missile and aircraft destruction of the sides on the ground, which depends on the variant of the inflicted strike, the combat readiness of the carriers, the control system, and other parameters which already have been mentioned, then it is possible to determine the limits of change in the correlation of forces in nuclear weapons.

The calculated results produced according to the formula are assembled in a table in which, for various values of probabilities of nondestruction of the carriers at launch, the correlation of forces is given (relative to the initial correlation of forces).

Probability of Nondestruction for "*P*" (enemy)	Probability of Nondestruction for "*H*" (our)				
	0.2; 0.2	0.4; 0.4	0.6; 0.6	0.8; 0.8	1; 1
1.0; 1.0	0.19	0.40	0.60	0.80	1.0
0.8; 0.8	0.25	0.50	0.75	1.0	1.25
0.6; 0.6	0.33	0.66	1.0	1.52	1.67
0.4; 0.4	0.49	1.0	1.5	2.0	2.5
0.2; 0.2	1.0	2.0	3.0	3.6	4.6

Judging by the data in the table, the correlation of forces as a result of the nuclear strikes can be changed within very broad limits depending on the probabilities of the nondestruction of carriers at launch. For example, in the case where probabilities of nondestruction at the launch of our ballistic missiles and aircraft is 0.4 and the probability of nondestruction at the launch of enemy ballistic missiles and aircraft is 0.8, the correlation of forces after nuclear strikes will be 0.5. This case is true for a sufficiently unexpected enemy attack. If we should take 0.8 as the probability of

nondestruction of our missiles and aircraft at launch, and the 0.4 coefficient as the probability for the enemy, then the correlation of forces will equal 2.

It is understood that the table presented is purely of an illustrative nature, but it also makes it possible to judge the influence of the combat readiness of nuclear means and control systems on the correlation of forces as a result of strikes.

From what has been stated it is not difficult to draw the conclusion that the correlation of forces in a nuclear war remains one of the most important criteria by which it is possible to judge the success of combat operations and also to select the most expedient variants of the operations. The correlation of forces in nuclear weapons must be defined as the relationship of the combat capabilities of the sides during the inflicting of strikes; it depends on the coefficients for the distribution of nuclear means of the sides, the probabilities of overcoming the defense, and the nondestruction of the nuclear means at launch, as well as the variants of inflicting strikes.

In nuclear warfare, of course, the correlation of forces of the sides can suffer sharp changes, depending on the plan of operations and its realization. To obtain a correlation of forces in our own favor it is necessary to conduct careful studies in regard to finding the optimum variants of combat operations of nuclear forces and the possibility of applying scientifically based foresight and to use them correctly in combat operations of modern warfare.

About the Author

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The Dictionary of Basic Military Terms (1965);
Weapons of Antimissile and Antispace Defense (1971);
Questions of Scientific Control of the Soviet Armed Forces (1973);
Scientific-Technical Progress and the Revolution in Military Affairs (1973);
Science. Technology. Military Affairs (1975);
Multipurpose Rockets (1975).

Note

1. *Voyennaya mysl'*, No. 6, 1967, FPD 0112/68, 11 August 1968.

Combat Operations Involving Conventional Means of Destruction[1]

Col B. Samorukov

In a world war, should the imperialists manage to unleash one, all means of mass destruction will be used extensively, above all nuclear weapons. The imperialists of the United States continue to increase their nuclear potential. And in case a third world war is unleashed, they will count mainly on nuclear weapons, which they intend to employ without fail at some particular stage.

In recent years, foreign military theoreticians have expressed their thoughts more and more often on the possibility of unleashing a war in Europe without the use of nuclear weapons. For example, the military-political leadership of the United States and the North Atlantic alliance proposes that the concept of "forward defense" and the strategy of "flexible response" must on the whole be based on the use not only of nuclear, but also of conventional weapons. Hence the quite firm stand on the variant whereby a world war can be unleashed and waged for some time only with conventional means of conflict, and nuclear weapons will be used some time in the course of military operations.

The alternative of beginning of war only with conventional weapons of destruction, with subsequent shift to the use of nuclear weapons, has been studied for several years in large operational-strategic training exercises which have been conducted by the combined armed forces of NATO and also by the national troops of the countries which belong to this aggressive military organization.[2]

Such a severe shift in American and NATO strategy, which until quite recently considered the main method of unleashing a war against the world socialist system to be a sudden attack with the decisive use of the maximum possible amount of nuclear weapons, is undoubtedly the result of the sharply increased nuclear might of the Soviet Union. The NATO journal *Fifteen Nations* states: "With the increase in the nuclear potential of the Russians, the Americans have become convinced that it is necessary to avoid a nuclear conflict and, in case of war, to delay if possible the use of nuclear weapons. Therefore, in case of an armed conflict, conventional armed forces will be used first."[3]

In the United States they understand more and more clearly that in conditions of an established, in their opinion, balance in both sides'

nuclear armament, the unleashing of war through the unlimited use of nuclear weapons constitutes an extremely great risk for the aggressor. R. McNamara, U.S. Secretary of Defense, acknowledged that a strike by Soviet strategic missiles against 200 cities of the United States could in a matter of hours lead to the destruction of 149 million persons and two-thirds of the industrial potential of the country.

What is most characteristic of the beginning of operations without the use of nuclear means? What are the most important characteristics in the organization and conduct of combat operations in these conditions?

Above all, attention must be given to the fact that constant readiness of both sides for the use of nuclear weapons is dangerous, that one of them can precede the other in the infliction of a nuclear strike.

This will force the opponents to organize and carry out their combat operations with conventional means of destruction in such a way as to be in the most favorable position in relation to each other in case of the use of nuclear weapons, to acquire an advantage in nuclear means, to be ready for a rapid offensive immediately after nuclear strikes, and to have the necessary dispersal of troops for the purpose of protection from means of mass destruction.

For these purposes, both sides will evidently concentrate the main attention on destroying as large as possible a number of nuclear means of the enemy and thereby disrupting or weakening to the maximum extent the nuclear strike being prepared by him. Of course, the maximum of forces and means will be enlisted to carry out this very important mission. Both sides will also take every measure to inflict, before the beginning of use of nuclear weapons, destruction on the most important groupings of the first operational echelon of the enemy, to succeed in overcoming difficult natural obstacles as well as zones and lines of obstacles, especially of high explosives, and to seize objectives which have great operational importance and regions of terrain which are advantageous for offensive operations with nuclear weapons. One of the primary missions resolved in this period will be the most exact definition of available data on the enemy and the receipt of new data, especially on nuclear means, for the purpose of the most effective subsequent use of one's own nuclear weapons against him.

The second very important characteristic is that combat operations without the use of nuclear weapons independent of the development of events cannot be of long duration. Hence arise the demands for another approach to their organization and conduct. The short duration of such operations is explained mainly by the fact that each of the sides must inevitably be interested in fulfilling the above-cited minimum of missions in the shortest possible period of time in order to achieve advantages over the enemy which will permit one to have greater success thereafter. Because this is a mutual aspiration of both sides, the maximum reduction in the period of conducting combat operations without the use of nuclear weapons is unavoidable.

It is possible, of course, that for one of the sides, which has achieved

the necessary results and is successfully developing the offensive, it will be advantageous to delay the beginning of the use of nuclear weapons as long as possible. However, this does not change the conditions. On the contrary, in such a case the opposing side might considerably accelerate the beginning of operations with nuclear weapons in order to achieve a sharp turning point in conditions in his favor. For it is obvious that if he does not succeed in doing this at the critical moment, then subsequently it will be all the more difficult to use nuclear weapons with the necessary effect.

The successful beginning and development of combat operations by conventional means of destruction by one of the sides and the quickly growing danger of use of nuclear weapons by the other side might force the one side to abandon operations by conventional means alone considerably before it succeeds in performing the outlined minimum of missions, despite the favorable premises for this. Finally, the duration of operations with conventional means alone can be sharply decreased for the purpose of achieving greater surprise in a nuclear strike and faster destruction of the enemy.

Other factors are also noted which result in short duration of military operations without the use of nuclear means. In the end, resolution of the question on the use of nuclear weapons remains with the political leadership.

Speaking more specifically about the views of the military-political leadership of the NATO countries, their essence consists in the fact that combat operations without nuclear weapons in a world war will be of extremely short duration. The military officials of West Germany, for example, argue that in Western Europe, which does not have great strategic depth, it is impossible to tolerate losses of territory, and a "nuclear threshold"[4] must be crossed as soon as possible. West German Minister of Defense Hassel declared in January 1965: "The conception of 'flexible response' as it applies to Europe should not mean that the so-called 'nuclear threshold' can be raised to an intolerably great height. In regard to Europe, this means that the 'nuclear threshold' must be very low."

The point of view of military circles in Great Britain in this matter was formulated in the English White Paper on military questions as follows: "The government feels that a large war cannot last long without one side or the other resorting to nuclear weapons. Military operations without nuclear weapons will be only a brief prelude to a nuclear war."

The military-political leadership of the United States, in effect, takes the same positions.

These views are also confirmed in the practice of operational preparation. Proceeding from the experience of training exercises carried out abroad during recent years, the use of nuclear weapons began in a maximum of 4-5 days

The following very important characteristic consists in the fact that, to carry out the prescribed missions, both sides will need mainly the same forces which are indicated for the conduct of operations with the use of nuclear weapons. The fact is that the additional deployment of large

forces for the beginning of an operation and, what is more, their concentration in certain zones or sectors of the front most likely cannot be used as a constant threat of the use of nuclear weapons. Moreover, both sides will have to limit the use of these forces, keeping in mind the necessity of insuring constant readiness of a certain portion of their means for the use of nuclear weapons. This considerably decreases their combat capabilities, especially in the use of rocket troops and aviation.

In these conditions it evidently becomes necessary primarily to concentrate forces for a strike only against the most important objectives and to decrease to the minimum the number of forces and means for carrying out a number of other missions, especially those whose fulfillment requires considerable time and the achieved result of which does not directly influence a great decrease in the nuclear capabilities of the enemy. The successful use of the main forces in the beginning of military operations will permit the subsequent effective execution of other missions.

What forces and means can be used in the conditions examined for carrying out the most important missions?

First the formations of ground troops are usually examined. They must carry out a large portion of missions, above all such missions as the destruction of nuclear means of tactical and operational designation, the destruction of formations of the first operational echelon, the overcoming of large natural barriers and lines (zones) of principal barriers, and the seizure of the most important regions.

A special role belongs to aviation, which will be the main long-range means in these conditions. Aircraft are capable of destroying operational-tactical type missiles, as well as aircraft on the airfields and in the air. However, in order to carry out these missions, the aircraft must overcome the opposing side's very strong air defense. To suppress it in conditions when nuclear weapons are not used, the aircraft must allocate a large portion of their forces.

An important mission of aircraft is aerial reconnaissance, which is called on to supply the command element with data which would permit most successful performance of the missions in the period of use of conventional means and in the switch to the use of nuclear weapons. It must constantly check and revise the coordinates of objectives against which nuclear weapons should be used.

Air support of troops is becoming a great and very important mission, especially in such culminating moments as, for example, the beginning of military operations and the repulsing of counterattacks. Aircraft also have the role of cover of the troops from strikes from the air, especially in operations of formations which have penetrated into the operational depth.

This entire volume of missions, which is considerably larger than in conditions when nuclear weapons are used, must be carried out by aircraft with a considerably lesser number of forces, because part of them will be in constant readiness for the use of nuclear weapons. Moreover, the periods for carrying out missions are highly limited. This means that their

operations will be characterized by especially strict sequence in the infliction of strikes. Considering the nature of missions and the requirements for the order of carrying them out, as well as the experience of past wars, it might be assumed that from the very beginning of military operations without the use of nuclear weapons the belligerents will enlist the main forces of aircraft in the struggle for the freest use of aircraft in the airspace of the enemy and for preventing the penetration of his air force toward the groupings of the rocket nuclear means and troops. It is not by accident that the foreign press quite strongly raises the question about the necessity of gaining supremacy in the air. Thus in the West German journal *Truppenpraxis* it says that "one of the most important missions of tactical aircraft is the achievement of supremacy in the air or at least the achievement of supremacy in the air limited to time and place for the purpose of not permitting or limiting fulfillment of the enemy plans."[5] Primary objectives of air strikes are in this case airfields and, above all, carriers, aircraft, air defense means, rocket troops, and control posts.

For the same reasons the operations of aircraft will be characterized by extreme selectivity, the destruction in each case of the "core" of the objective, and the use of the appropriate weapons for this.

Thus, for example, in inflicting strikes against airfields, the landing strips may first be put out of commission. This makes the aircraft based at these airfields helpless against air raids inflicted on them. Available experience speaks highly convincingly about this.

In the struggle against air defense means, radar stations are undoubtedly the "core" of the objectives because they are the most exposed to destruction and also because each of them supports several active means of combat.

Aircraft need much assistance from other forces and means, especially in overcoming air defense. They need in particular the help of radiotechnical troops, advance detachments and airborne troops, long-range artillery, and reconnaissance-diversionary groups.

The navy can give much help to the ground troops and aircraft in their operations without nuclear weapons. Its forces, coordinating with aircraft and troops attacking, for example, in a coastal zone are capable of carrying out missions of destroying surface ships and naval aircraft in the coastal regions. They can inflict strikes against naval bases, ports, and airfields, cover the flanks of the attacking troops from enemy strikes from the sea, land a naval force and destroy the enemy landing forces, and conduct a struggle along the lines of communications and for seizure of the channel zones.

Now let us briefly examine certain general principles of the organization and conduct of combat operations.

Very serious attention is usually devoted to selection of the zone of the main strike and to determining other strikes inflicted by formations. It is acknowledged that the most expedient zone of the main strikes, other conditions being equal, is that in which the attacking troops can consider overcoming the enemy resistance most successfully, develop a swift attack,

and in a very short period enter the regions of disposition of the main mass of nuclear means of operational-tactical designation of the enemy, as well as the flank and rear area of his main grouping, for the purpose of his destruction. Of course, in contrast to the situation in which nuclear weapons are used, in principle this can be a zone where the density of enemy troops is less in comparison with others. And from this point of view the approach to selecting the zone of the main strike, it would seem, is to a great extent similar to that which is well known from past experience. However, in using such an approach, one very important factor which would not have existed before, but which sometimes will be a decisive factor now, would not be considered. This is that the zone of the main strike must insure the best subsequent use of the results of nuclear strikes. Here is the essence of the basically different approach to resolving this question.

As for the number of other strikes inflicted by formations, it would seem that there could be less of them than in operations with the use of nuclear weapons. The difference in the capabilities of attacking troops in both cases is quite obvious. However, as we will see from subsequent discussion, each formation in these conditions will also be forced to attack, in effect, in an independent zone. Consequently, there will be no fundamental difference in the number of strikes inflicted by formations in comparison with the strikes when nuclear weapons are used.

The question of meeting engagements is resolved in a different manner. At first glance, in such a situation the probability of such engagements is quite great because in the main theaters both sides from the very beginning of combat operations will strive to seize the initiative and carry out a decisive offensive, creating thereby the necessary conditions for subsequent operations with the use of nuclear weapons.

Moreover, meeting engagements, as the experience of the past war indicates, were the most decisive method of operations for the fast destruction of the enemy and achievement of the goals of the operation. Therefore both sides, obviously, could also resort to it now if the purpose of a meeting engagement, as before, involved mainly the destruction of groupings of ground troops.

However, as has already been noted, the chief goal of operations of both sides in these conditions is considered to be the destruction in a short period of the nuclear means, and above all those of operational-tactical designation, as well as a swift entry of the troops into operational depth, insuring in the end maximum readiness for attack in conditions of the use of nuclear weapons. A meeting engagement requires the enlistment of the main forces of combat—aircraft, artillery, and tanks. In this way their strike against means of nuclear attack will be weakened. Moreover, such an engagement can assume a highly prolonged nature. Beginning with the clash of the advanced units, it can last until the adjacent operational reserves join it. The situation is further complicated if the enemy switches to the defense in the course of a meeting engagement. In such conditions the most important missions which it was planned to carry out by conven-

tional means of destruction can remain unfulfilled with all the consequences which ensue from this.

Consequently, a meeting engagement, as a combination of simultaneously conducted meeting battles joined by unity of goal, plan, and leadership and intentionally undertaken, is not the best method of operation in these conditions. Both sides will obviously resort to it only in those cases when there is no possibility of avoiding it or in especially favorable conditions when it is possible to destroy an approaching grouping in the minimum period of time.

Individual meeting battles are another matter. They, as is easily imagined, will occur. This is because the most favorable zones for attack of units and formations on both sides can often coincide. Avoiding meeting battles in such cases would not produce great advantages in the development of an attack or in achieving the assigned goals. Units and formations, in bypassing the attacking troops, could lose the tempo of advance, and the approaching enemy would remain undestroyed.

Inseparably linked with the above proposals is the question of the width of formation zones of attack. Here, just as in resolving many other questions of carrying out combat operations without the use of nuclear weapons, serious contradictions arise which are difficult to resolve. Thus, a constant readiness of troops to operate in conditions of the use of nuclear weapons requires that they be dispersed to the maximum possible extent. Theoretically it cannot be pictured other than as great as in a situation when nuclear weapons are already being used. This is necessary due to the uncertainty of the nature and force of a nuclear strike which the enemy can inflict and the natural desire to decrease to a maximum the loss of one's troops from this strike even in the most critical situation which can arise. Also of interest is the conclusion that this dispersal must be more uniform because it is difficult to foresee beforehand in which zones the enemy can mass nuclear strikes. It is impossible also to foresee all the changes in the direction of the wind which can occur by the beginning of use of nuclear weapons. These changes require that considerable corrections be made in the procedure adopted for dispersing the troops in order to bring it into complete accordance with the new conditions.

In determination of the width of zones of attack, however, a role is played not only by the necessity of protecting the forces and means from enemy nuclear attack, but also by their use with the maximum effect to destroy the enemy. The achievement of this role in conditions when nuclear weapons are not used requires operations which are directly opposite to those of dispersion and, consequently, an approach different from that in the first case for determining the width of zones of attack.

How can this contradiction be resolved if not one of the above requirements can be rejected?

The most likely solution is a solution whereby the width of zones of attack will be within ranges which insure the necessary dispersion of troops in conditions of the threat of use of nuclear weapons, and the massing of forces and means of ground troops will be achieved through their

periodic concentration in carrying out the most important missions. It is this point of view which is expressed most frequently in the press.

However, does this apply equally to all levels of operations? It is one thing to have broad zones both for the field forces and the formations which are part of these field forces, and another thing to have broad zones for the field forces, but to specify zones of attack which are narrower in comparison with the other zones for formations operating in the main directions. It is one thing to concentrate troops for a short time on an operational scale, and quite another thing in a tactical unit.

One becomes convinced in this manner that the most acceptable situation in the conditions examined is the one in which both the field forces and their constituent formations will have broad zones of attack which insure the necessary dispersion and maneuver of troops. The concentration of ground troops is permitted only for a very limited period of time and only in a tactical unit.

Overcoming a defense. A very important condition for swiftly overcoming a defense without the use of nuclear weapons is, as is known, the presence of considerable superiority in forces and means over the enemy, especially in artillery and tanks. However, it is hardly possible to create such superiority. This is explained mainly by the fact that with a constant threat of the use of nuclear weapons by the enemy, it involves a risk of overconcentration of troops and placing them under nuclear strikes. However, the combatants possibly may not have the necessary forces and means for this. In such a situation, they have no alternative but to try to achieve for a very short period of time a minimum advantage in forces and means over the enemy in individual zones (sectors) and to utilize it to the maximum extent. However, this superiority can also obviously be created only through maneuver of forces and means within the zones of attack mainly of formations with their subsequent fast dispersal after overcoming a defense.

It is required each time to seek methods of overcoming a defense which can be employed with the least expenditure of forces and means. In this regard, decisive importance is acquired by a penetration into the depth of defense through sectors which are unoccupied or are sparsely occupied by troops, by the infliction of strikes in zones where the defending formations and units have not yet become consolidated, and also by a turning movement of open or poorly defended flanks.

Success in overcoming a defense will depend also on the skillful selection of a method for switching of troops to the attack. They must use the method whereby they would achieve the most effective utilization of their fire means to suppress the defense and also in which they would consider the necessity of protection from nuclear weapons in case of their use by the enemy.

Obviously this method will differ in principle both from the method known through the experience of the past war (an attack on the scale of operational field forces usually begun from an initial position occupied and prepared in advance in direct contact with the enemy, and in which at

the beginning of the attack it was possible to conduct powerful artillery and air preparations), as well as from the method which is the most probable in conditions of the use of nuclear weapons (defense is suppressed mainly by nuclear means, and formations switch to the attack on the march from remote regions).

Of special importance in operations without the use of nuclear weapons will be the seizure and overcoming of various obstacles, above all of powerful explosive obstacles. This is an extremely complex and still little studied task. For the present it is proposed that it can be successfully resolved only in a centralized manner, mainly on an operational level. For this purpose the operational command element has at its disposal great opportunities for selecting the necessary forces and means, as well as the methods of operations. It can organize more effectively the reconnaissance of obstacles, and in particular reveal in all their forms the system, time, and procedure for placing powerful charges, the purpose and time of use, the organization of security, and control of the charges.

It is stressed that the mission of clearing powerful explosive obstacles cannot be carried out by means of gradual removal and rendering harmless of charges or by their demolition such as was done in regard to the mine in the past. It is extremely complex to remove them physically. Therefore, performance of the mission will consist most probably not of destroying or removing these charges, but of not permitting them to blow up and thereby safeguarding the troops from the destructive effects of the charges.

Success in overcoming barriers is possible only through sudden operations of all the forces and means used for this, above all of reconnaissance, advance detachments, and airborne troops simultaneously throughout the entire depth of their position.

Surrounding and destroying vast enemy groupings. Because an attack without the use of nuclear weapons will be of short duration, this method of operation will be possible only in those cases where the main forces of the surrounded groupings are located at a short depth. However, is it sensible to surround such a grouping when it does not have the most important operational-tactical nuclear means? The conclusion is drawn that it is not, because fulfillment of one of the main missions—destruction of these means—is not achieved.

Of course, for subsequent operations it is very important to destroy also the tactical nuclear means located in the formations. For this, however, it is not necessary to simultaneously surround vast groupings of ground troops. This mission can be carried out more successfully through the destruction of individual formations piecemeal.

We should not lose sight of the fact that surrounded formations along with their nuclear means, in case of a switch to the use of nuclear weapons, become primary objectives of nuclear strikes. Therefore, in conditions when it is time to switch to the use of nuclear weapons, the attacking troops will hardly be brought into operations which can prevent them from utilizing most effectively nuclear means for the destruction of these

formations. In such a situation, it is considered advantageous to confine maneuver of the above formations and to force them to concentrate their disposition. For this purpose it will sometimes be sufficient to cut off the main paths of their movement and, with well-organized surprise operations, to envelop them with small forces.

It must be noted that in attacking in broad zones, the combatants usually will not have the kind of dense formations and groupings that make encirclement expedient. Moreover, for the encirclement and destruction of troops and especially of vast groupings in the initial period of an operation, there simply might not be the necessary number of forces. No less important is the fact that encirclement and destruction of the enemy with conventional means requires considerable time which the troops might not have at their disposal. Therefore, participating in the encirclement and destruction of the enemy, the attacking formations would be deprived of the possibility of developing an attack in operational depth and they would not achieve the main goals of their operations.

Thus, for these conditions, encirclement which would be carried out by design does not constitute a characteristic method of operations. Obviously the combatants resort to it only when it is impossible by other means to penetrate to the main nuclear means and destroy them. A typical situation here might be the cutting off of troops and isolation of small groupings as the result of a swift attack of the combatants. It is clear that the procedure for destroying such groupings will differ greatly from that which was usually used in the past. The difference will consist in the fact that the main forces cannot and will not be brought in to destroy troops which have been cut off.

Repulsing a counterattack. It is not out of the question that with the successful development of an attack on the whole, the troops will have to repulse a counterattack by the defenders. In this case a struggle against the counterattacking grouping can be extremely complex. First, it is very difficult to destroy decisively the reserves intended for the counterattack in the period of their movement forward by using conventional means alone. For this purpose, judging by the experience of the past war, a large number of aircraft would be needed.

Second, if it became necessary for the defenders to inflict a strong counterattack, then it is right to assume that by the moment that is carried out it can adapt to the use of nuclear weapons of tactical designation. Consequently, a counterattack can begin with a massed nuclear strike and be the culminating moment in the course of the operation, so to speak, the watershed between nonnuclear and nuclear operations.

Proceeding from this, the attacking troops, after discovering preparation of the defense to inflict a counterattack, will strive to establish the readiness of its nuclear means for use and promptly inflict a decisive blow against them, utilizing all the necessary means for this. In such a situation, special importance is acquired by the highest possible readiness of the maximum number of rocket subunits and carrier aircraft to inflict a nuclear strike.

The troop combat formation. The characteristics examined in the organization and conduct of combat operations without the use of nuclear weapons directly and indirectly influence the troop combat formation. In principle it may include those same elements that are found in attack with nuclear weapons and can meet many general requirements.

Thus, a large portion of the tank formations capable in short periods of time of penetrating into the operational depth and destroying the enemy will obviously be used in the first echelon of a side. Their high mobility promotes the conduct of broad maneuver for the infliction of swift strikes to the flank and rear of the enemy, and, in case of his attempts to switch to defense, the disruption of these plans and surmounting of the defense being prepared on the march. The tank troops are also more stable against nuclear strikes. This acquires special importance in switching to operations with the use of nuclear weapons. Therefore they can successfully operate in a complex nuclear situation for the purpose of quickly carrying out nuclear strikes inflicted against the enemy.

However, in order that the tank troops carry out their missions, it is proposed that the antitank means which the formations and units of the combatants have in large quantities be reliably suppressed. As is known, artillery can cope most successfully with this, utilizing high-explosive fragmentation, incendiary, and smoke shells. Thus, artillery is becoming more than before a constant companion of the tank units and formations. The first echelon of attacking troops therefore will be very strong in tank and artillery equipment.

Most often there will be no second echelon in such a form as a field army. The forces necessary for its creation simply might not exist. Moreover, it is difficult to use it on the whole, considering the characteristics of the missions facing the troops and the nature of their attack.

By virtue of possible sharp changes in the situation and with the beginning of use of nuclear weapons, as well as of operations of first echelon troops against isolated zones on a broad line of attack, it would be difficult for the second echelon to determine even the direction of its attack, not to speak of the allocation of specific missions. It could find itself without sufficient maneuverability in conditions where the large formations which constitute it require especially great mobility. As a result of all this, such a second echelon would hardly play its role in carrying out the missions facing the troops, and with the beginning of use of nuclear weapons would be a most important target of nuclear strikes.

The presence of greater centralization in the use of artillery is considered characteristic for these conditions. The need for this is explained primarily by the fact that it is necessary in a very short span of time to carry out missions of destroying and suppressing enemy nuclear means. In such a situation, the greatest success is possible with centralization of the use of long-range artillery, which permits the concentration of efforts for the destruction of the most important objectives and the selection for this of the most favorable sequence of operations.

We cannot but note also the characteristic of a certain change in depth of formation of the troops in comparison with the conditions when nuclear weapons are used. It is assumed that in the operational plane it will be somewhat less, although from the point of view of insuring the necessary dispersion of troops, this would seem to be intolerable. However, with such a great depth of formation of troops as there is in conditions of the use of nuclear weapons, it is very difficult to simultaneously utilize the reserves for carrying out the assigned missions. Considering the possible period of operations of troops without the use of nuclear weapons, these reserves will perhaps not be successfully introduced into the battle at all when the need for them arises. However, this at the same time does not mean that they must be kept at lesser distances, because with broad zones of attack, they would be compelled in such a case to carry out a highly undesirable and, for the given conditions, extremely dangerous maneuver along the front.

Also noted as a characteristic feature of the formation of troops is the constant presence in the combat formations of attacking tactical airborne troops and reconnaissance-diversionary groups. It is their duty in the course of an attack without nuclear weapons to carry out a great number of missions. They can be extensively used above all to destroy the means of nuclear attack detected, overcome zones of obstructions and important natural barriers, and seize key positions and communications centers. Judging by the experience of the wars in Korea and Vietnam, they may be small in numbers but well-equipped, mobile, and actively operating subunits. Utilizing the relief of the terrain and the forests and by flying to objectives in helicopters at low altitudes, they are capable of achieving surprise attacks and carrying out the missions assigned to them even in conditions of strong air defense.

Strong and maneuverable advance detachments which have a high degree of independence are very extensively used in the combat structure of field forces and formations of attacking troops in order to carry out very quickly many important missions. The absence of a solid front, the presence of great gaps and intervals in the formation of the enemy, and the increased maneuvering capabilities of tanks are creating favorable conditions for their fast penetration in depth and the conduct of active, decisive operations for carrying out such missions as the destruction or seizure of enemy missile units and guidance and control posts.

It is clear that the operations of airborne troops, diversionary-reconnaissance groups, and advance detachments will produce the greatest success only when they are used suddenly.

In light of all the above, there is a different resolution of the question of planning combat operations without nuclear weapons.

Not having the opportunity in this article to examine in detail this highly complex question, we would like to direct attention merely to that which involves mainly the approach to its resolution.

Above all we recall from the experience of the past that the missions for the troops are usually determined by proceeding from the fact that the

final goal of operations would be achieved by the consistent (in extent of their advance) execution of intermediate missions with a constant increase in efforts by introducing the second echelons and reserves.

However, such sequence in the conditions examined can be disrupted at any moment by the infliction of nuclear strikes. And in this case the combat capabilities of the attacking troops would not be utilized sufficiently and the goal of operations would not be achieved. This is explained chiefly by the fact that the main efforts of the attacking forces would be concentrated on the destruction of the directly opposing troops, and the destruction of such very important objectives as operational-tactical nuclear means would inevitably be postponed because at this time they do not directly oppose the attack. Second, a gradual increase in efforts in terms of extent of advance of the troops obliges one to provide for this the allocation of the appropriate forces and means. As a result, considerable combat capabilities are constantly kept in reserve to carry out tasks which in these conditions cannot be of decisive significance. At the same time, this reserve may simply be shut off from combat operations at the expense of achievement of the main goal because nonnuclear operations can grow into nuclear operations at any time.

Such planning probably would not conform best with insuring constant readiness of the troops for operations in conditions of the use of nuclear weapons. The guiding principle in the organization of combat operations would be the achievement of their final goal as a result of carrying out all the intermediate missions. Hence the transfer of rocket troops and their deployment in positions, the changing of bases for aircraft, the dispersal of formations, and the carrying out of other measures willingly or unwillingly would lead to some specific time which would be viewed as the probable end of operations by conventional means. However, since these operations could be disrupted by the sudden use of nucelar weapons considerably earlier, the above measures could be inconclusive.

As a result of thorough study of objective premises of development of combat operations carried out only by conventional means of destruction, the most practicable and well-planned course may be that whereby achievement of maximum completeness is insured in operations of troops as they carry out each individual mission. In other words, it is required that at any moment the overall operations of the troops have a completed cycle, i.e., that a specific goal be achieved, even a limited goal but one which must be a part of the main goal, and the troops must be ready to the maximum extent to carry out their assigned mission without the use of nuclear weapons and to operate in conditions of their use.

It is clear that the basis of such planning will involve the use of the maximum possible number of forces and means at the very beginning of operations for the achievement of the main goal. and especially for the destruction of the nuclear means and the swift penetration of troops into the operational depth.

In contrast to the past, there can be no such general missions extended

in time and space as the immediate and the subsequent. The planning of operations by means of extended missions is becoming unrealistic. Characteristic now for each mission are its special specific nature and its maximum limitations in size and time for carrying it out. There can, of course, be considerably more of these missions than specified previously.

These are only some of the questions concerning the organization and conduct of combat operations with conventional weapons at the beginning of operations in a nuclear war, questions which are mainly of a decisive nature and which are examined mainly in regard to the ground troops. It is evident that each of these questions, just as many others concerning operations of other branches of the armed forces, can constitute a subject for independent study.

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Notes

1. *Voyennaya mysl'*, No. 8, August 1967, FPD 0125/68, 26 August 1968.
2. Training exercises Weitzer (1963), Desert Strike (1964), Autumn-64, and Autumn-66.
3. NATO's *Fifteen Nations*, April-May 1966.
4. A "nuclear threshold" signifies the duration of conduct of a war begun with conventional means of combat until it develops into a nuclear war.
5. *Truppenpraxis*, August-September 1966, pp. 600-603.

The Encirclement and Destruction of the Enemy During Combat Operations not Involving the Use of Nuclear Weapons[1]

Maj Gen S. Shtrik

The problem of methods of conducting offensive operations has always been and remains a subject of the most fixed attention in the theory and practice of military art. And this is natural since we are talking about the search for and determination of the most effective ways of routing the enemy and successfully achieving the aims of overall offensive operations.

Modern world war, if launched by the imperialists, will undoubtedly be a nuclear war.

However, a situation may arise in which combat operations begin and are carried out for some time (most probably for a relatively short duration) without nuclear weapons, and only subsequently will a shift to operations with these weapons take place. At the same time, if both sides have an approximately equal number of troops, then there is not excluded a certain balance of forces, in which combat operations with conventional weapons alone can extend over a longer period of time.

In the event that war begins and at some time conventional means of destruction are used, the general aim of the offense may be primarily the defeat of the main opposing troop groupings of the first strategic echelon of the defensive side, the maximum destruction of its operational-tactical and tactical means of nuclear attack, and seizure of important individual targets, the loss of which would result in the loss of defensive stability.

In achieving this aim, the drive of attacking troops deep into operational field forces of the defensive side, into areas where its nuclear rocket weapons and aviation are located, will provide the possibility for defeating opposing defensive ground forces and destroying their nuclear weapons before they can be employed.

One of the effective methods of troop operations under these conditions is the encirclement and destruction of enemy groupings by means of combat operations with conventional weapons.

In order to fully analyze this method, we will recall how, during the years of the Great Patriotic War, the defeat of enemy groupings was implemented during the course of attack. An analysis of operations in encirclement and destruction of the enemy shows that they were based on defeat of opposing groupings piecemeal. In this, most frequently the aim of an operation was achieved by encirclement and subsequent splitting of

enemy groupings or splintering them into small units.

Such notable events of the Great Patriotic War as, for example, the battle of Stalingrad, the Iasi-Kishinev, Korsun'-Shevchenkovskiy, Belorussian, and Berlin operations shall remain forever in the annals of world military history. During the war, the Soviet Army carried out more than 10 major encirclement operations, which ended in the defeat of approximately 200 enemy divisions. All the same, what accounts for this dominant role of encirclement and destruction of large enemy groupings in operations of the Great Patriotic War?

In our opinion, the explanation for this must be found in the great effectiveness of this method of enemy defeat during a period in which ground troops, forming the foundation of the armed forces, did not possess the means for inflicting simultaneous defeat on the enemy to a considerable depth. One should also note that enemy groupings operated then in concentrated combat formations and this to a certain degree made their encirclement easier. Attacking troops were most often forced to deliver attacks upon the weakest points of enemy operational field forces and, as a rule, in converging directions. As a result of this, as shown by the experience of the war, not only was successful encirclement of enemy groupings in the inner part of the front achieved, but also favorable conditions were created for their isolation from the flow of reserves in the outer part of the front, which, in its turn, permitted the dismemberment of enemy groupings and their piecemeal destruction. In this, encirclement and subsequent destruction of large enemy groupings was frequently the main task of all offensive operations and such operations were considered the most effective method of defeating the enemy. This is how it was in the last war when the threat of using nuclear weapons was absent.

But is it expedient under conditions of attack employing only conventional weapons, and with the constant threat of delivery of nuclear attack by either side, to pose the problem of defeat by means of encirclement and destruction of large defensive groupings? In order to resolve this problem, it is necessary to consider, although very briefly, several features which are characteristic of the attack under such conditions.

Above all, these features are determined by the fact that encirclement and destruction of the enemy without use of nuclear weapons requires decisive concentrations of combined arms units, artillery, aviation, and air defense means in selected directions. In this, the main role is played by the ground troops, and primarily tank formations and units, as well as aviation with close coordination of all combat arms and forces. But a certain contradiction arises here. The fact is that under conditions of the constant threat of enemy use of nuclear weapons, the concentration and disposition of a large number of troops in limited regions is highly unsafe. In such a situation, assault groupings of attacking troops, intended to carry out the encirclement, obviously can be allowed to form only for the shortest period of time in order to deliver a strong blow at the necessary moment, to defeat the enemy, and develop the attack on dispersed formations in planned directions.

The correctness of posing and resolving the problem of encirclement and destruction of the enemy becomes understandable if one takes into account the particular element that encirclement involves a certain risk of losing time and the necessity of diverting considerable forces of attacking troops from the implementation of one of their basic tasks—swift movement deep into enemy territory with the aim of destroying enemy nuclear weapons. The complexity of encirclement will be in the fact that the defense, occupying a comparatively large territory and possessing high troop mobility, can offer most decisive resistance to attempts to encircle its major groupings. For carrying out an encirclement with conventional weapons alone, it is obvious that a certain superiority over the enemy is required, but this is not always achieved under the conditions being considered.

From what has been stated there arises a most important feature of the encirclement and destruction of defense troop groupings—the requirement to defeat them sequentially, since the effectiveness and range of conventional weapons do not permit achieving this at one time. The experience of exercises in recent years and theoretical research show that encirclement can take place as the result of the swift attack of troops in separate directions when the defense or enemy conducting a meeting engagement is dispersed into isolated groupings and their encirclement and destruction piecemeal is one of the intermediate missions of the operation.

In this, highly favorable conditions develop for the use of turning movements and envelopments, for delivering splintering blows, for encircling and destroying these groupings piecemeal. The encirclement and destruction of enemy groupings delivering a counterattack or moving into defensive positions on a new line are also possible in addition to the encirclement and destruction of enemy troops moving out of or remaining in the rear area and on the flanks of attacking troops and which are finally cut off and pinned down in almost inaccessible areas or by the sea.

In some directions, encirclement and destruction of the enemy is possible with the active advance of troops in coordinated action with adjacent attacking groupings.

In carrying out combat operations at various depths, they most often will be of a concentrated nature, which increases the possibilities for troop maneuvers, intensifies the struggle in the flanks and in the rear area of enemy troops, and at the same time facilitates the encirclement of individual enemy units.

As a result of the swift movement of advancing troops in individual directions on the flanks and in the rear area, they may also find themselves among strong isolated or bypassed groupings of defensive troops. These must be destroyed in the shortest period of time, otherwise they can slow down the attack by active operations and have an adverse influence on the accomplishment of the overall mission. Furthermore, in the interests of maintaining high rates of movement, troops participating in the encirclement must be disengaged as rapidly as possible for the swift development of an attack in decisive directions.

Forestalling the enemy from carrying out attacks acquires important significance for the successful forward movement of troops during an attack with conventional weapons. Such forestalling, carried out by extensive maneuvers of tank troops and air attacks, will often be of decisive significance at the beginning of combat operations during the encirclement and destruction of enemy groupings in the first echelon.

Forestalling the defense from increasing efforts also has great influence on the development of the attack. This can be achieved by means of prompt introduction of the second echelons and reserves, maneuvers of the artillery, and massive use of aviation. Forestalling the increase of efforts ensures maintenance of constant superiority over the enemy in forces and means, which in its turn contributes to encirclement and destruction of his groupings during the course of development of the attack.

Considering what has been stated, one can assume that in the event that nonnuclear operations occupy a relatively short period of time, encirclement in its scope will take place at the tactical level. If nonnuclear operations are more prolonged, attacking troops will be able to encircle and destroy operational groupings of defensive troops.

Depending on the developing situation, encirclement under the conditions being discussed can be completed by the creation of an interior front with a simultaneous continuation of attack in the most important directions deep into defensive positions. At the same time, in order to prevent withdrawal of enemy troops from encirclement, sometimes it is not necessary to have a solid internal front. Obviously, with the high maneuvering capabilities of troops, it will be sufficient to block the main routes of probable enemy withdrawal and at the same time split his groupings into isolated units. For the implementation of this task it is necessary to create along important directions rather strong assault groupings for the purpose of destroying the enemy while still in the process of encirclement and to commit the second echelon or reserves into the battle.

This is what happened at the end of the Great Patriotic War in a number of offensive operations, particularly in Belorussia in 1944, when one unit of Soviet troops swiftly attacked in the depths and another unit at the same time pounded the encircled enemy groupings. It must be mentioned that already during these years this task was implemented in short periods of time by the rapid piecemeal breakup and destruction of enemy groupings during the course of an attack without letup.

It is well known that formerly in operations an outer front of encirclement was also formed. Today this is obviously not needed. Attacking troops will either develop an offensive at high tempos or repel the counterattack of enemy reserves approaching from the depths. In this, it is particularly important to correctly distribute forces between the inner front of encirclement and the groupings continuing to attack into the depths of enemy dispositions.

If one turns to operations of the Great Patriotic War, it can be noted that in the majority of cases half or more of the forces of attacking troops

were assigned to the inner front of encirclement.

Name of Operation	Number of Troops (in percent)			
	Engaged in Encircling the Enemy		Engaged in Destroying the Encircled Enemy	
	On Inner Front	On Outer Front	On Inner Front	On Outer Front
L'vov-Sandomierz	30	70	30	70
Korsun'-Shevchenkovskiy	50	50	35	65
Bobruysk	50	50	25	75
Iasi-Kishinev	55	45	30	70
Stalingrad	70	30	40	60

From the table it is clear that, depending on the nature of development of offensive operations, the outer front was consistently strengthened at the expense of regrouping of troops from the inner front. In the same way, troops gained the capability of developing an offensive deep into enemy operational field forces in the interests of the entire offensive operation.

Under modern conditions in distributing efforts between the inner front of encirclement and troops advancing into the depths of the defense, as in the last war, one should subordinate everything to one aim—the most rapid defeat of the main enemy forces and the development of an attack into the depths of his territory. The distribution of offensive efforts will depend on the position of defensive groupings. For example, in encircling and destroying a comparatively small (tactical) grouping defending itself on the flank of an attacking operational unit, it will obviously be expedient to use fewer forces and, as a rule, from the composition of the first echelon of such unit; for destroying troops left in the rear area, one can commit a unit of forces from the second echelon or from the reserves. For the encirclement and destruction of relatively large (operational) groupings, commitment of main forces of the attacking unit may be required. But in any event, it is necessary to strive toward having the main forces rapidly regrouped on the main directions of attack as they become disengaged.

In determining the composition and correlation of troops specifically intended for the encirclement and destruction of the defenders and of troops developing the attack in depth, it must be clearly realized that the enemy possesses great maneuverability and firepower. Owing to this, naturally, under no conditions will he remain indifferent to his encircled groupings and will try to make full use, primarily, of fire and mobile means for striking attacking troops and opposing the encirclement.

It is completely understandable that under such conditions superiority

in combat training of troops and in the art of their control acquires decisive importance for the successful encirclement and destruction of the enemy. Of particular importance in this will be foresight of the development of events among commanders at all levels. Troops are required to use fully their combat potentialities in order to destroy the encircled enemy in the shortest period of time with the full might of fire and crushing blows.

The basis of operations in encircling and destroying defensive groupings and primarily enemy nuclear rocket weapons, consists of strikes by aviation and artillery and the swift advance of troops along several directions. These operations will be implemented in such a way that the enemy is deprived of the possibility of organizing resistance and, at the same time, cannot influence the development of an attack in depth. Nuclear weapons must be destroyed and crushed as soon as they are revealed and continuously from the very beginning of military operations. Obviously, for this a considerable number of forces and means must be assigned.

The piecemeal dismemberment and elimination of encircled troops can be implemented by various methods, but clearly the most effective is the delivery of several blows from opposite directions. Enveloping groupings, capable of delivering attacks in converging directions, can be created during the course of the attack for this purpose. In order to support the swift movement of troops advancing in the rear area of encircled groupings, as well as for seizure of the most important road junctions, crossings, bridges, and passes in directions of their possible withdrawal and for preventing the approach of reserves, airborne landing forces can be used.

First echelon formations carrying out the encirclement and destruction will boldly and daringly penetrate through gaps and holes deep into enemy operational field forces, split and quickly crush isolated enemy troops piecemeal, and destroy nuclear weapons, reserves, and control posts. For the most rapid completion of the rout it is necessary that strikes for the purpose of splitting and destroying encircled enemy groupings be delivered even as early as during the process of encirclement maneuvers, not waiting until basic routes of withdrawal are seized. In order to prevent the withdrawal of large troop groupings from encirclement, it is most expedient that the offense deliver splintering blows in those directions leading to probable routes of withdrawal. Under these conditions modern tank troops have a particularly great role in the mission of encirclement and destruction of the enemy.

It is important that in the directions selected for delivery of attacks there be, above all, the possibility of rapidly concentrating necessary forces and means without complex regroupings. It is necessary that these directions permit the delivery of blows by main forces throughout the depth of disposition of encircled groupings and, at the same time, ensure close coordinated action of attacking troops. It is advantageous that attacks for the purpose of splintering the enemy be delivered in the shortest directions and in those sectors where the enemy cannot use previously prepared lines and where he does not have strong reserves.

The number and direction of attacks in encircling enemy groupings

and their splintering will primarily depend on the assigned mission of attacking troops, potentialities of their forces and means, level of enemy resistance, and on the nature of terrain. The threat of enemy use of means of mass destruction is of decisive influence in determining the number of attacks.

It is not ruled out that encirclement may be implemented during the course of a meeting engagement. In this event it is expedient that a portion of the forces repel the enemy attack, using advantageous natural terrain features, and that main forces deliver a number of swift blows from several directions. In those cases in which the enemy occupies the defense as a result of a meeting engagement disadvantageous to him, this defense should be penetrated in one or two sectors by normally adjacent flanks of contiguous units and, at the same time, active holding operations should be conducted in other directions.

The importance of the nature of terrain sharply increases under conditions of conducting combat operations in encirclement and destruction of the enemy without the use of nuclear weapons. Thus, in the presence of a coast line, swampy terrain, wide river, mountain range, or other barrier on one of the flanks of the encircled enemy grouping, the attack can be delivered in one direction with subsequent development on the side of the natural barrier. In this event, attacking troops will have a deeper operational formation, permitting the gradual increase of attack forces in the required direction. Once the enemy is hemmed in by one of the above-mentioned natural barriers, measures should be taken to capture or destroy water crossings, mountain passes, or to hold roads and exits from marshy regions.

Characteristics of the coastal axis affect the nature of encirclement and destruction of enemy groupings. In particular, under these conditions naval forces can organize a blockade of the coast from the sea by committing naval aviation, submarines, and sometimes even surface ships. The laying of mine obstacles along the blockaded coast, approaches to it, and on probable routes of movement of enemy transport and combat vessels will be widely used.

In any event, combat operations for the elimination of encircled enemy groupings should be conducted without interruption day and night with maximum concentration of all forces and means until the complete destruction or capture of the enemy. However, such operations demand high moral and physical effort from all personnel, thorough training, and exceptionally efficient maintenance of equipment. Because of this, it is necessary to implement the appropriate interchange and relief of units operating in the first echelon. If the encirclement and destruction proceed successfully, units of attacking troops can continue at night to carry out the mission with all personnel of the first echelon or with forward detachments specially assigned for this.

In a situation in which it is assumed that enemy groupings will try in the morning to withdraw from encirclement or will in some way complicate further advance, it may be expedient to introduce units into battle

from the reserves or second echelon of attacking troops in order to carry out night combat operations. In any event, it is extremely important that combat operations at night be conducted uninterruptedly, swiftly, at high tempos, and with the delivery of increasingly strong blows. This can be achieved by attacks of aviation and artillery, introduction of the second echelon or combined arms reserves into battle, as well as by the regrouping of forces and means from other directions.

Attempts of the defenders to deliver a counterattack for the purpose of penetrating the inner front of encirclement must be thwarted already at the moment of their preparation by systematic attacks of aviation and massed fire attacks of artillery on troops during their regrouping.

In the event that such attempts are not thwarted, it is expedient that combined-arms units of the offense deliver a surprise counterblow to groupings withdrawing from encirclement. Depending on the situation, a portion of the forces may be required to repel an enemy attack on the spot and the main forces required to complete the destruction of encircled groupings. In order to prevent the enemy from withdrawing from encirclement, captured lines in the most probable directions must be strengthened, above all the antitank defenses must be intensified, and reserves moved in.

An important role in ensuring the repulsing of enemy counterattacks is played by purposeful reconnaissance of all kinds, aiming at the early discovery of the enemy reserve composition and directions of movement, enemy intentions, and the probable nature of operations. Having reliable reconnaissance data, troops are in a position to forestall the defenders from deployment and thus create favorable conditions for their defeat. At the same time, one of the basic tasks of reconnaissance is the prompt discovery of enemy preparations for the delivery of a nuclear attack.

Successful operations of attacking troops in repelling enemy counterattacks create exceptionally favorable conditions for the destruction of his encircled groupings. This principle was fully confirmed in the Stalingrad, Korsun'-Shevchenkovskiy, Budapest, and other operations of the Great Patriotic War. During the course of repelling an enemy counterattack, a buildup of efforts primarily will take place with troops released from the inner front of encirclement and with reserves, and will also require the most extensive maneuver of forces and means. The difficulties of carrying out such a maneuver are conditioned by extremely limited time. Troops must execute maneuvers in the threatened direction and simultaneously complete encirclement and destruction of enemy groupings.

If the correlation of forces is not in favor of troops developing the attack in depth, their combat operations most probably will consist of all kinds of fire, mass air attacks, and use of conventional weapons to cause damage to troops launching the counteroffensive or to the enemy carrying out a counterattack, to stop him and subsequently, with the approach of his reserves, to shift to a decisive attack deep into the enemy defense and, at the same time, to complete the defeat of encircled groupings.

As for troops continuing the attack in individual directions deep into

enemy disposition, they will simultaneously defeat the withdrawing enemy and destroy his approaching reserves. In this, under conditions in which neither side has yet used nuclear weapons, troop combat operations will most frequently consist of seizing and temporarily holding specific objectives, ensuring not only the destruction of encircled enemy groupings, but also successful development of the attack. Indiscriminate forward movement of attacking troops under these conditions can lead to undesirable consequences.

Aviation is an important means of defeating the encircled enemy with the use of conventional weapons alone. Its basic task is the destruction of tactical and operational-tactical nuclear weapons and their carriers by attacks of fighter-bombers and fighter planes. Besides this, aviation is in a position to deliver attacks on troop concentrations, combat equipment and motor transport, impede the maneuvers of encircled troops, block regions of encirclement from the air, strike advancing reserves, participate in fire preparations and support of combat operations of troops in destroying encircled groupings, and protect troops from enemy air attacks.

The volume of aviation tasks implemented by conventional weapons is sharply growing. One should keep in mind that aviation of the attacking side from the very first minutes of combat operations encounters the strong counteraction of enemy air defense. In connection with this, a clearly differentiated approach to the definition of basic tasks for aviation is needed. Aviation will be able to implement its tasks consistently, delivering attacks on the main targets, concentrating basic efforts on cooperation with attacking troops in the rapid completion of encirclement and destruction of the enemy, impeding the approach of his reserves, and frustrating the maneuver of encircled troops.

In conducting combat operations without nuclear weapons, the rockets of ground troops must be maintained in constant readiness, since changes of the situation continuously make their tasks more specific, and change or redesignate the targets of attack. Appropriate correctives in planning are required in the event of a shift to nuclear operations.

Under conditions of nonnuclear operations, artillery is the main fire weapon for destruction of encircled enemy groupings in tactical depth and for fire support of attacking troops. The artillery can fulfill its tasks only in cooperation with aviation and the fire weapons of the motorized infantry and tanks. Rocket and especially long-range cannon artillery weapons have an important role in destroying enemy carriers of tactical nuclear weapons. High accuracy of artillery firing and ability to open fire rapidly permit the artillery to destroy carriers of nuclear munitions in a short period of time after their detection.

Artillery is charged with the destruction and neutralization of tanks, fire weapons, personnel, and enemy control points which support tank and motorized infantry attacks, as well as support of attacking troops in encirclement and destruction of the enemy. Such a large volume of tanks will require additional reinforcement of combined arms artillery units

from reserve units of the Supreme Command. However, even with this many of these tasks will have to be implemented in sequence.

Air defense troops are mainly intended for the reliable cover of attacking troops and rear targets from air attacks of any enemy using conventional weapons, as well as for impeding aid to encircled groupings or their evacuation by air, and for the destruction of enemy transport aviation, particularly helicopters. It should be taken into consideration that losses of enemy aviation on airfields under these conditions will be relatively small. Consequently, repulsing air attacks of the opposing side requires much time and the creation of a considerable density of air defense forces and means along the main directions at the expense of secondary directions.

The organization of control of attacking troops in the encirclement and destruction of the enemy when using conventional weapons alone has several features which are related to the locations of control points and specific operations of commands and staffs. In effect the forces and means of communications in the operational link are divided in two for control of troops operating on the inner front of encirclement and control of troops advancing in the depth of enemy dispositions. Furthermore, the commander and staff will need to systematically refine the plan of operations and, in particular, problems on the use of nuclear weapons. The implementation of constant control of readiness of carriers and nuclear ammunition for immediate use is necessary.

It is not ruled out that under some conditions of the situation, for example, in completing the destruction of encircled enemy groupings or in repulsing their counterattacks the necessity will arise for the creation of observation points not only on a tactical, but also on an operational scale. Under these conditions great significance is attached to the control of artillery fire and aircraft operations by the commander and the combined arms staff.

In conclusion, we will note that under the above-mentioned conditions, encirclement and destruction of enemy groupings continue to remain one of the possible methods, and in individual cases the most acceptable and effective method, of their defeat. This can very substantially influence the success of the entire offensive.

About the Author

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Note

1. *Voyennaya mysl'*, No. 1, January 1968, FPD 0093/68, 22 May 1968.

The Content of the Concept of an Operation[1] (A Reply to Readers)

Lt Gen G. Semenov

In a letter to the editorial board Lt Col A. V. Grigor'yev writes that in the practice of operational training as well as in the military press one frequently encounters contradictory explanations of **the content of the concept of an operation.** In this, too broad a treatment is permitted in some sources and in other definitions, on the contrary, one can find an underevaluation of the significance of the concept of an operation, in which the content of the latter amounts only to a definition of the main and other attacks.

At the request of the editorial board, Lt Gen G. G. Semenov agreed to explain his opinion on the given problem. Below is published his answer to the author of the letter.

In order to correctly understand the correlation of the concept of an operation and the decision, it is above all necessary to take into account that both the concept and the decision on an operation are always of a concrete and purposeful nature. The purposefulness of the decision means an accurate understanding not only of what must be achieved, but also of how, when, and with what means this must be done.

In the decision on an operation, as is known, the commander sets forth the objective of the operation, specifies methods of achieving the objective, assigns tasks to subordinates, and indicates the sequence of task implementation. The objective of operations is usually formulated as it was established by the higher command. Under methods of achieving this objective are implied: forces and means, sequence in which given enemy groupings must be destroyed, the type of nuclear attacks to be delivered for this, where to concentrate main efforts, which are the most efficient groupings of troops, and in which directions to use them to take advantage of the results of nuclear attacks. In other words, the selection of the method of achieving the established objective is connected with determining the method of conducting the operation or the sequence of the use of forces and means of the operational unit for the defeat of the enemy over the entire depth of the operation.

The content of subordinates' tasks and the instructions on the sequence of their implementation, specify what must be done for the successful realization of the aim of the operation, how best to coordinate operations of various troop organizations, and what measures to use in implementing comprehensive security and control.

It is not difficult to see that the content of a decision on an operation in the broad sense includes at least three basic groups of problems besides formulating the objective of an operation: first, determination of the most important enemy groupings which must be defeated in the forthcoming

operation, establishment of the methods and sequence of defeat of enemy groupings, selection of the direction of the main and other attacks and targets for destruction by nuclear weapons, determination of the composition of the most efficient groupings of friendly forces in directions of attack or defense and their operational formation; second, determination of combat missions for troops and the sequence of coordination among them; and third, determination of missions and basic measures for the comprehensive security of combat operations and the organization of control.

Of all the enumerated groups of problems contributing to the decision, the first group is the main, determining group. In it is set forth the basic meaning, the essence of the decision, its fundamental idea. Specifically, this group of problems is usually referred to as the concept of an operation. In our opinion, we can give the following definition: the concept of an operation is the main idea of the decision of a commander, which determines the objective and sequence of operations of forces and means for achieving of assigned missions.

Consequently, the concept of an operation is not the decision as a whole, but only the most important of its constituents, the basis of the decision. What the commander hopes to achieve in an operation and how this will be done is set forth in concise form in the concept of an operation.

The basis of the concept of an offensive operation carried out by ground troops consists of the use of nuclear weapons by operational units, primarily in the first attack, and the effective use of its consequences by motorized infantry, tank, and airborne troops. Because of this, in determining methods of defeating the enemy in the concept of an operation the following must be indicated: how many nuclear rounds of what strength to use in the first nuclear attack; what enemy targets and groupings to destroy with nuclear weapons and which of them to destroy to a specified extent; where, in what sequence, and in cooperation with whom to complete the defeat of these groupings by forces of attacking troops; and what targets and troop areas must be captured in order to promptly exploit the results of nuclear attacks and to implement the next task; how to conceive the use of nuclear weapons and troops during the development of an operation.

Several of the enumerated problems can be stated in the decision of the superior commander; nevertheless the commander sets them forth again for subordinates, since without these important data the concept will not fully reflect the fundamental idea of the decision.

Specification in the concept of the sequence of the defeat of the enemy results from particular features of the formation of his groupings, their potentialities, the nature of the probable operations, as well as the potentialities of friendly troops. Such consistency comprises the basis for detailed planning of an operation and a battle.

As a consequence of the great dispersion of enemy groupings on the front and in depth, the completion of their defeat by combined-arms units, even after the use of nuclear weapons, cannot always be attained by

a short-distance and brief attack, regardless of its strength. Combined-arms units frequently must deliver several successive attacks in depth which are coordinated as to objectives, place, and time. The sequence of completing the defeat of enemy groupings finds its expression in the breakdown of general tasks into a number of intervening tasks, for example, into immediate and long-range tasks; and in some cases this sequence indicates the direction of future actions, tasks of the day, etc.

Nuclear attacks and troop operations should be included in the understanding of the selection of the direction of the main attack as specified in the concept. In this, it is important to correctly indicate the main (usually the strongest) grouping of enemy nuclear rocket means and troops, the defeat of which will lead to disruption of the stability of his operational formation and to the attainment of the aim of the operation in a short period of time. The main strength of nuclear weapons is concentrated for the destruction of this particular grouping and in the direction that permits effective exploitation of the results of nuclear attacks by troops, particularly tank troops.

The composition of the groupings of one's own forces and means will depend on the direction of the main and other attacks. These groupings are created in conformity with assigned missions, the method of conducting the operation, and conditions of terrain; their composition is calculated to provide constant superiority over the enemy in nuclear and other firepower, in groupings of ground troops and aviation, as well as in the rapid use of the results of nuclear attacks and the reliable defense of one's own troops from enemy actions. In the process the commander proceeds from the necessity of maintaining constant troop readiness for the conduct of maneuvers for exploiting successes, delivering swift and surprise attacks to the enemy or repulsing his attacks, negotiating zones of contamination and destruction, and restoring the lost combat capabilities of units and formations. The idea of the maneuver set forth in the concept is embodied in the creation of groupings of forces and means.

The operational formation of troops must be determined in the concept of an operation. It is true that it is sometimes considered that this need not be done, since later in the assigning of combat missions this is set forth. It seems to us that the given problem is an essential component of concept of an operation, since it is inseparably connected with the creation of a grouping of forces and means in the beginning of and during an operation, and it determines the working out of other problems of the decision. It is necessary that the operational formation of troops together with other requirements be coordinated with the methods of defeating the enemy which are indicated in the concept of the operation and insure the delivery of the first nuclear attack, the rapid exploitation of its results by the troops, the dispersion and, where necessary, the rapid concentration of troops, the buildup of efforts in decisive directions, as well as the conduct of highly mobile actions during the course of the entire operation.

In our opinion, these are the basic problems forming the content of the concept of an operation. In looking them over, it is obvious that the

concept of an operation is not a substitute for the decision, but constitutes its basis and is not limited to the determination of the direction of the main and other attacks, but rather includes a statement of the method of conducting an operation, creation of an expedient grouping of forces and means in the directions of attack, and the operational formation of troops on the basis of the general objective and idea of the operation.

In practical activity, the concept of an operation is determined in the majority of cases by the commander independently; sometimes it may be completely or partially indicated to him by the superior commander. However, in all cases the concept of a major offensive operation is worked out with regard to the use of strategic means of combat. This can be explained by the fact that under modern conditions such operations should be considered in close connection with the tasks being accomplished in the theater of military operations by strategic nuclear forces and operational formations of other branches of the armed forces. Because of this, the concept of an operation of operational formations should determine, on the basis of strategic nuclear attacks, the attacks of coordinated formations of other branches of the armed forces, and their capabilities in the use of nuclear weapons.

It is difficult to overestimate the importance of the concept of an operation during the process of controlling troops. This is particularly important under modern conditions when preparing an operation in a short period of time, as the commander frequently will not have the possibility of working out the decision in detail and is limited by the definition of the concept of the operation. In this event, the rest of the problems related to the concept can be successfully implemented by the staff of the operational unit and the commanders of troop branches and services.

Consequently, the concept of an operation conveys to the entire process of control regularity, purposefulness, necessary unity, and also provides steadfastness and direction in the struggle for achieving assigned objectives. And, conversely, without the concept of an operation there is no unity of will or actions, and this inevitably leads to dispersion of forces and complicates the concentration of troop efforts.

The following basic requirements can be applied to the concept of an operation as well as to the decision as a whole: conformity of the concept and the decision to the concrete situation, capabilities of one's own forces and means, aims, tasks, and the conditions of their realization; simplicity of concept and decision, originality of their execution; conciseness, accuracy, concreteness, and clarity of formulation so as to eliminate ambiguity in understanding. The commonplace is not tolerated here at all. Only under these conditions can one count on the reasonable initiative, activity, and creativity of subordinates in implementing tasks and achieving aims of the operation.

The realization of the enumerated requirements depends both on the art of the commander and on the organization of the process of making the decision, on the work style of the commander and the field command, and on their ability to use mathematical methods and various computers;

that is, on everything which is included in the concept of methods of making a decision.

Fulfillment of these requirements can only take place in the event that the concept of an operation is worked out on the basis of and as a result of knowledge of the natural connections and tendencies in the development of the situation. The degree of conformity of the concept of an operation with the conditions of a combat situation depends primarily on an accurate estimate of the actual correlation of forces of both sides and foresight of changes in that correlation during combat operations. Hence, it is necessary that the methods of defeating the enemy which are formulated in the concept of an operation are always in conformity with troop combat capabilities. In this connection, it is appropriate to recall the dictum of M. V. Frunze that the art of a commander is displayed in the ability to select from among the varied means at his disposal those which will yield the best results in a given situation and at a given time.[2]

In conclusion, we note that the concept of an operation, being the most important component and the basis of the decision, is closely correlated with the other parts of the decision. The main combat tasks are determined on the basis of the concept and measures for the coordination and comprehensive security and control of troops over the entire depth of an operation are planned on this basis.

About the Author

Semenov, Georgiy Garvrilovich, Lieutenant General, Candidate of Military Science at the Academy of the General Staff. General Semenov graduated from the Academy of the General Staff with a gold medal in the postwar period. He graduated from Frunze Military Academy in 1941 on the eve of the war. His wife and small daughter had already left on vacation with her mother in Dnepropetrovsk, which was soon captured by the Germans. Semenov was posted to the operational section of a division's staff, and later in operations of the 3rd Shock Army. In 1950, Semenov was assigned to Peking as a military advisor for a period of 3 years. After serving as chief of staff of the Baltic Military District, he was assigned in 1964 as deputy commandant of the Academy of the General Staff for military science work. He has written his memoirs, entitled:

The Shock Attacks (1970);
Three Years in Peking (1978).

Notes

1. *Voyennaya mysl*, No. 1, January 1968, FPD 0093/68, 22 May 1968.
2. M. V. Frunze, *Selected Works* (Voyenizdat, 1965), p. 70.

Gaining Supremacy in the Air[1]

Col N. Semenov

The origin of the struggle for air supremacy belongs, as is known, to World War I, when aircraft began for the first time to influence directly the course of combat operations. At first the constantly increasing capabilities of aerial reconnaissance and the constantly increasing influence of aircraft on operations of the ground troops, and later the emergence of the danger of ships being subjected to strikes from the air at bases and along the coast, made it necessary to organize a struggle against flights of enemy aircraft. In order to prevent enemy reconnaissance aircraft and bombers from carrying out their assigned missions and to create at the same time the most favorable conditions for operations of friendly aircraft, a large number of mainly solo aerial battles were fought, which constituted at that time almost the only method of the struggle for air supremacy.

In World War II, combat operations on the ground and at sea were conducted, as a rule, with the most intensive participation of aircraft. They were broadly used for independent operations and joint operations with other forces in which tactical and operational missions were carried out. They were also entrusted with missions of a support nature incomparably broader than in the past. Success of military operations here depended to a large extent on the capabilities of aircraft to support their ground troops and navy or to prevent the enemy from fulfilling its combat missions.

The desire of the combatants to create the most favorable conditions for the conduct of combat operations by the troops made it necessary to build up the air forces and required special organization of the struggle for gaining air supremacy. This struggle differed essentially from that which was conducted in World War I, when it involved merely the implementation of cover and support for the ground or naval forces in limited regions. The number of aircraft participating in its increased many times, its scope and duration increased sharply, and the methods of conducting it changed. Group aerial battles were employed most broadly. Indicative of this was the struggle for air supremacy of the Southern Front in 1943, which lasted for more than 2.5 months (from March to the second half of May) and which took the form of an aerial battle over the Kuban', in which more than 1,000 fighter aircraft from both sides participated.

As a result of this battle, Soviet aviation gained air supremacy which

it firmly held to the end of the war, insuring the succesful conduct of operations by ground troops and the navy.

Besides the specially organized struggle against the air enemy, the achievement of air supremacy was promoted by the fact that fighter aircraft escorted bomber, reconnaissance, attack, and torpedo aircraft along their flight routes and in the region of the target.

Cover of objectives from an air strike was broadly used through the organization of the fighter aircraft on ready alert at airfields or on air patrol.

And finally, in the struggle against the German air force, an important place belonged to the PVO troops, which independently and in coordination with fighter aircraft successfully repulsed attacks by enemy bombers against the economic and political centers and the lines of communication of the country.[2]

The complexity of organization of joint operations of fighter aircraft with forces and means of air defense and the complexity of control of a large number of aircraft participating simultaneously in air battles required the creation of special command posts for control of fighter aircraft, antiaircraft artillery, antiaircraft searchlights, etc. This control (including the selection of targets and the guiding of fighter aircraft to them) was implemented primarily by radio, on the basis of visual evaluation of the situation in a region of battle by the appropriate commander on the ground or by a particular commander in flight. The approach of the fighter aircraft to the target was also made in accordance with data of visual observation of it. The tactical-flight data on the aircraft here permitted multiple execution of attacks in an air space the largest expanses of which did not exceed several kilometers.

In World War II, the combatants clearly displayed the desire to inflict air strikes against airfields, aircraft carriers, air ammunition depots, and aircraft construction plants. However, as a rule, the strikes against airfields produced sufficiently appreciable results only with surprise operations, especially in the beginning of the war and primarily in those cases where this was made favorable by the location of airfields, the number of aircraft based at them, and also meteorological conditions. In the course of the war, when it was often difficult to achieve surprise in the infliction of strikes against airfields and when aircraft were located on them in a dispersed and camouflaged manner, the importance of such strikes in gaining air supremacy was insignificant. For example, of the total number of bombs dropped by American aircraft in the European Theater of Military Operations, about 4 percent were used against airfields and little more than 2 percent against aircraft plants.

Relatively short flight ranges and limited load capacity of bombers of that time and, as a result, the impossibility of insuring in the majority of cases the delivery to the target of the aerial bombs with the necessary destructive power constituted the main reasons which hampered the organization of regular mass air strikes against airfields and other objectives for the purpose of gaining air supremacy. Considerable difficulties

also arose in seeking targets of opportunity in poor weather, and also in the complexity of precision bombing (mainly due to the lack of on-board radar sychronously linked with flight control of the aircraft on its combat course and the impossibility of automatic calculation of the effect of wind on the flight of the aircraft and the fall of the bomb).

Moreover, the losses inflicted on the enemy could not be great because his aircraft at the airfields were concealed in revetments the construction of which was a simple matter, and the airfields themselves did not require the construction of complex, expensive concrete runways which, if put out of commission, could result in interruptions in the flights of based aircraft.

Also, aircraft strikes against airfields and other ground objectives for the purpose of gaining air supremacy were not broadly used throughout the entire war because the chief method of gaining air supremacy in the theory of military art of the combatants was considered to be aerial combat, and the main force in the struggle for this supremacy was fighter aircraft.

The achievement of air supremacy was determined above all by the qualitative supremacy of air forces and, above all, fighter aircraft. For this purpose it was required to conduct promptly a number of special preparatory measures (selection of airfields for basing, including the construction of new ones, the most suitable disposition of subunits, units, and formations at them, creation of reserves of material-technical supply and weapons, deployment of control points, detailed study of the flight region, collection of data on the enemy, selection of the altitudes and flight routes to the target and back, etc.) as well as implementation mainly of a series of aerial battles.

Sometimes brought into the struggle for air supremacy were tank and airborne troops, submarines, surface ships, and diversionary and other detachments which were used to seize airfields (most often temporarily) and destroy the aircraft on them, fuel depots and weapons, homing radio stations, control towers, etc.

Also highly characteristic was the fact that air supremacy should be achieved for a rather long time in certain zones or in relatively limited regions. The side which lost air supremacy in a particular zone could regain it only by shifting new forces of aircraft there. However, considerable time was required for this because the limited flight radii of the existing aircraft did not permit their utilization in regions which were very remote from the bases which had been seized.

The experience of use of aircraft in two world wars indicates that in accordance with the degree of development of the air force and the equipment of the ground troops with more powerful long-range means of destruction, an increase in their maneuverability, and an increase in the scope and quickness of military operations, there was a steady increase in the need for air support of the troops.

Due to the regularly increased frequency in change in conditions at sea (this was the result of improvement and further development above all

of aircraft, naval equipment, and weapons), the ship forces of the fleets also needed in ever-increasing scale the support of air reconnaissance, cover from air strikes, mine laying by aircraft, ship search by aircraft, etc. Aircraft began to receive more and more missions which they were to carry out independently for the benefit of the ground troops, as well as of the navy. As a result, the role and significance of the struggle for air supremacy and its scale constantly increased.

This development is very important. It permits one to disclose more completely and understand correctly the problem of achievement of air supremacy at the beginning of nonnuclear military actions under modern conditions.

In examining this development, it is easy, in particular, to become convinced that with the present condition of the armed forces and their further development, the main indicators which characterize armed conflict are sharply increasing. The capabilities of the aircraft themselves have increased considerably. Now they are capable of operating against the majority of objectives on ground and at sea at any time of the year almost regardless of the hydrometeorological and climatic conditions. Their flight radius, duration, load capacity, speed, and ceiling have considerably increased in comparison with piston aircraft. They have sighting systems which insure the reliable destruction not only of fixed, but also of mobile targets of small sizes. Their armament includes conventional and nuclear missile weapons which can be used at a distance to the target of from several hundred meters to several hundred kilometers.

It is becoming quite obvious from the above that the necessity of gaining air supremacy in conducting military operations without the use of nuclear weapons in modern conditions is becoming even more acute than in the past. However, it is clear that it will be considerably more complex to resolve this problem. It will evidently require a reevaluation of many factors and a different approach to the use of forces and means.

Above all it should be stressed in particular that air supremacy will be gained while both sides are constantly ready for the use of nuclear weapons. This will require the allocation of specific forces, including aircraft, for the destruction of nuclear means.

In contrast to the past, the capabilities of modern aircraft permit them to carry out in short periods broad maneuver for the purpose of gradually increasing the efforts and replenishing the losses in any zone of a theater. Therefore, in all likelihood it is impossible to gain supremacy in a limited region or in a certain operational zone. The question of achieving air supremacy can now be raised only on a large operational or strategic plane.

For the same reasons, success in this struggle will evidently be achieved only if its main missions are carried out within the shortest possible periods of time. Otherwise only very brief, temporary success in the operations of aircraft of a particular side is possible.

The following characteristic results from this. The essence of it is that it is impossible to achieve air supremacy with aircraft alone. The joint ef-

forts of several branches of the armed forces and arms of troops are needed to resolve this problem. These efforts will produce the desired result, evidently, only when they are concentrated to the maximum extent in carrying out the most important missions of gaining air supremacy.

All these missions are carried out in combination, but first and foremost among them are (this is indicated by the experience of recent events) the destruction or suppression of radar stations for aerial observation. It is felt that the greatest success in suppressing the operation of radar stations can be achieved with powerful ground or ship jamming stations capable of operating continuously over a large frequency range (the possibility of using aircraft jamming stations is somewhat limited because the period of their operation cannot exceed the time of flight, and moreover it is difficult and sometimes impossible to install on the aircraft the high-capacity electronic devices which are capable of reliably hampering the operating of particular types of enemy radar stations at great depth). By depriving the enemy of means of observing air space or creating conditions for him which do not permit normal utilization of these means, he is placed in a position where he is unable to repulse aerial strikes promptly and in an organized manner or provide his own aircraft with the conditions for the most effective overcoming of the countermeasures of the forces and means of air defense. It becomes possible to inflict a strike with a planned (or almost planned) number of aircraft at an assigned time against the assigned targets, and not against alternate targets, as is the case with well-organized enemy resistance, to insure the density (calculated) of infliction of a strike which was established before take-off, and to maintain control of all the necessary flight systems at the moment of use of the weapons.

Of no less importance is the destroying of control posts by aircraft and antiaircraft means and putting out of commission the network of technical (primarily radio and radioelectronic) means for insuring accurate air navigation. Without these means, at modern flight speeds it is extremely difficult to utilize aircraft successfully, especially during their operations at night and in difficult meteorological conditions during the day against such small objectives as ground rocket launchers, command posts, etc.

To disorganize the control system of the aircraft (including the navigation systems) and the air defense means, the combatants will strive to employ broadly and are employing (as is indicated by postwar events and conflicts), along with aircraft, the services of radiotechnical troops, airborne troops, naval forces, and diversionary and other detachments. Experience shows that detachments even consisting of several men which are landed from submarines or dropped from aircraft can destroy or put out of commission for a long time radar stations, control towers, long-range and short-range homing airport stations, glide-path and approach beacons, equipment for instrument landing, etc. All these operations are usually complemented broadly by false orders and misinformation capable of leading the flight personnel and crews of the control posts into

error and leading to confusion and error of judgment.

In comparison with the past war, the importance of strikes against airfields for achieving air supremacy will increase sharply because the greatest losses in enemy aircraft can be inflicted if he does not succeed in getting them into the air.

This is explained first by the increased capabilities of modern aircraft to inflict such strikes. They now have everything necessary for this and can carry out such a mission regardless of the weather and time of day. Second, in contrast to piston aircraft, the combat use of jet aircraft involves to a large extent the use of specially prepared concrete runways. Of course, in various periods of the year it is possible in some regions to use certain types of jet aircraft from unpaved airfields. However, in general, combat operations must be conducted from fixed fields having the appropriate runways, taxiways, fuel depots, various training installations, etc. Putting such airfields out of commission for a lengthy period of time makes it impossible to use aircraft based on them and to use the airfields to support the manuever of aircraft. The vulnerability of modern airfields and aircraft on them has compelled the military specialists of all countries to seek intensively for effective ways of insuring combat operations of aircraft from small unpaved airfields, in connection with which S/VTOL aircraft have emerged.

Because in the utilization of conventional means some aircraft will evidently have to carry out other missions and some will be in constant readiness to use nuclear weapons, in order to insure a simultaneous strike against airfields, the combatants can employ missile troops, certain ships, and missile-carrying submarines. Incidentally, very great hopes are placed on submarines in a number of countries in operations against airfields, especially along the coastal zone. Moreover, the United States is already trying to create missiles for submarines which are designated precisely for the infliction of strikes against airfields.[3] For this purpose, it is proposed to have missiles with special rotary (separating over the target) heads with conventional charges and inflammable substances. American specialists feel that the use of submarines with such missiles can insure in certain conditions the achievement of the greatest surprise in strikes. They also propose that in this case the air defense of the airfield loses its significance, and they can be subjected successfully to air strikes, after which they can be seized bv tank and airborne troops and by diversionary and other detachments.

Which airfields will be the primary objectives of strikes or capture, specifically which forces can be used for this, and in what sequence will be determined by many factors: the number and types of aircraft based at particular airfields, the specific conditions and their possible change, the nature of the terrain on which the combat operations are being conducted, their scope, the weather conditions, the time of year, etc. Most important among them in all cases is, of course, the presence of carrier aircraft at airfields. As for other factors, the proportion of them in various conditions can vary.

For example, certain military specialists of West Germany feel that with other conditions being equal, special importance is acquired by the nature of the terrain on which combat operations are being conducted. In mountainous, and sometimes in flat but wooded terrain, fighter aircraft and, in part, fighter bombers, are evaluated by them as of little use for operations in support of ground troops. They are of especially little effectiveness in supporting large attacking units in meeting engagements. Due to the complexity of piloting aircraft and the necessity of strict observance of measures of flight safety, the pilots of single-seat aircraft are unable over such terrain to attack accurately the control posts, tactical reserves on the march and in areas of concentration, and other such objectives, because they cannot (or almost cannot) promptly detect them and retain them in their field of vision until the approach for attack. At night and in difficult meteorological conditions during the day, it is generally impossible to use fighter aircraft to support troops in the mountains. Therefore, in operations in mountainous and sometimes wooded terrain, it is most expedient above all to inflict strikes against the airfields of bomber aircraft. In flat terrain, on the other hand, the primary strike objectives are airfields which contain fighter aircraft.

A new factor which will now also be considered in evaluating the airfields as strike objectives is the equipping of aviation with V/STOL aircraft.

In examining airfields as strike objectives in the struggle for air supremacy, the ships which insure the basing of carrier-based aircraft should be discussed separately. Possessing a high degree of maneuverability, they can considerably influence supremacy in the air in a number of cases in operating independently, and also by suddenly increasing or quickly replenishing the forces of aircraft, they can give support to the troops (or carry out other missions on their behalf) in remote regions of combat operations. In certain conditions they are also less vulnerable to strikes from the air than are airfields on land. At the same time, success in the use of such ships depends to a large extent on the capabilities of the combat and special support of them by other forces of the fleet, as well as on the hydrometeorological conditions. Thus, for example, the take-off of aircraft and especially the landing of them in stormy weather is difficult and sometimes quite impossible.

In struggling for air supremacy, the necessity of using fighter aircraft will not decrease, although the role will be far from that played in carrying out this mission in the past. Now success in an aerial battle can be achieved only if reliable control of fighter aircraft is insured. At modern flight speeds, the approach of a fighter aircraft toward the target begins at a great distance from it (otherwise deviation is possible), when its on-board radar sights cannot always "catch" the objective of attack. Therefore it first approaches the target in accordance with data of ground or ship control and guidance posts. And this is possible only when the control system of the fighter aircraft is not disrupted.

But even in those cases when the fighter aircraft can be brought

promptly and successfully into the zone of "lock-on" of the target by its on-board radar, it is still possible to miss, i.e., not destroy the objective of the attack for some reason or other. Repeated attacks on the target by the same fighter aircraft can be counted on only if it has a very high degree of maneuverability (which is most effectively achieved in swing-wing aircraft).

The majority of types of modern fighter aircraft often do not have the opportunity which was present before to attack a target many times, especially at low altitudes, and also at night and in difficult meteorological conditions during the day. Moreover, a target which is shot down and even destroyed if, for example, it is a missile-carrying aircraft, can carry out its mission in a number of cases. Incidentally, the dependence of fighter aircraft on control posts, as well as the impossibility of attacking a target repeatedly, constituted one of the reasons for the decrease in the necessity of their accompanying aircraft of strike aviation.

Judging by military events, and conflicts of recent years, the effectiveness of repulsing air strikes against ground and ship forces and means of air defense is now increasing more and more.

In conclusion it should be stressed that in studying the problem of struggling for air supremacy in modern conditions, the question of surprise in the use of forces and means in this struggle deserves special attention. Judging by the press statements of foreign military specialists, extremely great importance is now imparted to the searches for ways of the practical resolution of this problem.

Notes

1. *Voyennaya mysl'*, No. 4, April 1968, FPD 0052/69, 27 May 1969.
2. In the aerial blockade of the German troops at Stalingrad, Soviet aircraft, jointly with the air defense troops, destroyed and damaged more than 1,000 enemy aircraft during the period of December 1942-January 1943. See *Vtoraya Mirovaya Voyna 1939-1945 [World War II 1939-1945]* (Military Literature Publishing House, 1958), p.400.
3. The American firms Martin and Convair began in early 1967 at their own initiative to develop roughly several designs of powerful solid fuel ballistic missiles with high-explosive warheads designated for operations against airfields and for carrying out certain missions in combating air defense in support of aircraft.

The Question of Influences on the Military and Economic Potential of Warring States[1]

Col M. Shirokov

For the achievement of victory in a present-day nuclear war, if it is unleashed by the imperialists, not only the enemy's armed forces, but also the sources of his military power, the important economic centers, and also points of military and state control as well as the areas where different branches of armed forces are based, will be subjected to simultaneous destruction. In the process the scale and consequences of strikes against objectives in the deep strategic rear area may significantly exceed the strikes against troop groupings in the theaters of military operations. However, the quantity of objectives, especially military-economic, located on the territory of warring states, as is known, is very great. Therefore the belligerents will strive to select from the objectives those which have the greatest influence on the course and outcome of the armed struggle.

The experience of World War II shows that the main factors which must be considered in resolving this very complex task are primarily the objectives and character of the war, the availability of forces and means, the peculiarities of the enemy's economic potental, and the developing political situation. Let us examine the influence of these factors on the selection of targets of destruction in greater detail.

In the past war if one of the warring countries, in planning military actions, counted upon quickly destroying the enemy army, seizing his vitally important areas, and driving any particular state out of the war, it did not attempt to destroy the industrial installations. On the contrary, it was interested in preserving them for the support of its own troops and the entire country. In such cases air attacks and other means of destruction were directed only against those targets which, during the planned period of military operations, provided the enemy with the greatest capability of active resistance. This proposition is confirmed by numerous examples.

In preparing for the attack against the Soviet Union, the Hitlerite command calculated that it did not possess sufficient material and manpower resources to wage a prolonged war. German industry had many weak spots, especially in the matter of providing many types of strategic raw materials. Therefore the German Fascist command planned to seize first of all important industrial areas in the militarily weaker countries of Central and Southeast Europe and to use them for strengthening its own economic potential. They especially "preserved" those enterprises and

areas whose production could satisfy the most serious shortages of Fascist Germany.

In the strategic plans for the war against the USSR, the Hitlerite command assigned primary importance in the initial period of the war to routing our troop concentrations on the operational directions leading to the main economic areas (the central, the Leningrad, and the area along the Dnieper), striving to occupy and use them to support the further conduct of the war. To a significant degree this was explained by the fact that the Fascist German army counted on breaking the resistance of our troops in a short period of time. However, after the Hitlerite command became convinced that the plan for a blitzkrieg war had failed, they began planned preparations for disrupting the economic might of the Soviet Union. Let us note from the outset that the Hitlerites also failed in realizing these plans. One of the main reasons for this was that the strikes against economic objectives required the employment of a large quantity of aviation which was vitally necessary for the support of ground troop operations on the decisive axes. But air operations conducted by insignificant forces could not exert a serious influence on the economic potential of our country nor on the morale of the Soviet people.

Despite the continuous air action and blockade of the city, it is known that industry in Leningrad and also in the central regions of the country regularly provided the Soviet Armed Forces with various arms in great quantity throughout the entire war. The Hitlerites could not realistically plan air strikes against the most important arsenal of the Soviet Union, the Urals, until the main operations of the ground troops were completed and the required forces and means released. According to their calculations, such strikes could deprive the Soviet Army of the economic base and lead to its defeat.

The comparatively small quantity of heavy bombers in the air forces of the Soviet Army also limited independent operations of our aviation against economic objectives located in the deep rear of the Fascist Germany.

Our allies in the anti-Hitler coalition also had insufficient means at their diposal for effective action on the Germany economy. At the Casablanca Conference in January 1943, U.S. and British strategic aircraft were assigned the missions of destroying the German military industrial and economic system and undermining the morale of the German people "to the degree required to destroy their capability for armed resistance." At that time 40-50 percent of the British and 35-40 percent of U.S. military production was concentrated on aviation. The air forces of these countries had from 700 to 2,000 strategic bombers.

However, this mission still remained unfulfilled. And the main reason was its lack of definition and extensiveness, and also the shortage of forces and means. The effectiveness of the air strikes was also seriously reduced by the insufficient consideration of the peculiarities, the critical and vulnerable areas in the economy of Fascist Germany and militarist Japan. All of this in its turn led to disagreements and errors in the selection of

targets of destruction and the principle of attacking them.[2]

The British strategic air command, for example, considered that the best objectives for accomplishing the missions assigned at the conference were the German cities, in which were concentrated the most important industrial enterprises for waging war. However, as was subsequently confirmed, to demolish just the capital of Fascist Germany with a density of 900 tons of bombs per square kilometer, 400,000 tons of bombs were required, that is, nearly one-fifth of the tonnage dropped on the "Third Reich" during World War II. It was also planned to inflict powerful strikes against no less than 100 of the most important German cities. During the course of the war more than 50 percent of the structures in 62 cities were destroyed. However, these raids scarcely contributed to the victory. The destruction of buildings did not always put industrial enterprises out of action. Frequently buildings were destroyed, but the equipment remained undamaged and could be used for military production, which almost to the end of the war did not decrease, but increased. The key and most important vulnerable points in the the military economic potential of Fascist Germany were the power facilities, the fuel industry and transport. However, only at the very end of the war did they become the targets of strategic aircraft. Major General Hans Rumpf writes that the vital nerve center of German military industry was paralyzed only when the Allies shifted to concentrated strikes on the main objectives of key branches of industry, in particular on 12 large plants producing synthetic fuels, and when they put nearly the entire road network out of commission.

Consequently, wartime experience forced the selection of economic objectives for strategic aircraft attacks in accordance with the availability of forces and means, with consideration of peculiarities of the economic potential, and the presence of critical and vulnerable points in the military-industrial base. The bomb load (approximately 2.7 million tons) dropped on Europe during World War II was distributed among various objectives as follows: 32.2 percent on ground transportation; 23.7 percent on industrial areas; 9.3 percent on plants producing fuels, synthetic rubber and other chemical products; 6.9 percent on airfields and airstrips; 4.2 percent on sea and water transport; 2.0 percent on V-1 and V-2 missile launch sites; 2.4 percent on other branches of industry and 17.3 percent on the remaining targets.

It is evident from the above information that in tonnage of bombs dropped transportation was the primary objective (36.4 percent), followed by industrial objectives, and primarily those occupied in the production of liquid fuels and synthetic rubber.

Subsequent local wars in Korea and Vietnam have also shown that the attacks directed at the economy depend to a significant degree on the objectives and the progress of the war. Up to the time that the U.S. command was hopeful of achieving victory by the rout of the armed forces, it rarely resorted to attacks upon economic objectives. However, after finding out that it was incapable of breaking the courage and tenacity of the Korean troops and the soldiers of the National Liberation Front of South

Vietnam, the U.S. resorted to the most extreme measures—attacking industrial, agricultural, and transport objectives and population centers, in order to crush the economic and moral potential of the country and force people to surrender.

Attacks, even with conventional weapons, on the weak and underdeveloped economic bases of the DPRK and the DRV led to the destruction of important sectors of the military economy and significantly reduced the capabilities for the logistical support of the armed forces. However, the enormous aid of the countries of the socialist camp, above all of the Soviet Union, and the high combat morale of the Korean and Vietnamese people did not permit the U.S. imperialists to carry out their aggressive plans and achieve victory.

Under the conditions of massive use of nuclear weapons, attacks upon economic objectives can knock small states out of a war, sharply reduce the economic and moral potential of the major countries of the world, and thereby create the most favorable conditions for the attainment of victory. This is the conclusion reached by Western theoreticians. The well-known ideologist of imperialism H. Kissinger states: "The idea that victory in war is insured by the destruction of the industrial potential of the enemy and the undermining of the morale of the civilian population is the basic principle in both British and American strategic thinking." Additionally, imperialist military theoreticians openly advocate the great advantages of the destruction of industrial centers and cities, which, in contrast to objectives of military significance such as missile launching positions, represent extremely vulnerable targets. At the present time attacks by even a small quantity of nuclear munitions on industrial objectives can quickly lead to important strategic results.

Whereas during World War II the entire destruction in Berlin or Hamburg from conventional bombs amounted to an area of up to 0.04 sq. km, just one 20 kiloton atomic bomb dropped on Hiroshima destroyed all structures within an area of 12-15 sq. km. At the present time there are available nuclear munitions with an explosive power equivalent to 20-30 megatons and more. The zone of destruction in the explosion of one such warhead exceeds the area of even the largest population centers. Now one or two nuclear warheads can destroy not only an extremely large city, but also a major industrial area. Within several minutes the explosion of a large quantity of nuclear warheads with an explosive power of dozens of megatons can change entire countries into piles of wreckage and lifeless deserts covered with radioactive dust. U.S. specialists calculated that the expected losses after a 24-hour nuclear war will amount to 50-75 million persons, that is one-fourth to one-third of the entire population of the country. McNamara surmises that the destruction of one-third of the population and approximately two-thirds of the industrial capacity would result in the government's losing its position as a major power for many years. British scientists have concluded that four megaton bombs dropped upon Great Britain will destroy a minimum of 20 million persons, or more than one-third of the entire population of the country.

The accumulation of great quantities of nuclear arms and delivery systems, and also the high destructive capacity of such weapons naturally also changes the methods of exerting influence on the economic potential. It is now possible to attack effectively targets covering a large area and to put out of action simultaneously all the main industrial centers and regions throughout the entire depth of enemy territory. However, this does not mean that in each specific instance the special features of the economy and the presence of critical and vulnerable points will not be considered. In selecting any specific region as the target and determining the sequence of nuclear strikes against it, first and foremost it is necessary to determine the effect the strikes will have at a given time, the influence of the target on the progress of armed combat and on the functioning of the entire life of the country. It is also important to determine the quantity of forces and means required for destruction of the target and the capabilities of the enemy to rebuild. For this purpose it is important to study the relative importance of specific regions (objectives) to the industrial production of the country, especially in the output of production required in the manufacture of missiles and nuclear weapons and other modern combat materiel; the role of the region in the political life of the country; the degree to which the given industrial complex is tied in with other branches of industry; the relative importance of the region as a population center of the country, and especially as a source of qualified and scientific-technical personnel; the vulnerability of the region and the extent that its industrial output can be produced by other industrial centers. In the selection of regions (objectives) for nuclear attacks the industrial branch principle of exerting influence on the economic potential of a country will also be given consideration.

It is known that modern industry is possible only with the efficient cooperation of all its branches and transportation. If one or two key branches or the transportation are put out of action the entire economic life of the country is disrupted and, consequently, its military potential will be sapped or significantly weakened. Even the destruction of individual especially important plants has had a great effect on the output of certain types of military production. For example, it is sufficient to destroy a few enterprises producing transistors in order to extremely restrict the production of missiles for all branches of the armed forces. And even strikes on area objectives are directed at that portion of the target which is of vital importance to a country or a coalition of countries. In determining these targets application should be made of the industrial branch principle and the selection of the critical link in the economy. Experience confirms that the thorough consideration of this aspect can provide the greatest effect.

Thus, for example, in his book *World War II—1939-1945* the well-known British military theoretician Fuller writes, that if Churchill had thought strategically, it would have been clear to him that the bombing of objectives should not have been limited to the industrial enterprises alone, but to their sources of power as well. If the latter had been steadily weakened, then in the long run 90 percent of German industry would have

been brought to a standstill. Especially effective could have been attacks against the electric power and oil refining industries, since electric power is required in large amounts by all branches of the national economy, including the defense industries.

Power stations, particularly large ones, are also advantageous targets because power-consuming and very important defense industry enterprises (chemical, aluminum, and magnesium plants, and others) are frequently situated near them. This will make it possible, along with the destruction of the electric power stations, to put out of action many other important enterprises, and also electrified transport. During World War II Fascist Germany expended more than one-third of all its electric power on the production of synthetic fuels and nitrogen. Nevertheless, electrical power did not become the main target of destruction even though, just as under modern conditions, it is difficult to overrate its importance.

The U.S. theoretician Possony wrote that there were many reasons for electric power stations not being selected as primary targets: first, the reserve capacity of German electrical power stations was overrated; second, it was considered that if some electrical power stations were destroyed other power stations could compensate for shortages in electric power; and third, the Germans could transmit electric power from other regions and occupied countries. The experience of the war has refuted all this. Electric power stations, particularly hydroelectric stations, proved to be vulnerable and important targets.

It is known that oil is also one of the most important strategic raw materials. Its products are required in large quantities for the operation of the most important branches of industry, agriculture, and transportation. During the war the oil supply problem was very acute for both Germany and Japan. Their defeat would have been significantly accelerated if it had been possible already in the early period of the war to concentrate air strikes on targets connected with the production of liquid fuels.

During World War II great quantities of bombs were dropped on metallurgical plants. These strikes, it appeared, were most logical. It is known that metal comprises one of the main strengths of a country, since no type of weapon can be produced without it. For this reason many metallurgical plants in Germany and Japan were repeatedly bombed. However, the production capacity of the metallurgical industries of those countries barely changed. Typically, even the more concentrated and vulnerable metallurgical plants of Japan (until the war the Yawata-Kokura area accounted for more than half of ferrous metal production), upon which large quantities of bombs were dropped, sustained insignificant damage.

Understandably, this does not at all mean that under modern conditions metallurgical industry installations will not be profitable targets. If the enemy is experiencing significant difficulties in supplying metal, and if his metallurgical industry is heavily concentrated, then strikes against its most important objectives can produce a decisive effect, especially if they are directed against large blast furnaces, coking ovens, converters, and

plants producing high grade steel and nonferrous metals used in great quantity for the production of strategic combat materiel.

Of all the other branches of heavy industry, the chemical industry should be singled out in particular. Some of its enterprises are exceptionally important and extremely vulnerable. During the past war the U.S. Strategic Bombing Survey calculated that the Allied Air Command made a serious error by not selecting as a first priority target the sole and very vulnerable plant for the production of dibromoethane. This plant produced the ethyl compound required for high grade gasoline, so necessary that not one modern airplane can fly without it. Specialists maintain the bombing of this single target could have caused greater damage to the German air forces than was caused by all the saturation bombings against aircraft plants throughout the war.

Disruption of transport operations will have an enormous effect on the economic and military capabilities of a country. As wartime experience has shown, the most important objectives are rail centers and marshalling yards, bridges, tunnels, train ferries, and trains on land, and ports and vessels on the water. In selecting each of these objectives, first an evaluation was made of the availablity of existing forces, means, and time, their vulnerability (dimensions, physical features, degree of dispersion, capability for offering resistance, and location), and the possible effect upon the transportation of troops and materiel if an objective was put out of action.

In the final stage of World War II, the Anglo-American Command frequently selected administrative-political centers and the most populated sections of cities as targets, in order to "break" the morale of the enemy. This was shown especially clearly in July 1945 when the Americans began massive attacks against Japanese cities. On 5 July alone, U.S. planes burned out 117 square miles of the enemy's cities. The largest cities of Japan—Tokyo, Nagoya, Osaka and Kobe, in which more than 14 million persons lived—were from 35 to 55 percent destroyed. Howver, these barbarous bombings did not seriously affect enemy morale. At the beginning of August 1945, the U.S. Government made the decision, which was not of direct military expediency, to drop atomic bombs on Japanese cities. In August 1945 the cities of Hiroshima and Nagasaki were pointlessly destroyed and burned. Approximately 90,000 persons were killed and 180,000 injured.

The main purpose for employing atomic bombs was not so much to exert pressure upon the people and ruling circles of Japan and to hasten their surrender, as it was to "intimidate" the Soviet Union from a "position of strength." Moreover, the U.S. did not select for these strikes the most important strategic objective of Japan—Tokyo, which was the main industrial, political, and military center of the country. The destruction of that city could have aroused the great wrath of the people and impeded the U.S. negotiations with the Japanese reactionaries, with whom they proposed to find a "common language."

Historical experience shows that political motives can force the aban-

donment of strikes against extremely important economic and military targets or their implementation with smaller forces and means and on a selective basis. In a number of cases it is possible that attacks will even be made against objectives which are not of great military and economic importance, but which are advantageous from a political viewpoint.

It is obvious that the need for a thorough evaluation of the political situation when sapping the military and economic potential of warring states assumes incomparably greater importance under conditions of a nuclear war. At present, political conditions will be considered when selecting regions for delivering nuclear strikes on a country-wide scale, when determining the number of objectives, the degree of their destruction,the priority of inflicting strikes, and the methods of destruction of industrial, administrative-political, and other centers.

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Notes

1. *Voyennaya mysl'*, No. 4, April 1968, FPD 0052/69, 27 May 1969.
2. Here we will not touch on issues connected with the political views of influential members in the governments of these countries, which in a number of cases were the determining factors.

The Maneuver of Forces and Materiel in an Offensive[1]

Maj Gen S. Begunov

In the course of military operations of the Great Patriotic War, the Soviet command element utilized broadly the maneuver of forces and materiel. In offensive operations of ground troops, maneuver was implemented mainly by tank and mechanized units, formations, and field forces for the purpose of enveloping the centers of resistance, reaching the rear of the enemy, surrounding and destroying enemy groupings, and also switching efforts to another zone for the development of an attack. In accordance with the degree of development of means of armed conflict, equipping of the troops with combat equipment, and increasing their mobility, there was an increase in the scope of military operations and the role of maneuver, its content changed, and the capablities for its implementation were expanded.

The appearance of nuclear weapons and the newest means of delivering them to the target brought radical changes to the methods of armed conflict. With calculation of this, based on generalization of the experience of military operations of the past and of postwar views toward the conduct of offensive operations, new views were developed on the content of maneuver and the procedure for implementing it. Discussions have developed on the pages of the military press. In particular, in the journal *Voyennaya mysl'*, this discussion was finished with a concluding article in which maneuver was defined as "the organized and fast shifting of a specific grouping of troops or of individual subunits, units, and formations in a battle and operation for the purpose of occupying a more favorable position in relation to the enemy for the infliction of a strike against him or for repulsing a strike by him."[2]

At that time, this definition of the content of maneuver was well-founded and correct. However, in the past 10 years, the number of means of armed conflict has increased incomparably and their quality has improved. There has been a corresponding change in views toward the conduct of offensive operations and toward maneuver and its content in particular. Now maneuver is interpreted above all as an organizational and quick shift or redistribution of previously planned nuclear strikes of rocket troops and aircraft for the purpose of the decisive defeat of an opposing grouping of enemy troops, mainly a nuclear grouping, as well as the rapid transfer of forces and materiel for the purpose of creating the

most favorable grouping of them for prompt and complete exploitation of the results of the use of weapons of mass destruction and completion of the defeat of the enemy.

As is evident, the new conception of maneuver distinguishes the most important factor of what characterizes modern military operations of any scale—prompt and purposeful use of nuclear weapons and other means of destruction of motorized and tank troops for quickly carrying out the main mission.

Of course, this does not mean that the decisive objective of an offensive will be achieved by maneuver alone. With the help of it, additional capabilities will only be created which must be implemented by subsequent operations in order to achieve the final result. The most skillful maneuver which is not completed by a prompt and effective strike will not lead directly to the complete defeat of the enemy. It merely creates conditions which insure subsequent success of combat operations.

At the same time it became characteristic that maneuver (mainly the shifting of efforts and the redirection of nuclear means) and strike by these means were very closely coordinated with each other, they seem to blend with one another. It is also easy to note the blending of nuclear strike and maneuver in the use of nuclear weapons by combined-arms formations. It is in the course of a nuclear strike (when decisive destruction is inflicted against an enemy grouping and coordination and control are disrupted) that the optimum opportunities are created for maneuver of combined-arms formations. Such maneuver is prepared by a nuclear strike and accompanies it. This constitutes a very important feature of modern maneuver—continuity of carrying it out, which is insured by the capabilities of modern forces and means of combat.

Depending on the objective, the number of forces and materiel participating in maneuver, the echelon of command (command element), and its organization, it can be of a strategic, operational, or tactical nature.

Strategic maneuver is organized and carried out in accordance with the plan and under the leadership of the supreme high command. Large groupings of strategic rocket troops, the air force, PVO strany troops, naval forces, and ground troops can participate in it. It is carried out both within the boundaries of one theater of military operations in the framework of an operation in a theater of military operations, and among various theaters. The chief content of strategic maneuver is the redirection of nuclear strikes and nuclear groupings for the fast and complete destruction of large enemy groupings and the achievement of strategic results.

Operational maneuver is usually carried out in accordance with the plan and under the leadership of the command element of the corresponding formation. It must insure the successful achievement of the objective of the operation or fulfillment of its intermediate missions. The main content of operational maneuver is the redirection of nuclear strikes inflicted by operational-tactical rockets and by rocket-carrying aircraft of frontal aviation, as well as the shifting of groupings of troops for the purpose of the maximum subsequent exploitation of the results of nuclear strikes.

Tactical maneuver has as its general designation the creation of conditions which insure the fulfillment of missions by the troops in battle. It is implemented by formations, units, and subunits, by tactical rockets, and by artillery fire, and it is limited in scope to the boundaries of the field of battle and, in time, to relatively short periods. The troops participating in tactical maneuver operate in fire and tactical coordination with the remaining forces conducting the particular battle. It is organized by the commanders of formations, units, and subunits.

All these types of maneuver have a specific link and mutual dependence. However, the main thing characteristic of modern conditions is the specific influence of strategic maneuver and strikes on operational and tactical maneuver, and of operational maneuver and strikes on tactical maneuver.

Depending on the change in direction of operations and the switching of forces and materiel, maneuver can be divided into frontal (from the rear to the front), flank (to the side of one of the flanks), and maneuver from the front to the rear. They are utilized most often in combination between themselves and they often develop from one to another, such as a frontal to a flank maneuver and vice versa.

As is known, the most widespread forms of maneuver in the past war were close envelopment—implemented with tactical and fire coordination with the troops attacking from the front, and deep envelopment—a deeper form of a flank maneuver carried out by the enveloping grouping of troops in tactical, operational, and sometimes strategic coordination with the troops attacking from the front. The former often created favorable conditions for the infliction of fire destruction from the flank and the rear, and the latter, for deep approach to the flank and rear of the enemy for the purpose of encirclement and destruction of his important tactical or operational groupings.

Close and deep envelopment can be carried out on open flanks in combat formations or in the operational formation of the enemy troops. Such conditions will occur quite often in modern operations, because nuclear weapons permit the creation of large gaps in the operational formation of the enemy, and even the threat of use of these weapons will force him to disperse and conduct combat operations in zones with the existence of large gaps between the formations and field forces. There will be exposed flanks, as a rule, in pursuing retreating troops, in meeting engagements, in operations in the mountains and in desert and forest regions, and also among air and naval landing troops which are conducting battle.

The depth of maneuver is increasing because modern means of destruction, and above all tactical and operational tactical missiles, provide coordination of fire at considerably greater distances. Now close envelopment can be implemented not only on a tactical, but also on an operational level, especially if one considers the ever-growing capabilities for transferring troops by air to land in the rear of the enemy for the purpose of a simultaneous strike from the front and the rear.

Modern means of combat, especially nuclear weapons, have increased the role and significance of such an important form of maneuver as the frontal attack inflicted in one or several zones, which permits the splitting of an opposing enemy grouping into segments and which insures a swift development of attack in the shortest direction in depth. A frontal attack creates the most favorable conditions for exploiting the results of fire effect on the enemy and it insures high speeds of advance of the troops and a savings of forces, materiel, and time. It will often be undertaken for the purpose of fast exploitation of the results of mass nuclear strikes and swift penetration to the rear of the enemy, i.e., to regions of disposition of his nuclear means, airfields, control posts, warehouses, and bases of materiel. In developing an offensive, a frontal attack can develop in the transfer of efforts from some zones to others. It is characteristic that those missions for which operational field forces were previously needed to carry out can now be carried out by formations in considerably shorter periods and more effectively.

Used most broadly in a modern offensive operation, it is assumed, are strikes from various zones for the purpose of fast approach to the rear toward enemy groupings which have survived or have retained their combat ability and the cutting off and destruction of them.

All the above forms of operational and tactical maneuver can be most completely displayed in meeting engagements and battles. The basis of maneuver in this case can be established as the desire to disperse a grouping of enemy troops encountered and destroy it piecemeal by means of nuclear strikes and decisive operations of tank and motorized formations. Most effective will be the infliction, in coordination with airborne troops, of a combined strike at the flank and rear of the enemy, simultaneously pinning him down with a portion of forces from the front. In favorable conditions of a situation, such as when an enemy grouping is reliably destroyed by nuclear weapons and conventional fire, and also when there is difficult terrain on the flanks, it is advantageous to inflict a frontal strike for the purpose of completing the destruction of the grouping by splitting it into portions and quickly exploiting success in depth. Maneuver in a meeting engagement (or battle) can also be carried out by means of close double envelopment in combination with a simultaneous strike by a portion of the forces from the front. In all cases it is important to forestall the enemy from inflicting fire strikes, above all by nuclear weapons, and from seizing advantageous lines, deploying the main forces, and inflicting a swift strike.

The withdrawal of troops from under enemy nuclear strikes will also be used in a modern nuclear war. Such operations are frequently referred to in literature as antiatomic maneuver. Implied here mainly is a change of regions of disposition of troops and of position regions of fire means for the purpose of preserving them from the effects of weapons of mass destruction of the enemy. This is achieved by the prompt transfer of forces and by occupying regions which insure their withdrawal from under possible enemy strikes or which provide the maximum degree of protection

from the effects of nuclear weapons. The change in regions of disposition of troops is made periodically, quickly, and secretly. The previous conditions are maintained in the evacuated regions in a number of cases.

The mass use of nuclear weapons by the belligerents, as was indicated above, makes it possible to conduct offensive operations, broadly utilizing various forms of troops maneuver. However, it does not follow from this that modern conditions of conducting military operations present unlimited capabilities for maneuver. The fact is that the use of means of mass destruction has caused the appearance of a number of factors which hinder and, in a number of cases, preclude the conduct of troop maneuver. Included among them, for example, is the presence of broad zones of radioactive contamination, regions of solid destruction, fires, flooding, etc., which occur as the result of nuclear strikes. Moreover, we cannot but consider that the troops which are being transferred even at great distances from the front are outside their shelters and therefore constitute favorable targets for nuclear strikes of the enemy. This, in turn, limits the possibility of maneuver by second echelons and reserves.

Hence, primary importance is now acquired by maneuvering of fire because it produces a gain of time and does not involve large transfers of troops. In contrast to the past, it involves above all maneuver of nuclear-missile strikes and air strikes, which imparts to it completely new qualities. While earlier the concentration or transfer of fire to great distances usually involved considerable regrouping of fire means and great expenditure of time, now maneuver of nuclear strikes can be carried out in extremely short periods and virtually at any range without moving the launch areas of the missile launchers.

The rocket troops and aircraft, in carrying out maneuver by nuclear strikes, are capable of inflicting destruction against large enemy groupings, and above all against means of nuclear attack, in any zone through the entire depth of operational formation of enemy troops, and thereby quickly change in the selected zone the correlation of forces to their own advantage, disorganize control and operation of the rear, and finally influence decisively the course of the operation. Airborne troops will also play a large role in this.

However, to complete the destruction of the enemy and seize his territory, it will be necessary to have broad maneuver by all other forces and materiel, including the ground troops. This maneuver will be coordinated by target, place, and time with nuclear strikes in order to exploit promptly their results.

Depending on the developing situation, the formations and field forces of ground troops can carry out maneuver not only in zones previously established for their operations. In a number of cases, they will have to maneuver through the zone of the adjacent formation or field force to destroy in coordination with them especially important enemy groupings. The transfer of efforts of formations and field forces can be implemented by changing the zones of attack of operational formations or the zones of operations of strike groupings.

To achieve success in the attack in a new zone, it will be necessary above all to switch the efforts of the rocket troops and aircraft for the purpose of destroying the means of nuclear attack and defeating the enemy grouping. Sometimes it is also required to have a redistribution of means of reinforcement and flight resources of aircraft and the amount of nuclear ammunition allocated to field forces (or formations), as well as changes in the procedure for taking measures to supply the troops and changes in the systems for troop control and the methods of coordination of attacking groupings, both among themselves and with the supporting forces and means.

Maneuver by the second echelons and reserves can be used to develop a swift attack in the decisive zone, to complete the defeat of the reserves and counterattacking enemy groupings, and also to attack in a new zone created in the course of the operation. It is also possible to conduct such a maneuver for the purpose of replacing portions of the forces of the first echelons which have lost their combat ability due to enemy nuclear strikes or as the result of prolonged operations in zones of radioactive contamination, as well as to carry out other missions which arise suddenly in the course of the attack. However, it should be kept in mind that it will be extremely difficult and dangerous to carry out maneuver successfully with the second echelons, especially with large groupings, from one zone to another. Moreover, it must be considered that the simultaneous introduction into battle of all the forces of a formation in modern complex conditions of conducting military operations cannot always be achieved. In this connection, and also in view of the fact that in modern operations it will be extremely difficult to determine beforehand the specific missions for the second echelon, it is more expedient, in our view, to have in the operational field force several more reserve formations (or units) by zones. This will make it possible to put them into battle and maneuver them considerably more easily and quickly.

In modern conditions there has been an immeasurable increase in the importance of maneuver carried out by means of transporting troops and materiel by air. Maneuver by air insures great flexibility, speed, and surprise. It permits the troops to exploit most effectively the results of nuclear strikes and to travel great distances in short periods regardless of the nature of the terrain, the level of its contamination with radioactive agents, and the existence of regions of destruction, forest fires, and nuclear-mine obstacles.

The increased capabilities of military transport aircraft and naval transport means permit not only the use of vast airborne and naval landing troops, but also the transfer of relatively large groupings of troops with combat equipment and armament, large reserves of material, and other cargoes for great distances. This can be done for the purpose of fast exploitation of the results of nuclear strikes in the rear of the enemy (to seize important regions, lines, sectors of the coastline, and naval bases), fast replacement of the troops which have suffered great losses from nuclear strikes, shifting of efforts to other zones, etc.

Maneuver of forces and materiel, especially that involving a change in the grouping of troops of the first echelon, of course, makes it necessary to have corresponding changes in the organization of their rear support, such as changes in the direction of bringing up supplies and the procedure for supplying the troops. Maneuver of material and technical means is also required in cases of great losses from nuclear strikes of the enemy, disruption of the bringing up of supplies from the depth of the country, and shifting of efforts of operations of troops from one direction to another.

The increased importance of maneuver of forces and materiel in modern offensive operations and the complexity of carrying it out are proof of the fact that the organization and conduct of it must be at the center of attention of the commanders and staffs. In planning an operation, it is necessary to define clearly the goals and nature of maneuver and the methods of carrying it out. At the same time, it should be kept in mind that in the course of the offensive it is possible to have very frequent and sharp changes in a situation, and this will require elaboration or the adoption of new decisions and the conduct of maneuver of forces and materiel in the shortest periods for the immediate destruction of means of enemy nuclear attack, the defeat of his main groupings of troops, and the achievement of high speeds of attack.

In order to carry out maneuver quickly, the necessary forces and materiel, and above all nuclear weapons and means of delivering them to the target, must always be in readiness at the disposal of the commander. The reserves should have their place in the operational field force correctly determined, as should be the procedure for transfer (changing bases of supply), especially of missile troops and aircraft, and their appropriate level of readiness should be established. It is necessary to orient promptly the commanders and staffs concerning possible missions and to carry out in advance the measures for rear and other types of support.

For successful maneuver it is extremely important to foresee the development of events and carry it out in extremely short periods. The time element will often be the decisive factor in achieving success in an operation. It is for this reason that the reserve formations must be at a level of readiness which would permit the conduct of maneuver quickly, secretly, and to the surprise of the enemy.

Maneuver must be simple and must exclude complex regroupings. In organizing and carrying out maneuver, it is necessary to consider that the enemy will try to disrupt it with strikes of its nuclear and other fire means and with active operations of strike groupings and other methods. In this connection now as never before it is necessary to retain the secrecy of the plan of maneuver. This is achieved by strict limitation of the number of persons involved in preparation and implementation, by constantly combating all types of enemy reconnaissance and by conducting feigned maneuver and other measures for concealment.

Just as any activity of the troops, maneuver must be thoroughly supported. The types and degree of its support will depend on the goal and scale. However, special attention must be devoted in all cases to the struggle

against nuclear means of the enemy, as well as to measures of protecting the troops from weapons of mass destruction. There has also been a very strong increase in the importance of measures for engineer and highway support: the preparation of routes, the restoration of roads, the laying of cross-country routes, the construction of detours in regions of defiles and road junctions, the preparation of alternate crossings across water barriers, efficient organization of commandant's service, etc. All this must be considered in the organization of maneuver. Of special concern of the commanders and staffs at all levels will be the maintenance of coordination of forces and materiel which carry out and support maneuver, as well as the creation of steady and continuous troop control. The latter will often require the organization of separate (independent) lines or zones of communication and the broad use of mobile means, above all of aircraft and helicopters equipped with modern technical means of observation and communication.

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Notes

1. *Voyennaya mysl'*, No. 5, May 1968, FPD 0013/69, 4 February 1969.
2. *Voyennaya mysl'*, No. 3, March 1955, p. 35.

Modern Warfare and Surprise Attack[1]

Maj Gen N. Vasendin and Col N. Kuznetsov

A surprise attack has always been the favorite method used by an aggressor in beginning a war against peace-loving states. Therefore a study of the methods of achieving surprise in the unleashing of a war by an aggressor is of primary importance.

At the present time, much research has been done abroad in regard to these questions and a number of military-scientific works and theoretical articles have been formulated. The acuteness and urgency of this problem require regular and thorough scrutiny of it again and again, proceeding each time from specifically developing conditions. This is explained above all by the constant development of means and methods of armed conflict and by the changes in connection with this in the capabilities of achieving surprise. These capabilities are not always evaluated in a similar manner.

There are, for example, opinions which deny the factor of surprise in a strategic nuclear attack or which maintain that its influence on operational and strategic scales will be of extremely short duration. Such assertions are based on the fact that modern means and methods of reconnaissance permit the disclosure of an immediate preparation of an aggressor for an attack, as well as the beginning of the first strike of his strategic nuclear means, and this in turn will insure the immediate infliction of a destructive retaliatory strike if the side subjected to attack maintains its forces at a high level of readiness. The opinion also exists that the capabilities for detecting an attack being prepared are sharply decreased at the present time and that the probability of achieving surprise is increased, and we agree with this.

The economic resources of the main countries of the world are now such that they permit long before the beginning of a war the retention in readiness of numerous armed forces capable of carrying out the main or even all the missions of a war. The strategic nuclear means of some countries have been perfected to the point where it has become possible to retain them for a long time in a high degree of combat readiness which does not require much time for immediate preparation before use. Strategic nuclear-rocket weapons now have the capacity of constant, literally absolute readiness for operation at the signal in any conditions of a situation. This permits an aggressor to unleash and conduct a war of any scale with the combat forces available.

The increase in the technical capabilities of achieving surprise and the

danger of the first nuclear strike of the enemy which has colossal destructive power in modern conditions compel us to examine again the problems of the defense capability of countries. In conditions of the unlimited use of nuclear rocket weapons, countries which were unable to prepare for repulsing an aggressor or to disrupt or even weaken the nuclear attack can in a short time suffer destruction the extent of which will play a decisive role in the further conduct of war. While several weeks or months were required in the past for the direct preparation and unleashing of a world war, in modern conditions only minutes are needed to inflict a nuclear strike against the enemy. Thus possibilities are created for the sudden simultaneous or successive beginning of military operations in the main theaters of military operations. Surprise, just as armed conflict on the whole, acquires global scope and very great importance in a world nuclear war.

As is known, in nonnuclear wars of the past, surprise, depending on the scale and effectiveness of the first strikes, usually deprived the side subjected to attack of the capability for a certain period of time of undertaking a counterblow of considerable force and actively opposing an aggressor who has attacked unexpectedly. The enemy, in inflicting the surprise strike, has thereby insured for himself to a certain extent and for a certain period of time relative impunity.

Can this be hoped for now? Evidently not. With modern means of reconnaissance, early detection, warning, and control, should an aggressor succeed in putting the chief means of destruction into operation (mass rocket launches, takeoff of aircraft, launch of space apparatuses, etc.), this does not mean that he will not receive a worthy punishment. Everybody knows that in modern conditions in an armed conflict of combatants which are relatively equal in power (in number and especially in quality of weapons), an immediate retaliatory strike of immense destructive power is inevitable.

Therefore, the preparation by an aggressor for a sudden nuclear attack directly involves not only an increase in the combat readiness of strategic nuclear means and the achievement of effectiveness of the first strike, but also an increase in the degree of protection of means of attack and objectives of the deep rear area from retaliatory nuclear strikes, as well as the creation of high mobile strategic nuclear means capable of changing the launching point in time after the launch. Conducted simultaneously with the preparation for a nuclear strike is intensified work for further developing antimissile defense. Constant radar observation and continuous combat alert by the entire air defense system is organized.

To achieve surprise in a nuclear war, an aggressor will strive not only to insure unexpected implementation, in regard to time, methods, place, scales, and means, of an attack (strike) undertaken at the beginning or in the course of a war for the purpose of seizing the initiative and defeating the enemy in the shortest possible periods, but also to carry out an entire series of organized measures for protecting the armed forces and objectives of the deep rear area from retaliatory nuclear strikes. The fact of the

matter is that in modern conditions a surprise attack cannot produce the expected effect if the forces and means designated for the development of an advantage achieved by a sudden strike suffer considerable losses and do not carry out the missions entrusted to them.

What ways and methods for achieving surprise can be used by the aggressor in striving to carry out his plans?

In studying this question, it is necessary above all, in our opinion, to distinguish the technical and organizational capability of achieving surprise, because not everything which permits the level of development of equipment in general can be implemented at a particular stage in a specific situation.

For the purpose of achieving surprise and increasing the effectiveness of the initial strike, the aggressor, along with existing types of weapons, might use new types of weapons, such as more modern submarine ballistic missiles and and mobile medium-range missile launchers which are being developed and are intended for use in the continental theaters of military operations, improved models of intercontinental missiles, and also automatic and manned space apparatuses of varied designation.

To insure a high degree of reliability of delivery of nuclear charges to the objectives of destruction, ways are being sought for the missile warheads to effectively overcome the antimissile defense. In particular, special plastic or metallic shells of warheads covered with a radio-absorbent coating can be used. This decreases their capacity for reflecting radiowaves and considerably reduces their range of detection in trajectory. At the same time, means of active and passive interference of the antimissile radar system, as well as dummy targets, are installed in the missile and the warheads. For the purpose of overcoming antimissile defense, work is being done to create warheads which operate and maneuver in the descending mode of the trajectory. Possibilities are being sought for decreasing the flight time of the warheads by changing the form and altitude of trajectory and selecting the direction of rocket launches in bypassing the zones of fire by antimissile defense. It is proposed that special space apparatuses be used to create active interference for the antimissile radar system.

For the purpose of decreasing the flight time of the missiles and the approach time of the aircraft, the launch sites and the airfields are placed close to the borders of those countries which are viewed as potential enemies. As an example we can point to the instance of patrol by American nuclear submarines in the Mediterranean Sea and the East Atlantic, in the Norwegian Sea, and the western part of the Pacific Ocean, and and also the concentrations of a large number of their operational-tactical missiles and delivery aircraft of tactical and carrier-based aviation in West Europe, Turkey, Japan, South Korea, and the countries of Southeast Asia.

According to data of the foreign press, much scientific and experimental work is being conducted in the United States and other imperialist countries in creating a basically new radiation weapon, as well as more

highly toxic chemical and bacteriological agents than those which now exist. Development is proceeding on methods of combating strategic nuclear and space objectives.

A very important premise and a decisive factor for achieving surprise is considered to be the presence of a promptly created grouping of strategic nuclear forces and means and their retention in constant readiness for operations. This increases the capability of attacking with previously prepared forces and means without carrying out mobilization and the complex series of preparatory measures.

To achieve surprise in a modern war, an aggressor on the eve of war and in the course of it, increasing the activities of his reconnaissance, will evidently take active measures to suppress and blind reconnaissance forces and means of the enemy by creating strong interference against radio and radiotechnical means. For this purpose, high-altitude nuclear explosions can be carried out in the beginning and in the course of the war to destroy the system of control and communications and to suppress the antimissile and antiair defense radar system and the aircraft control systems.

We should also consider the circumstance whereby for the purpose of deception, an aggressor might resort to the use of those methods of operations that do not produce the end result in complete form, but insure a higher level of probability of achievement of surprise. This situation is now of great importance, because the simulation of military operations permits calculation of the optimum variant which can be used by an aggressor to achieve surprise. Considering this, the aggressor might select, for example, another sequence of use of strategic nuclear forces (intercontinental missiles, missile submarines, and strategic aircraft) for a treacherous attack in comparison with that which was specified under the optimum variant. In particular, it is possible that it is not the intercontinental missiles which will be launched first, but the operational-tactical missiles. The proposed sequence of unleashing of military operations in the theaters can also be changed.

Changes in the sequence of destruction of objectives are also not excluded. Thus, a strike by medium-range missiles can be inflicted first against such objectives as large military-industrial and administrative centers. However, as a means which is closer to enemy objectives, they can be used above all for a strike against antimissile and antiair defense means and control posts in order from the very beginning to deprive the state subjected to attack of the capability of defense. Other variants are also quite probable.

Speaking of the surprise unleashing of a nuclear war, the following should be noted. Recently the command element of the U.S. Army, evidently, has not ruled out the possibility of opening military operations even in the main theaters with the use of conventional means of destruction alone. Such a beginning of war can create favorable conditions for the movement of all nuclear forces to the regions of combat operations, bringing them into the highest level of combat readiness, and subsequently inflicting the first nuclear strike with the employment in it of the maximum

number of missile launch sites, submarines, and aircraft at the most favorable moment.

However, the movement of nuclear forces into the regions of combat operations will be conducted in conditions of constant and active countermeasures of the defending side and with the limited (because it involves military operations which have already begun) use by it of all forces and means of reconnaissance. To achieve a surprise nuclear attack in the course of nonnuclear operations, it is necessary to insure not only secrecy in bringing nuclear means to the regions of combat operations, but also their constant protection from enemy strikes and secrecy and maximum speed in direct preparation of the first strike from any previously unprepared region. A skillfully organized struggle against reconnaissance, the suppression of radioelectronic means, especially early detection systems, false and deceptive operations, and other measures can have a decisive influence on the achievement of surprise in switching to combat operations with the unlimited use of nuclear weapons.

We cannot exclude attempts to achieve surprise by unleashing a local war. It is through the escalation of the local war in Vietnam that the U.S. imperialists aggravate more and more the international situation and kindle war hysteria, drawing their satellites into this dirty war. The local war can be used by the aggressor for the additional mobilization of forces. In the guise of moving troops to the regions of the military conflict, a strike grouping of forces and means can be created for an attack. Such a war gives rise to an increase in the combat readiness of all armed forces of the aggressor, an intensification of strategic reconnaissance, the deployment of control points and communications centers in the territory of the dependent countries, and the carrying out of an entire series of other measures.

It must be noted, however, that an aggravation of the international situation by aggressive imperialist circles on the eve of the war is not obligatory. On the contrary, for the purpose of disinformation and deceiving public opinion, they might resort to a false relaxation of relations and, under cover of this maneuver, suddenly unleash a war.

The preparation of the imperialist countries for war is now being implemented on the scale of aggressive blocs. However, the readiness of various countries of these blocs and their armed forces for war is far from similar. This complicates considerably the direct preparation of the aggressive blocs for war and creates at the same time a number of additional indicators which permit the detection of it and the prevention of surprise in an attack. However, for the sake of achieving surprise, the imperialists might disregard their secondary allies who will not play an important role in a nuclear war, especially in its beginning.

The annual measures for operational preparation of the armed forces of the aggressive blocs conform to the requirement of surprise attack. The variant of enemy operations is not excluded whereby in the guise of training exercises and maneuvers he tries to implement operational deployment of forces and means and their preparation to inflict a surprise first strike.

Incidentally, the broad publicity of such measures by imperialist propaganda is being conducted evidently for the purpose of demonstrating their power and formidable nature, supporting reactionary regimes, and stifling the national liberation movement of peoples, as well as preparing public opinion and blunting the vigilance of the peoples.

An armed conflict is a bilateral process. A purposeful, maximum possible counteraction of one side is organized for each action of the other combatants. Therefore, being developed and introduced simultaneously with the development and introduction of methods of achieving surprise are opposing methods for preventing (disrupting) surprise in attack and surprise in strikes in the course of a war.

What are the ways of forestalling and preventing (disrupting) a surprise attack? They are perhaps just as numerous and varied as are the methods for achieving surprise, and they are dictated to a large extent by a specifically developed situation. The mission consists in delving deeply into the essence of the manifestation of surprise and possible ways of achieving it.

Any aggressor risks unleashing a nuclear war only with confidence of achieving victory. And confidence in the success of a nuclear attack can occur in conditions where there is a sufficiently high guarantee that nuclear strikes will be delivered to the objectives of destruction, that a mass launch of ballistic missiles and takeoff of aircraft will occur for a relatively long time undetected by the country against which the attack is being carried out, and that the armed forces, and above all the strategic nuclear means of the enemy, will suffer such destruction that they will be incapable of carrying out a powerful retaliatory nuclear strike.

In order to eliminate the possiblity of such a favorable situation for the aggressor and deprive him of the temptation to risk the unleashing of a nuclear war, it is necessary to maintain strategic nuclear means in constant high combat readiness, dispersed and well-concealed, and to have a reliable system of early warning of a mass launch of strategic missiles and takeoff of strategic aircraft, as well as effective means of countering enemy ballistic missile warheads and aircraft.

Of primary importance are a high degree of constant combat readiness and speed of putting into operation strategic nuclear weapons and other forces and means. As is known, ballistic missiles insure the delivery of megaton nuclear charges to the objectives of destruction in a matter of several scores of minutes. Hence, a matter of minutes remain to prepare and carry out a retaliatory strike, excluding the time necessary for the detection of the launch of enemy missiles, analysis and report of the data to the command element, and adoption of a decision and transmittal to the troops of the order for the beginning of combat operations. Thus, speed of operations will depend not only on the readiness of means of combat, but also on the operational nature of the control system. Consequently, only powerful and numerous means of destruction maintained in high combat readiness in combination with a high-speed automatic control system can insure the prompt infliction of a retaliatory strike, and only

well-developed antimissile and antiair defense can reliably repulse an enemy air-space attack, i.e., essentially reduce the consequences of his sudden attack. Comrade L. I. Brezhnev, General Secretary of the CPSU Central Committee, pointed out at a reception in honor of graduates of military academies, that "within the concept of the combat readiness of the troops are concentrated the vast efforts and material expenditures of the people for equipping the army, conscientiousness, a high state of training, the discipline of all servicemen, the skill of the command staff in troop control, and many other things. In the final analysis, combat readiness is the crown of combat skill of the troops in peacetime and the key to victory in war."

The experience of the past hundred years indicates that surprise in unleashing wars was usually achieved as the result of poor knowledge of the attacking side, subjective mistakes in evaluating the intentions and plans of the enemy, foresee the possible nature of operations, not permit toward surprise attack. Consequently, to prevent and disrupt a surprise enemy attack, it is necessary to have, besides combat-ready forces and means, data on his preparation for a war and a thorough analysis of it. The chief thing is to delve deeply by means of individual and even insignificant intelligence indicators into the content of the intentions and plans of the enemy, foresee the possible nature of operations, not permit oneself to be deceived by a false maneuver, and be ready to counter his most unexpected methods.

Surprise also plays an important role in the course of a war already started. It can be one of the main factors which insure victory in a battle or in operations.

Surprise in the course of an armed conflict is achieved above all by retaining secrecy of plans and intentions, a skillful selection of the moment of beginning of combat operations, speed and concealment of regrouping of troops, the use of new methods of combat operations and means of combat, camouflage, and also unexpected and stronger strikes in several zones.

Necessary for completely realizing the advantages of surprise are speed and swiftness of operations and the prompt entry into battle of new forces and means capable of developing initial success and constantly increasing the power of the first strike or utilizing its results more quickly.

The fast-moving nature of combat operations and the sharp changes in a situation will result in unexpected and unforeseen situations which, occuring suddenly and changing quickly, will make it necessary for the command element of all levels to make decisions in very short periods of time. Surprise in the course of a nuclear war becomes a component part of the battle and operation. The chief method of achieving it here is the skillful use of nuclear weapons. In a situation of vast losses inflicted by both sides and in conducting an operation with limited forces, even individual unexpected nuclear strikes against the most important objectives acquire very great importance in achieving surprise. After an exchange by both sides of mass nuclear strikes, it is very difficult to foresee how complex the situa-

tion will be both at the front and in the deep rear area. The combat operations will acquire a violent nature and the struggle to seize the initiative will become especially acute. In these conditions, even maneuver which is simple in form and content but which is carried out secretly and in short periods of time can produce highly appreciable results. The use of nuclear weapons and other modern means of combat permits operational-strategic missions to be resolved in short periods of time. The achievement of surprise here will be promoted by new forms and methods of combat, speed and determination of operations, a gain of time in the use of nuclear means, and the prompt destruction of nuclear weapons of the enemy.

The possibility is not excluded that a war can assume a relatively prolonged nature. The combatant, quickly expending the supplies of nuclear weapons created during peacetime and unable to produce them during the war, especially in its final stage, will carry out operational-strategic missions mainly by conventional means. In this case, surprise in operations conducted in the course of the war will be achieved through secrecy and quickness of regroupings, the skillful and fast overcoming of zones of contamination and destruction, and daring operations of mobile troops and airborne and naval landing troops in the operational zone of the enemy and in the depth of the theaters of military operations.

The imperialist states, united in aggressive blocs, despite the ever-growing resistance of peoples of their countries, are continuing the arms race policy and the kindling of military conflicts near the borders of the socialist camp. Therefore, the problem of eliminating surprise in unleashing a world nuclear war is of extremely great importance for the USSR and all the countries of socialism.

As General Secretary L. I. Brezhnev of the CPSU Central Committee indicated in his speech at the joint solemn session of the CPSU Central Committee, USSR Supreme Soviet, and RSFSR Supreme Soviet, "we are taking into consideration the lessons of the past and are doing everything so that nobody catches us by surprise. And should madmen be found who dare to encroach on the security of the Soviet country or our allies, the Soviet people will not waver. No matter what the origin of such encroachment, from the north or the south, from the west or the east, the aggressor will encounter the all-shattering power of our glorious Armed Forces."

About the Author

Vasendin, N. D., Major General. General Vasendin won a Frunze Prince in 1966 for his writings, He was on the editorial board of *Military Thought* in the 1960's.

Note

1. *Voyennaya mysl'*, No. 6, June 1968, FPD 0005/69, 16 January 1969.

Methodology for Determining the Correlation of Nuclear Forces[1]*

Col B. Khabarov, Engr Col N. Bazanov
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In the article "Determining the Correlation of Forces in Terms of Nuclear Weapons" questions were raised concerning general principles of the approach to an evaluation of the correlation of forces in the course of combat operations, with a concrete method for calculating nuclear weapon forces and with various aspects of modeling applicable to the problem under consideration.

In our view the author correctly supposes that under modern conditions by force of a number of known factors normally included in the concept "the revolution in military affairs," and also for an understanding of the great responsibility involved in making a decision on the employment of nuclear weapons it is necessary to determine that correlation of forces on the basis of not only quantitative but also qualitative indicators.

There is no disagreeing with the author that this task can be solved most successfully by the method of mathematical modeling. With the aid of a model of combat operations in which adequate consideration is given to both quantitative and qualitative factors it becomes possible to research a number of basic aspects in the planning of an operation, including the correlation of the belligerent forces as well.

The development of a model of combat operations is a complex and labor-consuming process requiring a great quantity of particular research studies and their generalization. At the present time there has been a successful realization of those models of combat operations in which their determining factors are comparatively easily formalized (for example, a model of air defense combat operations). As for a model of combat operations in which all branches of troops participate, a number of serious difficulties involving both methodology as well as mathematics are encountered.

The methodology of determining the correlation of forces in nuclear weapons suggested by Comrade Anureyev can be used as the basis for working out a general model of combat operations in a theater of military operations. It will make it possible to determine the correlation of forces

*[See page 161 of this edition—U.S. Ed.]

for all means of armed combat and also make it possible to plan combat operations more expediently.

From a methodological point of view the following question is most valid. From which or for which echelon is it necessary to initiate development of a general model of combat operations with the aid of which the correlation of belligerent forces can be determined? The author of the article under discussion proposes that the correlation of forces in nuclear weapons be determined through the "relationship of the combat capabilities of the sides in the delivery of nuclear strikes." In our opinion, in principle this method can be used not only in the example given by the author, but also in determining the correlation in other types of weapons and forces participating in the operations. Inasmuch as combat operations under modern conditions are carried out within the framework of complex systems, then, obviously, in the model of a front-type operation we cannot deflect our attention to any specific degree from the character and primarily the results of the combat operations in the lower troop echelons which represent independent systems of various complexity and which are, at the same time, functional subsystems of the front.

For this specific reason it is difficult to agree with the assertion of the author that "the correlation of forces depends primarily on the plan of operations." Actually the correlation of forces according to phases and directions is fundamental for the selection of the optimal plan of combat operations. Along with this each troop echelon operates on the basis of different information with a varied degree of detail. In other words, in each troop echelon the course of combat operations is evaluated according to specifically applicable criteria. Additionally, with the increase in troop echelons (from tactical to strategic) these criteria have a different degree of approximation and accuracy. To a great extent the criteria are determined by the effectiveness of the intelligence system, as was convincingly shown by the author in his article. In actual fact, in making any particular operational-tactical computation the researchers regularly strive for the greatest possible accuracy in the calculations. On the other hand, the initial information, acquired with the aid of various intelligence means, quite frequently is not very reliable. That is why in the selection of criteria for a model of combat operations it is especially important to take this factor into consideration.

If the combat operations of a front's troops are viewed as a complex system consisting of an entire series of subsystems, then it can be established that the development and results of combat operations in it depend on the totality of the processes taking place within it, even though those processes are confined to the various troop elements. From this follows the conclusion that the various elements require their own characteristics of effectiveness of troop operations and means of armed combat. It is also evident that on an operational and especially on a strategic scale these characteristics must have a generalized character. But such generalizations are justified and have a scientific basis only when they are based on a great quantity of statistical material which can be obtained in peacetime condi-

tions only by repeated experiments carried out on mathematical models of tactical-scale combat operations.

Thus, in our opinion, it will be correct to carry out the development of models of combat operations at the tactical and the operational-strategic levels simultaneously, with close coordination of work in both directions.

An important thesis mentioned by Comrade I. Anureyev pertained to the preparation of specialists capable of successfully solving "linking problems" of operational art and mathematics.

We consider the selection of the type of model to be a serious methodological question. The method of statistical trials is most effective, it makes it possible to model complex phenomena of reality of a fortuitous nature. As is known, a situation in which it is necessary to make a decision for an operation and supervise combat operations contains not only the unknown, but also elements of chance.)

For the investigation of particular questions analytical models are required. In them the quantitative parameters are connected by analytical functions in the form of various types of equations (for example, the Lanchester equation).

The solution of the problem of the optimal determination of the correlation of forces, and in the first instance in nuclear weapons, depends to a great extent on the correctly selected methodology of evaluating the effectiveness of the means of armed combat. At present many such methods of evaluating the effectiveness of nuclear weapons have already been worked out. But the author is correct in noting that, as yet, there is no single approach to their development.

On the whole Comrade Anureyev's article is most useful. In it an attempt was made to find ways of solving a most important and complex problem.

Col B. Khabarov

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One of the most important problems resolved during the period of planning and in the course of modern operations is the determination of the quantitative and qualitative correlation of forces and means of belligerents. The difficulty of solving this problem consists primarily in the fact that it is too complex to evolve commensurable magnitudes for use in making comparisons. At the present time there is still no single method for determining the correlation of forces for all branches of troops and types of combat equipment and the search for it should be considered to be a most important and useful project.

The existing methods of determining the correlation of forces of belligerents by means of comparing only TOE troop units and the overall

quantitative correlation by types of weapons does not permit the complete disclosure of the capabilities and strengths of groupings. A common shortcoming of existing methods for the quantitative correlation of forces is the multiplicity of indicators, each of which characterizes an individual aspect of an event. Moreover under conditions of waging modern combat operations it is very important for the command element to know the qualitative correlation of forces.

In the preparation of such calculations at present the most promising method appears to be the one of evaluating the effectiveness of weapons for specific conditions of the combat situation.

Let us consider an example of determining the correlation of forces of belligerents for aviation nuclear weapons.*

Let N_1 = the number of aircraft capable of waging aerial combat against enemy delivery vehicles;

N_{1_i} = the number of i-type aircraft capable of waging aerial combat against enemy delivery vehicles;

N_{2j} = the number of j-type enemy delivery aircraft participating in the attack;

W_{ij} = the probability of destroying a j-type enemy delivery vehicle by our i-type aircraft during one pass at the target.

In such a case the mathematical expectation of the number of enemy carriers of each type which can be destroyed by our aircraft can be determined by the following formula:

$$M_j = \left[1 - e^{\frac{1}{N_j}\left(2 N_{2i} \cdot W_{ij}\right)}\right] \cdot N_{2j} \qquad (1)$$

The mathematical expectation of the number of destroyed enemy delivery vehicles of all types is:

$$M = \sum_j M_j \qquad (2)$$

and the average probability of enemy carriers reaching the targets after their penetration of the zone of aircraft operations equals

$$W = 1 - \frac{M}{N_2}, \qquad (3)$$

where N_2 = the number of enemy carrier aircraft participating in the attack.

Not considering it necessary to go into detail on the conclusions and assumptions of formulas (1), (2) and (3), we will merely note that with the aid of simple mathematical computations it is possible to proceed from the indicator of the effectiveness of a single aircraft W_{ij} to the generalized indicator W.

* [A number of the subscripts in the formulas that follow were not clearly legible—U.S. Ed.]

The last estimate can be the qualitative measure for determining the correlation of forces in nuclear weapons for aviation.

A similar method of computations was considered by Maj Gen I. Anureyev. In his article he suggested a method for determining the correlation of forces in nuclear weapons. And although this is a specific question in the general problem of the correlation of forces, its formulation is considered timely and necessary as the methodology offered in it enables both the researcher and the commander to go deeper into the evaluation of the combat capabilities of the belligerents. Inasmuch as the nuclear weapons are the main means of destruction, knowledge of the correlation of forces of the belligerents will be a great aid to the command in making a rational decision, will make it possible to evaluate a developing situation more completely, and also to map out measures to change the given correlation of forces to one's own advantage.

Agreeing with the author of the article, we will merely note that by using a mathematical device and selecting characteristics for evaluating the effectiveness of armament it is possible to make a sufficiently adequate determination of combat capabilities not only of individual types of military equipment, but also to determine the correlation of forces and means of various sized units in entirety.

In computing the correlation of forces of belligerents in nuclear weapons, the author, in essence, recommends the use of three indicators which characterized the main combat capabilities of nuclear weapons, specifically: the area of destruction of the shock wave, the probability of overcoming the enemy defense, and the destruction of delivery vehicles on the ground. These characteristics make it possible to take into account the most important quantitative and qualitative parameters upon which the effectiveness of nuclear weapon employment in an operation depends. But in such an approach the necessity arises of calculating all the previously mentioned indicators. In our opinion a more correct method is the development of a stochastic model for the evaluation of effectiveness of nuclear weapons, inasmuch as this model specifically will make it possible to determine sufficiently accurately the course and outcome of combat operations involving many chance occurrences and uncertainties. By means of playing out on it the plan of combat operations of our side and the possible plan of the enemy, taking into consideration the peculiarities of the theater of military operations and other conditions, the necessary indicators of the combat effectiveness of nuclear weapons can be determined, and they will form the basis for calculating the correlation of forces of the belligerents. Of course there are significant difficulties connected with the development of such a model. Since it is impossible to express by means of a single number the correlation of forces under conditions of nuclear warfare, the recommended value λ as the criterion for the evaluation of the correlation of forces in nuclear weapons should be considered as only one of the possible qualitative characteristics, and it should be supplemented with other data which in total will make it possible for the researcher to draw the necessary conclusions. However, there should

not be too many such evaluations, as in the final analysis this will complicate the process of analyzing the computation results.

We agree with the author that the method proposed by him for determining the correlation of forces in nuclear weapons can be used on the strategic scale and that the determination of the correlation of forces in nuclear weapons should be regarded as a continuous process encompassing the processing of information about the combat capabilities in nuclear weapons of belligerents taking into consideration countermeasures and inflicted damage. The use of computers for calculating the correlation of forces will simplify this process, reduce the time required for the solution of problems, improve their quality and exclude gross errors. This task can be accomplished in full measure with the availability of automated systems of troop control.

Let us consider still another proposition in Comrade Anureyev's article. The author's recommended formula

$$\lambda = \lambda_o \cdot \frac{\sum\limits_i \sqrt[3]{\mu_{in}^2} \cdot W_{in} \cdot W_{in^3}}{\sum\limits_j \sqrt[3]{\mu_{in}^2} \cdot W_{jn} \cdot W_{jn^3}}, \qquad (4)$$

can be written as:

$$\lambda = \lambda_o \frac{\sum\limits_i \sqrt[3]{\mu_{in}^2}}{\sum\limits_j \sqrt[3]{\mu_{jn}^2}} \cdot \frac{\sum\limits_i W_{in}}{\sum\limits_j W_{jn}} \cdot \frac{\sum\limits_i W_{in^3}}{\sum\limits_j W_{jn^3}} \qquad (5)$$

From the given formula it can be seen that by comparison of each of the factors included in formula (5) it can be determined on which side and according to which quantitative and qualitative indicators there are advantages and shortcomings; how the latter can influence the course of an operation; what measures have to be taken to change the correlation of forces to one's own advantage and successfully accomplish the assigned mission; and the methods for making best use of resources. This is an obvious merit of the formula and the methodology in the aggregate.

In formula (4) coefficients $\sqrt[3]{\mu_{in}^2}$ and $\sqrt[3]{\mu_{jn}^2}$ designate the area of destruction of the shock wave for components of combat equipment. Additionally, they characterize the quantity of delivery vehicles and the power of their nuclear charges. In our view, for a more complete evaluation the area of combined destruction of personnel S_{in} and S_{jn} can be taken from the nuclear weapons of various yields.

Coefficients W_{in} and W_{jn} shown in formulas (4) and (5) express the capability of means to overcome the antiair (antispace) defense of the enemy. These characteristics, of course, can themselves serve as a

qualitative measure for evaluating the effectiveness of air defense means. Coefficients W_{in}, and W_{jn}, of those same formulas can also be used to determine the capabilities of the means for completing takeoffs, launches and flights. They should be considered, as should the qualitative characteristics of durability of means of nuclear attack.

In individual cases in computing the expression

$$\frac{\sum_i \sqrt[3]{\mu_{in}^2 \cdot W_{in} \cdot W_{in^3}}}{\sum_j \sqrt[3]{\mu_{jn}^2 \cdot W_{jn} \cdot W_{jn^3}}}$$

in the form of two terms separately for active and passive targets one can also determine the effectiveness of destruction of nuclear means.

In our view the method proposed by Maj Gen I. Anureyev, with some additions, can be used successfully for calculating the correlation of forces in nuclear weapons for operations on a large scale and also for planning a first nuclear strike, as well as for accomplishing other specific missions.

Engr Col N. Bazanov and Lt Col Ye. Orlov

* * *

In his article Maj Gen I. Anureyev adheres to the broad concept "correlation of forces," with the implied meaning of the correlation of all the combat capabilities of belligerent armed forces participating in an operation at a given moment. The aut' or proposes that account be taken of combat personnel, the capabilities of control systems and the comprehensive support of combat operations, that is, in essence, all the numerous factors which determine the actual combat might of the belligerents.

On the theoretical plane one can agree with the proposed method. It is, without reservation, of scientific interest and is a definite step forward in the theory of the question being studied. However, theoretical research is most useful when it can be applied in practice. In the given case this is a doubtful possibility even with the use of computers, since it is practically impossible to collect in the time required that great quantity of initial data on friendly troops, and especially on the enemy, which is required to make the calculations proposed by the author for calculating the correlation of forces of belligerents at each given moment.

The author offers an appropriate formula for determining the correlation of forces in nuclear weapons. At first glance it creates a favorable impression by its simplicity, but after a closer look it is evident that the simplicity is illusory. For the disclosure of its individual indicators, for example, using the words of the article's author, "the probability of not

destroying delivery vehicles on the ground," additional calculations are required.

Also giving rise to objection is the specially designated method for determining the correlation of forces on the strategic scale. In the opinion of the author it consists of determining the most effective variant for making the first nuclear strike both in regard to the time of the attack and also to the distribution of targets among nuclear attack resources. In our view the purpose of this method should have been narrowed down in the given case to the optimum variants of destruction of only the nuclear means of the enemy, and not to all important objectives in general which do not directly employ nuclear weapons and referred to by the author as passive. The destruction of such objectives by a nuclear weapon will be reflected primarily in the disruption of the entire military potential of the enemy, and not just in his subsequent employment of strategic nuclear weapons. In our opinion calculating the influence of their destruction on the employment of nuclear weapons available at the start of a war can hardly be accomplished with the aid of mathematical methods, even with the availability of the most detailed model of armed combat.

If one were to agree in principle with the author's proposed method for determining the correlation of forces in nuclear weapons on the strategic scale, then it would be logical to extend it to the operational-tactical scale as well. Moreover, a similar method should also have been used for calculating the correlation of forces for other means of combat—aviation, artillery, tanks, etc. However, this is not very expedient.

The fact is that calculations on the strategic scale are accomplished prior to the start of a war and are based on comparatively slowly changing initial data. In the process the factor of time does not limit the preparation of calculations. It is a different matter with calculations on the operational-tactical scale. Here time plays a decisive role, and the character of initial data, depending on the situation, will be most variable as a result of rapid changes in the situation. Account must be taken of the great difficulties involved in the collection of essentially countless indicators required for the computations. Therefore at operational-tactical levels the requirement for maximum simplicity in the method of calculating the correlation of forces is considerably greater than on the strategic scale. For determining the correlation of forces of belligerents in strategic weapons and other means of combat involving large units and groups of units a fundamentally different method is necessary.

What indicators are required for calculating the correlation of forces of belligerents in nuclear weapons at operational-tactical levels? They can be divided into two groups, related directly to nuclear weapons and concerning the means of their delivery.

The combat capabilities of nuclear weapons, as is known, are characterized first and foremost by the power of the nuclear charges and their quantity. Therefore, in the computations, account should be taken not only of the total TNT equivalent, but also of its distribution among the individual types of munitions, and also of the portion of the TNT

equivalent delivered by carriers of various types inasmuch as the latter have different capabilities for overcoming the enemy defense.

In regard to the means of delivering nuclear weapons, the applicable required data include the quantity of delivery means of various types (missile launchers, aircraft, etc.), their firing efficiency, effective range, extent of dispersion, and the probability of overcoming the antiair and antimissile defense of the enemy.

There is no need to make a special accounting of the characteristics of control facilities and technical support, since, as a rule, they are reflected in the characteristics of the delivery means, in particular in their firing efficiency. For example, if the technical firing efficiency of a given means of delivery of nuclear weapons is three hours, and the control system (target reconnaissance, making the decision and assigning missions to means of delivery) makes it possible to insure repeat attacks only within four hours, then the firing efficiency should be calculated initially as four hours. This method simplifies completion of computations.

Such comparatively few indicators, if they are included in the formula where their mathematical function is determined, in general outline will characterize the correlation of forces of belligerents in nuclear weapons. The search for such a formula is very complex. However, it should sufficiently fully reflect the main factors in the correlation of forces under consideration and be convenient for practical use in a real combat situation.

It seems to us that, along with the expanded interpretation of the concept "correlation of forces," it is advisable to develop a more limited interpretation, considering in the appropriate calculations only the main factors influencing the combat capabilities of troops. In the process the method of determining the correlation of forces of belligerents is considerably simplified, even though there is a reduction in the accuracy of calculations. It is important not to simplify the method excessively, that is, take into account only the quantitative side and refrain from calculating the qualitative characteristics of the means of destruction. A comprehensive calculation of the capabilities of means of destruction insures sufficiently accurate results in the correlation of forces. Such an approach, it seems to us, will certainly prove its value.

On the whole the article by Maj Gen I. Anureyev deserves serious attention, since it provides a number of important initial propositions for the successful solution of the problem we are studying.

Col L. Semeyko

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Course on Military Superiority [*Red Star*, March 24, 1979];
The Secret Aims of the Pentagon [*Red Star*, September 15, 1978];
The Neutron Gamble of the Pentagon [*Red Star*, February 10, 1978];
Taking into Account the Realities of the Nuclear Age [*Red Star,* March 25, 1977];
and many others.

Note

1. *Voyennaya mysl'*, No. 8, August 1968, FPD 0019/70, 30 March 1970. [Responses to the article by Maj Gen Engr-Tech Serv I. Anureyev, "Determining the Correlation of Forces in Terms of Nuclear Weapons," *Voyennaya mysl'*, No. 6, June 1967, FPD 0112/68, 11 July 1968, pp. 35–45.]

The Maneuver of National Air Defense (PVO Strany) Forces[1]

Col N. Svetlishin

The problems of deploying and maneuvering PVO personnel and equipment have been discussed in this journal before.[2] But they have been discussed primarily as applicable to ground force operations. We in turn should like to comment on deployment maneuvering of domestic-assignment antiaircraft defense equipment and troops, focusing our attention chiefly on the specific features of these troops in comparison with other branches of the Armed Forces.

As is well known, the PVO **Strany** [domestic (fixed) target air defense (as opposed to PVO units attached to combat units)] troop grouping, in contrast to the **voyskovaya** PVO [troop air defense], is of a rather stable nature, and the bulk of forces are massed to cover the most important areas. The enemy, however, is relatively free in choice of direction and target of air attack. For this reason, events may so develop during the course of repulsing an air attack that the PVO manpower and equipment development prior to the attack will not sufficiently meet the current situation. It will be necessary to beef up defenses in certain areas or around certain targets; at the same time some covered targets will lose their importance, and a PVO troop grouping may be broken up as a result of missile strikes or enemy air attacks. As a consequence of this, PVO Strany troops, during the course of combat against aerial attack should be constantly prepared to regroup and redeploy their personnel and equipment. A skillful maneuver may play a decisive role in gaining victory in combat and in performing PVO missions.

The primary objectives of PVO Strany troop redeployments may be the following: concentration of effort in the main path of enemy air attack in order to cause maximum damage to the enemy and afford better protection of major targets; restoration of combat capability to a grouping depleted or disrupted by enemy strikes; antiaircraft cover for military air transports when flying through a PVO unit's defense zone; bridging the gap between PVO Strany troops and troop PVO, which may be created during the course of military advance, and organization of the defense of new targets (areas). A maneuvering action may also have the objective of removing PVO troops from under the brunt of attack. Maneuvering action can also secure optimum deployment of PVO forces for continuous

interdiction during the entire course of a bombing mission (when missions are flown against targets far to the rear).

Depending on the objectives of the manuever and the composition of the manpower and equipment involved therein, it may be tactical, operational, as well as strategic.

The tactical maneuver is organized by formation commanders for the purpose of creating favorable conditions for the execution of combat missions. This type of maneuver includes retargeting fighters in the air, maneuver with firepower and combat formations of ground PVO units. The tactical maneuver will be executed most frequently within a regrouping of manpower and equipment defending a specific target (or group of targets).

The operational maneuver is organized by a field force command for the purpose of shifting troop efforts from one area to another or to remove troops from under an enemy attack, as well as in border (front) field forces, to cover areas (targets) which up to the initiation of an offensive operation had been defended by troop PVO. The maneuver may start as the enemy's intentions begin to become clear, that is, when the areas are determined in which the enemy will concentrate his main efforts. This circumstance is naturally connected with a certain amount of risk and requires a solid forecasting of the character of possible enemy actions for a precise determination of time to initiate the maneuver.

A strategic maneuver by PVO Strany troops is executed on orders from the Supreme Command. It will be executed under conditions of radical change in the overall strategic situation. In particular such a maneuver will obviously be necessary if the PVO grouping which is protecting an important area is rendered ineffective as a result of a mass enemy attack or if changes take place during the course of a war in the location of military-industrial targets, particularly following nuclear attacks.

A PVO Strany troop maneuver may take place in the form of transfer of units and subunits into new areas (to new airfields) or by shifting efforts without shifting base (airfield) location of units and formations. The choice of form of maneuver will depend on the tasks and conditions of its execution and will require of command and headquarters a profound penetration into the current situation and a projection of its possible development.

In the final stages of the Great Patriotic War large-scale redeployment of PVO Strany troops was effected chiefly by moving forces in the directon of the front by taking them off targets far to the rear. For example, in order to increase defense of rail junctions, communications and other important targets along the 1st and 2nd Ukrainian fronts, which were subjected to regular air attacks, between 15 April and 1 June 1944, two fighter divisions, 14 antiaircraft artillery regiments, 26 separate antiaircraft artillery battalions, two antiaircraft machine gun regiments, and other units were transferred from rear areas along the Southern PVO Front.[3]

The positive side of deployment from the rear was the fact that the general air defense system for targets along the front, where enemy air activity was highest, always preserved a high level of combat capability. At that time such a deployment maneuver was the most efficient. This was caused by the fact that enemy bombers had a limited range and the boundary of the endangered zone constantly receded in the direction of the front as ground forces advanced.

Nowadays the possibility of deploying PVO Strany troops from the rear to protect targets along the front seems doubtful. The intercontinental nature of air attack weapons will make it impossible to remove PVO units from protecting important areas to the rear, even if the ground troops are able to effect a successful strategic offensive in one or several theaters of operations.

One must assume that in modern warfare concentration of PVO Strany troop efforts in the main areas during the course of operations and battles can be achieved chiefly by maneuvering deployment from secondary areas of fighter units and formations, primarily units of long-range missile-carrying fighter interceptors. Restoration to combat effectiveness of a PVO Strany troop grouping diminished as a result of nuclear strikes or enemy air attacks can be effected by regrouping personnel and equipment collected from targets which have lost their significance, as well as by drawing upon ready reserves.

As concerns the problem of bridging the gap between PVO Strany troops and troop PVO during an offensive, it can obviously be resolved primarily by utilizing PVO formations created as Supreme Command reserves.

A unique form of PVO deployment is represented by fighter operations from special interceptor scramble airfields and the application of "migrant" subunits of antiaircraft missiles and artillery along "favorite" enemy air approach routes. This form of deployment was extensively employed by PVO Strany troops during the Great Patriotic War. In February of 1944 the 106th Fighter Aviation Division command set up several fighter ambushes in the principal areas of Nazi air activities for the purpose of attacking lone reconnaissance aircraft in the Smolensk area. This technique resulted in the rapid downing of 13 enemy reconnaissance aircraft piloted by experienced fliers.[4]

Good results from employing fighter ambushes and "wandering" antiaircraft artillery units have also been achieved in PVO operations by the Democratic Republic of Vietnam. This indicates that such a form of PVO deployment maneuver, particularly when there is a shortage of PVO forces, may also be employed in the future.

The nature and scope of PVO Strany troop deployment maneuvers in a concrete situation will be determined primarily by the potential of the types of units themselves and special troops.

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Combat experience and war games indicate that the effectiveness of a deployment maneuver during combat depends in large measure on the degree to which the necessity and possibility of executing a given maneuver have been taken into consideration, as well as all situational conditions and the nature of the combat operations, as well as a carefully elaborated plan. During organization of an air defense system, the foundation of a PVO Strany troop grouping should contain the idea of extensive deployment maneuvering, taking into consideration the combat characteristics of each type of PVO unit.

An air defense plan should contain a specific elaboration of all matters connected with organizing and executing a deployment maneuver. In particular it is essential to indicate what maneuver is projected, in what direction and with what forces, depending on possible variants of enemy action: how to utilize reserves and bring them up to strength; measures to ensure logistical support during the deployment maneuver.

One must emphasize, however, that neither thorough preparation for a maneuver, or availability of adequate PVO forces and reliable information on the size and deployment of enemy air attack potential fully guarantee the success of a maneuver by PVO Strany forces without prompt discovery of the enemy's intention and the nature of his subsequent actions. In the process of attacking targets the enemy will always endeavor to confuse the PVO command by feints and diversionary actions. This is quite graphically illustrated with instances from World War II.

On 20 February 1944 the 8th U.S. Air Army, conducting a raid from bases in England against targets in the Leipzig area, sent a first wave of 300 bombers across the North Sea and Denmark toward the German border in order to deceive German air defenses. Detecting American aircraft in flight and assuming that these bombers would turn toward Berlin, the German command not only put their fighters in Northern Germany on combat alert but shifted additional forces from the South as well. Eighty minutes later the first wave was followed by the main bomber force—700 aircraft, which headed straight across Holland toward Leipzig targets. Spotting this new wave, the German command ordered the fighters which had been shifted north to turn around. But they were unable to carry out their mission, since they were almost out of fuel by the time they engaged the American bomber force. Subsequently, assuming that the principal bomber forces would return by the same route, the Germans scrambled all available fighters. But the bombers turned to the southeast and evaded the fighter attack. By the time the German command had discovered the intentions of the bombers and had directed their fighters toward the south and west, the bombers were already on the way home. Only a few German fighters succeeded in catching up with the tail end of the bomber formations over the English Channel and caused only insignificant losses.

In this case the German command had the opportunity to utilize more than 1,000 combat-ready fighters against the American bombers. Although the German radar detection system operated flawlessly and

although the bombers were within interceptor range, only 100 aircraft actually made the intercept, and their attacks had little effect.

One can conclude from the above example that when PVO Strany efforts are focused in one area at the expense of neighboring areas, one must have a guarantee against all contingencies. One must therefore have a constantly available reserve of personnel and equipment, and the deployment maneuver itself must be executed rapidly enough for the maneuvering forces to be promptly and effectively brought into action to repulse an enemy attack.

One important condition for the success of a deployment maneuver executed by PVO Strany forces is a comprehensive knowledge of air defense penetration techniques employed by the enemy. Principal techniques are penetration on a broad or narrow front, as well as simultaneous combination of these two methods.

One must assume that, even when attacking along a broad front, the enemy will endeavor not to dissipate his forces but will maintain a principal grouping into the most important areas in order to achieve superiority over PVO troops. The latter must of course deploy into these areas. In connection with the limited possibilities for deployment maneuver along a front (in order not to expose other areas), the force of the strike by PVO troops against principal enemy aircraft groupings may be amplified by fighter aircraft deployment from areas to the rear, drawn either from the second echelon or reserves.

In case of enemy penetration along a narrow front, PVO forces located in this area will obviously in the initial stages of battle not possess sufficient capability to destroy the enemy. Under these conditions primary responsibility will fall on those forces directly located in the area of enemy operations. It is quite obvious that if a PVO troop deployment maneuver is not promptly executed into this area, there may be a danger of premature exhaustion of defense forces in the area (particularly fighter interceptors) before the first attack waves have been repulsed. In such a situation an augmented action against the enemy will require skillful maneuvering of fighters based along the flanks of the penetration strip, chiefly with fighter harassment along the entire path to the target. In addition, the PVO grouping in the main area may be reinforced by temporary rebasing of units from adjoining areas.

In executing a maneuver it is important to consider weather, the radiation situation, and time of day or night. In a number of cases these factors are of decisive influence on a PVO maneuver, particularly with fighter aviation. When shifting to night operations it is frequently necessary to rebase fighter interceptors. Prompt redeployment (regrouping) of fighters from areas where adverse weather is expected (or where a high radiation level is projected) to fields with suitable weather (or favorable radiation situation) will reduce the number of inactive units when the enemy attacks under poor weather or radiation conditions.

Restricted opportunity and the difficulty of executing a deployment maneuver (particularly by ground PVO units) during the course of combat

operations brings out in sharp relief the matter of prompt creation of reserve manpower and equipment available to the PVO Strany troop operational command.

In this connection it is essential to emphasize that deployment of ready reserves was of great importance during World War II. Skilled utilization of reserves made it possible for the operations commands to handle newly arising tasks in a flexible manner. In the latter half of 1943 PVO was rapidly organized for targets along the front in the southern part of the country, immediately behind the advancing ground forces.

Assigned to the Donbass PVO Corps Region from the reserves of the Western Front PVO command was control of the 3rd Detached Brigade and PVO combat units assigned to protect targets on as-yet unregained territory. Assigning the task of protecting targets in the Eastern Donbass to this brigade and temporarily placing a number of units under it, the command and corps region headquarters moved up to Dnepropetrovsk, from where they continued to direct the units covering the Dnepr crossings and important road junctions and communications along the front.

It is clear that PVO Strany reserve units will be equally important under modern conditions. They are primarily for the purpose of handling tasks which develop unexpectedly. The availability of reserves in the hands of the operations command will in particular make it possible to quickly restore the effectiveness of PVO units, particularly after enemy nuclear strikes, as well as preventing the forming of a gap between PVO Strany forces and ground troop PVO during an offensive operation.

Without antiaircraft missile troop and fighter reserves it is also inconceivable to provide air defense for a major airborne operation at the point of origin and during flight to the drop zone. It is not always possible to handle these matters within the general domestic target air defense system, since it will be necessary to simultaneously protect a large number of targets (that is, various sized units of airborne troops and military transport aircraft) deployed over a considerable area. This is particularly difficult, since the target as a rule will not be combined with stationary targets protected by PVO Strany troops. While fighter aircraft can be used to escort transports carrying airborne troops, the troop deployment areas and departure airfields (considering organization of direct coverage) can be protected only by supplementary assignment of antiaircraft missile and artillery units (or subunits).

Various sized units of all types of PVO forces can be assigned to the reserve.

An air reserve may consist of various sized fighter units located either at permanent bases or at temporary deployment fields. The air reserve is assigned and utilized by order of operations command.

A radar and radio troop reserve can be set up in both operational and tactical units. It includes radio subunits, radio unit control entities and separate radar stations, which can be either widely deployed or concentrated at primary or reserve positions, as well as concentrated on trucks or in designated deployment areas.

A communications reserve is as a rule created in an operational element. It includes subunits and individual communications gear.

An antiaircraft missile troop reserve can in our opinion be established only in large antiaircraft groupings by assignment of the most highly mobile antiaircraft missile units and subunits. These units and subunits should be fully set up for immediate action or movement to a new area.

The reserve is used partially or in full, depending on the specific situation. The procedure of its utilization (bringing into combat) depends on the location and status of the units (or subunits) of which it is composed, the nature of the actions and intentions of the enemy, as well as the potential for restoring the reserve to full strength.

Of course, in the dynamics of combat operations the greatest effect will be achieved by putting into play reserve units and subunits which are not deployed and which are not being used for target protection. But the operational command will apparently not have enough such available reserves, since there always exists the tendency to at least temporarily reinforce coverage on the most important targets.

Therefore in cases when reserve subunits and units are employed for additional temporary target coverage, the command and PVO troop headquarters must carefully work out ahead of time measures for the rapid mobilization of these units and prompt deployment maneuvers into the required area.

Successful solution of the problem of creating PVO reserves represents one of the important conditions for flexible maneuvering of PVO Strany forces within the framework of battle dynamics, and consequently the most effective task executed by these forces.

Surprise and maneuver are closely interconnected. On the one hand the maneuver is a means of achieving surprise, and on the other surprise creates the optimum conditions for successful maneuver execution. In order to execute effective strikes against an enemy in the air it is essential to take every step to conceal the maneuver (camouflage, fake troop movements and operations, dummy targets, etc.). The scale and types of measures executed for the purpose of keeping the enemy unaware of a maneuver are directly dependent on the quantity and composition of personnel and equipment participating in the maneuver.

In all cases a PVO Strany troop maneuver should be executed in close coordination with neighboring forces, as well as with consideration of the utilization of the PVO facilities of the Ground Forces and Navy. Definitely of major importance will be prompt and precise information from neighboring forces on the location of the units executing the deployment maneuver.

In practical terms this can be achieved by detaching operational groups (representatives) from PVO Strany field forces (or formations) for duty in corresponding operational headquarters (command posts) of ground forces (or naval forces), the establishment of coordinated radio communications, as well as hookup into appropriate command and warning networks.

Successful execution of a PVO Strany maneuver will be promoted by anticipatory execution of such measures as preparation of airfields for fighter redeployment, positions and roads for antiaircraft missile and radio troop redeployment, organization of unit command posts during the redeployment maneuver and in the new areas of deployment, as well as stockpiling in these areas the requisite stores of supplies.

Airfields designated for fighter redeployment should be maintained in continuous operational readiness to receive the new arrivals, as well as comprehensive support and supply for various types of fighter units (or subunits). They must be assured the necessary stores of ammunition, fuel, replacement parts, as well as command facilities with appropriate radar equipment, service and maintenance equipment for airfield operations. The new deployment areas selected for antiaircraft missile and radio troops should be properly equipped with service facilities and communications equipment, and roads to be used during the redeployment maneuver should be properly prepared.

Implementation of these measures unquestionably involves certain difficulties and in turn will require additional supply and service personnel and equipment. It is obviously advisable to carry out some of these measures (such as preparing standby airfields, roads, control points, stores of supplies, etc.) in peacetime, while when hostilities begin those actions which could not have been taken earlier will be executed, including restoration to operational effectiveness of whatever was damaged (destroyed) by enemy attacks.

Unit headquarters constitutes the principal organizer of all measures for support and supply of a redeployment maneuver. The headquarters staff should prepare several variants of a maneuver, in detail and well ahead of time, providing for the sequence of execution and measures to exercise troop direction, support, and supply. The most important duty of headquarters during execution of a redeployment maneuver is maintenance of continuous and precise troop direction, particularly fighter aviation. They must constantly verify the readiness of the command posts of their units (or subunits) to assume direction of the fighters of neighboring units when operating at full range.

A PVO Strany troop redeployment maneuver is a complex operation which requires thorough preparation by commanding officers and staffs at all levels, as well as a high degree of personnel training and coordination between different types of PVO units and subunits.

The intense, swift, and dynamic nature of combat against an enemy in the air places extreme demands on the psychological preparedness of PVO Strany personnel. Discipline and organization constitutes a major factor which even in the most complicated situation guarantees a high degree of mobility and combat capability of various sized units, and consequently preparedness for prompt execution of a redeployment maneuver.

In conclusion we should emphasize that it is becoming more and more difficult to execute a PVO Strany redeployment maneuver due to changing

conditions, the more dynamic nature and rapidity of combat operations. This indicates the particularly vital nature of this problem, as well as the fact that it can be successfully handled only with a thorough study, finding new and effective forms of redeployment maneuver and comprehensive troop support and supply.

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Troops of National Air Defense (1968);
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Notes

1. *Voyennaya mysl'*, No. 9, September 1968, FPD 0115/69, 16 December 1969.
2. *Voyennaya mysl'*, No. 9, September 1965, pp. 19–17; *Voyennaya mysl'*, No. 1, January 1965, pp. 41–49.
3. *Arkhiv MO* [Ministry of Defense Archives], Fund 205, List 201056, File 3, Sheet 25.
4. *Arkhiv MO*, Fund 206, List 210367, File 21, Sheet 131.

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