

1/16/2006

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[Redacted]

[Redacted]

COUNTRY : USSR

SUBJECT : MILITARY THOUGHT (SECRET): "On the Development of the Theory of the Combat Employment of Front Aviation in the Postwar Period", by Lieutenant-Colonel N. Reshetnikov.

DATE OF INFO : August 1961

APPRAISAL OF CONTENT : Documentary

SOURCE : A reliable source (B).

Following is a verbatim translation of an article entitled "On the Development of the Theory of the Combat Employment of Front Aviation in the Postwar Period", by Lieutenant-Colonel N. Reshetnikov.

This article appeared in Issue 5 (60) of 1961 of a special version of the Soviet journal Military Thought which is classified SECRET by the Soviets and is published irregularly. Issue 5 (60) was sent to press on 25 August 1961. [Redacted] contained the Table of Contents for this issue.

[Redacted] Comment: Military Thought is published by the USSR Ministry of Defense in three versions, classified RESTRICTED, SECRET, and TOP SECRET. The RESTRICTED version has been issued monthly since 1937, while the other two versions are issued irregularly. The TOP SECRET version was initiated in 1960. By the end of 1961, 61 issues of the SECRET version had been published, 6 of them during 1961.

APPROVED FOR RELEASE  
DATE: DEC 2004

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ND: Excellent  
History.  
Probably the best  
available for  
1950s.

MILITARY HISTORY DEPARTMENT

On the Development of the Theory of the Combat Employment  
of Front Aviation in the Postwar Period

by

Lieutenant-Colonel N. Reshetnikov

All previous historical experience shows conclusively that military affairs develop in accordance with the economic level of this or that country. This objective regularity in the development of military art is characteristic of all social-economic structures.

The swift growth of the economic might of our country and the rapid development of Soviet science and technology have made it possible to introduce atomic and thermonuclear weapons, jet and missile, radioelectronic, infrared, and other completely new equipment into the armament of our army. This has led to the qualitative transformation of all types of armed forces and arms of troops and of their operational and tactical capabilities, to the appearance of new types of armed forces and arms of troops, to a change in the relative proportion and the significance of various types of forces and arms of troops. All this calls for substantial changes in the theory of conducting offensive operations and, in particular, in the theory of the combat employment of aviation in these operations. Therefore, when working out questions connected with the combat employment of front aviation in an offensive operation by the troops of a front, one must begin with an analysis of the modern means of armed combat, and of the employment of these means in accordance with their operational and tactical capabilities.

ML on  
war & Army

In the postwar development of the theory of combat employment of front aviation in offensive operations by the troops of a front, there were, in our opinion, three periods: the first period was from May 1945 to October 1953, the second, from November 1953 to 1958, and the third period began in 1959 and has continued until the present day.

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The dividing lines between the periods indicated are the times at which completely new combat weapons were introduced in mass quantities - nuclear weapons and missiles, which lead to a radical change in military affairs and, specifically, in the combat employment of aviation.

Characteristic of the first period were the crystallization into theory of the wealth of experience of the combat employment of aviation in offensive operations during World War II and the transition from the piston engine to the jet engine, which represented a qualitative leap in the development of front aviation, in operational methods and in the nature of its employment in a battle or an operation.

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The years of the first stage of the first period have very great significance for the operational art of the Air Forces (Voyenno-vozlushnyye sily), because it was mainly during this period that the practical results obtained in offensive operations by the troops of fronts during the years of World War II on the most important questions of the combat employment of aviation were crystallized into theory: - protection for troops and objectives of the front rear area against air strikes; the attainment and retention of superiority in the air; air preparation for an attack when breaking through the enemy defense; air support for advancing troops; support for mobile groups of armies and fronts; cooperation with troops in the liquidation of large encircled groupings of the enemy, in routing his withdrawing troops, and in combatting his reserves. During these years, the theory of the combat employment of jet aircraft was being developed together with that of joint operations with piston-driven aircraft. At the same time, theoretical investigations and practical and experimental research in the field of new types of weapons and means of destruction were being conducted steadily and purposefully.

All these questions of the combat employment of aviation were embodied in various regulations and instructions. However, the development of aviation technology of means of mass destruction, and of missiles of various designation, soon made necessary a radical revision of the majority of the

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above-mentioned regulations on the combat employment of aviation in an offensive operation, because of their obsolescence and their failure to correspond to the level of development of the materiel base of aviation which had been achieved by this time.

In October 1953, maneuvers were carried out in the Carpathian Military District in which all arms of ground troops and aviation took part. At these maneuvers, for the first time in the postwar period, nominal use was made of new means of combat and, specifically, of atomic weapons. In November of the same year, an order was issued by the Minister of Defense of the USSR on the training of the armed forces for operations employing atomic weapons. These events marked the beginning of the second period in the development of the theory of the combat employment of aviation in offensive operations.

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Point

The experience of history shows that weapons of destruction are one of the decisive elements in a battle or an operation. Atomic and then thermonuclear weapons immeasurably raised the significance of fire effect (ognevoye vozdeystviye) by aviation in a battle or an operation. The new quality of this activity of aviation began henceforth to show itself in a tremendous increase of force and effectiveness.

Remember the  
IL-28  
Beagle  
(Front Bomber)

Since an aircraft was at that time the only developed means of armed combat which could carry a load, was maneuverable and had a long range, it became the exclusive delivery-vehicle for nuclear weapons. At first the nuclear weapon was regarded only as a weapon of the Supreme High Command, and the basic means for its delivery to the target was long-range aviation (dalnaya aviatsiya). However, the formation of special units (large units) of front bomber aviation, too, soon began. Already by 1954 a whole series of drafts (proyekt) for manuals on the special features of the conduct of combat operations by large units of front and long-range aviation, when nuclear weapons were being employed, had appeared, together with drafts for manuals on the combat employment of units of special aviation and of

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large units of long-range and front aviation.

Aviation, which remained one of the long-range weapons throughout the whole of the first and second periods, in full accordance with the basic tenets of the theory of conducting a deep offensive operation, developed vigorously and continuously. Already by the end of the first period the relative proportion of aviation in the Soviet Armed Forces had increased by approximately four times. At this time it was considered that the air army of a front could consist of 3 or 4 fighter, 1 or 2 bomber and of 1 or 2 attack air corps (shturmovoy aviakorpus); a total of 5 to 8 air corps (15 to 24 air divisions) with a corresponding aircraft pool (samoletnyy park) of 2900 to 4600 combat aircraft.

In the second period, because of the presence of nuclear weapons as armament, a tendency toward a reduction in the combat composition of the air armies of front aviation made itself felt, but the growth of bomber aviation did not cease, because in 1956, when attack aviation was abolished as an arm of the air forces, its regiments and divisions were transferred to the complement of bomber aviation.

In the middle of the second period, a front aviation air army included 13 to 16 air divisions (8 to 10 fighter divisions and 5 or 6 bomber divisions), and, by the end of the period, it included 9 to 12 air divisions (5 or 6 fighter divisions, 1 or 2 fighter-bomber divisions, and 3 or 4 bomber divisions). By the end of the second period the role of fighter-bomber aircraft had begun to increase greatly because of the possibility of using them as a means for the delivery of nuclear weapons against operational objectives.

One can say that the origin of fighter-bomber aircraft in the composition of the Soviet Air Forces, as an arm of aviation, also dates back to 1956. In accordance with a directive from the Minister of Defense of the USSR, all air attack regiments and divisions were transferred to the complement of bomber aviation. However, in elaboration of the directive we have mentioned a directive by the chief

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of the Main Staff of the Air Forces was issued, announcing that until the introduction of bomber aircraft into the armament of these regiments and divisions (during 1956-1958) their training was to be conducted, according to the program for fighter-bombers, on MIG-15-bis fighter aircraft.

While at the beginning of the development of nuclear weapons, the only means for their delivery to the target were first aircraft and then artillery, highly diverse delivery vehicles soon appeared: shells for mortar and rocket artillery, antiaircraft guided missiles, guided missiles and free rockets for fighter aircraft, "ground-to-ground" and "air-to-ground" cruise-missiles (samolet-snaryad), ballistic and cruise missiles (krylataya raketa), missile-carrying submarines, etc. Nuclear weapons, having become an integral part of the equipment of all types of armed forces and arms of troops, exercised a decisive influence, both on the nature of offensive operations and on the nature of the combat activities of front aviation in these operations, since they are one of the main weapons of modern armed combat and because their potentialities are now incorporated in the basis of the planning and conduct of offensive operations.

In 1954 combat ballistic missiles were introduced into the armament of the ground troops of the Soviet Army. The basic regulations for their employment were laid down by an order of the Minister of Defense of the USSR dated 23 March 1955. In 1957 front aviation began to be armed with cruise missiles (krylataya raketa) which supplemented the combat capabilities of front bomber aviation.

With the introduction of operational-tactical ballistic missiles as armament for the ground troops and of cruise missiles as armament for front aviation, these missiles began to perform some of the tasks which belonged formerly to aviation, and primarily to bomber aviation. As a result, the tasks of bomber aviation started to change and a division of targets (operational objectives) between it and the missiles took place.

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From that time on front bomber aviation<sup>1</sup> gradually lost its exclusive position in the delivery of nuclear weapons against operational objectives in the operational depth of the enemy defense. This task began to be performed jointly by bomber aviation, cruise missiles and operational-tactical ballistic missiles.

As stocks of nuclear weapons were built up and as the production of missiles was mastered and they were introduced on a large scale into the armament of the army, missiles, as the most economical and effective means for the destruction of a whole series of the most important deeply sited enemy objectives, became the basic vehicles for nuclear weapons. Such conditions were prepared for by the whole course of development of the materiel base and of military equipment, by the end of 1958.

*Nucs  
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short  
supply  
until  
1958.*

The third period of development in the theory of combat employment of front aviation in operations started at the beginning of 1959. The establishment of missile troops and missile artillery in the composition of the troops of a front determined the volume and constituents of the tasks assigned to front bomber aviation, and led to a still greater diminution in the relative proportion of the composition of the air army which it represented. This applied to an equal extent to fighter aviation in the questions of protection of troops and of objectives in a front's rear area in connection with the introduction of guided anti-aircraft missiles (ZURS) into the armament of organic (voyskovoy) anti-air defense (PVO- protivovozdushnaya oborona) and the establishment of anti-aircraft missile troops. Describing the profound changes in the armament of the Soviet Army, N.S. Khrushchev declared at the 4th Session of the Supreme Soviet of the USSR, that our country has powerful missile equipment and that military aviation has lost its previous significance with the modern development of military equipment.

Thus, the development of the armed forces in the postwar

1. It should be kept in mind that the author is not examining /a few words missing/ aviation in an operation.

-7-

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years is distinguished by three important features - the introduction to the armed forces of jet engines, nuclear weapons and ballistic missiles. Of these, the introduction of nuclear weapons is the outstanding event, because this is a fundamentally new and very formidable type of weapon which determines and will determine the nature of offensive operations, the methods for their conduct, and the methods for the use in them of front aviation.

The essentials in the development of the successive stages of the theory of combat employment of front aviation in the postwar years were, therefore, the development of the theory of combat employment of piston-engined and jet aviation, in conditions when conventional weapons of destruction were available as armament; the development of the theory of the combat employment of jet aviation when it had an exclusive position in the delivery of means of nuclear attack on operational objectives; and the development of the theory of the combat use of aviation when operational-tactical ballistic missiles had become the basic means for delivery to the target of nuclear charges.

The combat composition and the relative proportion of front aviation in offensive operations changed continually during the postwar period. In the first period it was intended that there should be many air armies: in individual operations on important operational axes it was even proposed that there should be not one but two air armies in the composition of a front. In the second period, the relative proportion of front aviation was also great and its role as the only long-range weapon and the only means of delivering nuclear weapons to the target grew immeasurably, but there was a perceptible trend toward a decrease in the size of its composition as a result of the increasing scale of the use of nuclear weapons and the improvement in the quality of the aircraft themselves. In the third period, as a result of the introduction on a mass scale of operational-tactical ballistic missiles, front cruise missiles, and guided anti-aircraft missiles into the armament of an army, there has been a sharp reduction in the quantity of front aviation.

NB: Plans for size of SAAF continually scaled back.

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The further development of the theory of a deep offensive operation, which received its greatest practical realization during the concluding stage of World War II, is the characteristic of the postwar period. In the first postwar years, therefore, the tendency to develop, not only bomber aviation, but also such arms as armored and airborne landing troops and the motorization of the infantry were characteristic. Thus, for example, by the end of 1953 there were three times as many armored and mechanized troops in our army as there were during the war. The relative proportion of airborne landing troops increased by several times. In the planning and conduct of offensive operations, the execution of large airborne landing operations was therefore foreseen. All this influenced the combat composition and the combat employment of front aviation, which, when armed with propeller-driven aircraft, was mainly characterized by operations by large groups, air divisions or even an air corps. By Order No. 014 of the Commander-in-Chief of the Air Forces of the USSR, dated 18 January 1947, the air forces were assigned the following tasks for combat training in 1947:

-- fighter aviation, when working out variations for combat with enemy aviation in the air, was to consider, as its basic mission, training for massed operations by an air regiment and an air division for the repulse of raids by large forces of bombers, at medium and high altitudes;

-- the basic task of bomber aviation was training for operations by an air division and an air corps for the delivery of massed strikes in cooperation with the ground troops on the battlefield and in the operational depth;

-- the basic task assigned to the attack aviation was that of training for operations by an air regiment and an air division for the delivery of massed strikes in cooperation with the ground troops.

With the appearance of nuclear, and then missile weapons, even more favorable conditions were created for us for the

-9-

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conduct of a deep offensive operation, but on a completely new, and on a higher technical basis, the well-informed use of which was urgently called for by the directive of the Minister of Defense of the USSR on operational training for 1956. The directive instructed the military scientific cadres and the staffs of formations of all types of armed forces and arms of troops to work toward the comprehensive development of principles on the necessity for the simultaneous neutralization of the entire operational depth of the enemy's defense.

Because of the change in the combat characteristics of aircraft, the transition to jet engines, the introduction of nuclear weapons as armament for aviation, of "air-to-air" guided missiles as armament for fighters and of antiaircraft guided missiles with conventional and nuclear charges as armament for the organic antiair defenses, and as a result of the increased firepower and striking force of the ground troops, the tactics and combat employment of front aviation in the offensive operations of the second and especially of the third period began to be characterized by two features:

-- first, the tactics of all arms of aviation (bomber, fighter-bomber, and fighter aviation), were characterized by operations in open and dispersed combat formations, and by a transition from operations in close, compact combat formations of divisions, then of regiments, toward operations by subunits, flights, pairs and even single aircraft; the basis of the combat formation of a group of bombers, fighter-bombers, and even fighters, was already the delivery aircraft for nuclear weapons and interceptor-fighters with "air-to-air" guided missiles, rather than regiments or squadrons;

-- secondly, the combat employment of aviation was characterized by the gradual transfer of the basic efforts of aviation to the depth, as a result of the increased fire and striking powers of the ground troops, their ability to use atomic weapons against objectives on the battlefield, and, consequently, their increased capability to break through the tactical zone of the defense with their own

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forces at high speeds; this situation, together with the appearance in the operational rear area of various means for the delivery of nuclear weapons to the target, of large reserves of varying designation, and of a variety of radar and radio navigational stations, made it necessary for the main efforts of front aviation to be transferred to enemy objectives located in the operational depth.

Whereas in World War II 6.6 percent of bomber sorties were used for operations against objectives located 50 km or further from the front line, already by the middle of the second period, the assumption was widely made in the classified military press that in a future war the efforts of front bomber aviation might be distributed in the following manner: up to 40 to 50 percent of the sorties to a depth of 50 km from the front line, 40 to 50 percent to a depth of from 50 to 200 km and 15 or 20 percent to a depth of from 200 to 400 km.\*

At the present time, when the process of reevaluating the relative proportion and the significance of various arms of aviation is taking place, such an assumption does not lose its force, in principle, because it is considered that a depth of between 150 and 200 km will represent a zone of independent and joint operations by fighter-bomber aircraft, cruise (krylataya) missiles, organic missile and rocket artillery, and that of over 200 km will be a zone for front bomber aircraft and operational-tactical ballistic missiles.

The above-mentioned circumstances, together with the constantly changing combat qualities of aircraft, exercised a substantial influence on the transformation of the operational significance of the tasks of aviation, on the very constituents of these tasks, on the form and methods of combat operations by aircraft while these tasks were being performed and, particularly important, led to the disappearance of old tasks for aviation and to the appearance of new ones which are performed in support of offensive operations by ground troops.

The basic missions of front aviation in an offensive operation can be considered to be the protection of troops and front rear area objectives against air strikes, combat

\* Collection of Articles of the Journal "Air Force News" ("Vestnik Vozdushnogo Flota") No. /a few words missing/.

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with the enemy's aircraft, the destruction of nuclear weapons and of the means for their delivery, the fulfilment of air preparation and air support for the offensive, the provision of drops (landing) by airborne troops in the enemy's rear area and of support for their combat operations, combat with operational transport and reserves, the disruption of troop control and of the work of the enemy's rear area and aerial reconnaissance.

The task of destroying nuclear weapons and the means for their delivery to the target is a completely new task for aviation, one of primary importance which appeared at the beginning of the second period, and the task of air support for an offensive operation, as it were, a traditional task, which has been carried out by aviation for a long time, is one which, in our opinion, has lost its significance to a considerable degree, as a result of the increased fire and striking capability of the ground troops.

We consider that the decrease in the significance of air preparation for an offensive was already evident by the middle of the second period. The experience of exercises has shown that ground troops with their artillery weapons and with the appropriate organization of artillery preparation for an offensive can create the following densities of neutralization (plotnost' povavleniya) of enemy objectives: up to 90 or 100 percent in the first zone (pozitsiya), up to 40 or 60 percent at the second and up to 20 or 30 percent at the third, 20 to 50 percent of the most important objectives in the tactical depth and up to 100 percent of the artillery and mortar batteries.\*

Since then, the firepower of the ground troops has increased still further, thanks to the introduction as armament of atomic artillery and atomic mortars, and of missile and rocket artillery, and to the increase in the allotment of nuclear ammunition for an offensive operation.

\* Collection of Articles of the Journal "Military Thought"  
No. 7 (31), 1956, page 168.

-12-

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The process of the disappearance of air preparation developed as its constituents changed. First of all, its depth increased and the need grew for the destruction of such objectives as the closest division and corps reserves of the enemy and of their nuclear means. Subsequently, air preparation began to change more and more to air support, which now included operations by aviation not only on the battlefield but mainly beyond its limits, carried out with the goal of neutralizing and containing the nearest enemy reserves, of destroying his nuclear and missile means and of isolating the battlefield from the approach of fresh forces, i.e., mainly operations against mobile objectives, the destruction of which is open to aviation only. Consequently, air support also has a further qualitative constituent, which differs from those of air support for a ground troop offensive in a battle or operation in World War II or during the first postwar period. Without going into details of the conduct of air support, it should be noted that when supporting an offensive, it appears that aviation will also be used to neutralize a whole series of objectives on the battlefield, of which there will be no lack, mainly in cases when missiles and the artillery are lagging behind.

A few words about combat with an enemy air grouping.

In the first and second periods, as in the years of World War II, the rout or weakening of the enemy air grouping was directly connected with the struggle to win superiority in the air. Winning this superiority was one of the main tasks of front aviation, because its attainment was considered to be a necessary condition for successful operations by the ground troops and by aviation itself. This was connected with the fact that aviation was essentially the basic means of air attack (in the first period) and the basic means for the delivery of nuclear weapons against operational objectives (in the second period).

The basic forms of combat for air superiority are air operations, and everyday combat operations by units and large units of front aviation destroying enemy aircraft during the course of operations being carried out by the :

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ground troops. The theory of the organization and conduct of independent air operations, aimed at the acquisition of air superiority, the first foundations of which were laid during World War II, reached full development at this time.

At present, because of the sharp quantitative and qualitative development by the opposing sides of various means of air attack, in particular of ballistic strategic and operational-tactical missiles and also of front cruise missiles, by the expansion of the spatial scope of combat with the missile and air grouping of the enemy, as has already been mentioned in our press, it has become impossible to acquire air superiority. The need to carry out independent air operations in order to acquire air superiority has disappeared and such a task is not assigned to aviation.

Then  
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goes  
away.

However, front aviation has not lost the task of participating in the destruction of the missile and air grouping of the enemy, in the first instance in cooperation with the missile and antiaircraft-missile troops of the front, the Supreme High Command Reserve and long-range aviation, with the goal of disrupting a surprise attack by the enemy and of seizing the initiative.

The basic form of combat for the routing of the enemy's missile and air grouping is now considered to be systematic daily operations by all types of forces and arms of troops, conducted within the framework of front operations, and the basic method of operation is the delivery of strikes against airfields, against the assembly bases and depots of nuclear weapons, against the launching platforms of pilotless weapons, and against radar equipment, and enemy headquarters and control points.

It should be noted particularly that, whereas in the first and second periods, front aviation, which remained the only long-range means of armed combat and the only means of air attack, fulfilled almost all its missions independently in most cases, in the third period, because of the dominant role of operational-tactical missiles and because of the increase in the range of tube and

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rocket artillery and the wide-scale introduction of cruise missiles and antiaircraft guided missiles as armament, front aviation began to perform the above-mentioned tasks, not independently, but in conjunction with ballistic and cruise missiles, and tube and rocket artillery, operating mainly against small and mobile objectives. Air reconnaissance, air support and the transport of troops and materiel supplies into the enemy's rear area by air remain an independent field in the use of front aviation. The conduct of air reconnaissance has become one of the basic tasks of aviation. Its role in the operations of ground troops, of aviation and especially of missile troops has grown immeasurably.

In the third period of the postwar development of the theory of the combat employment of front aviation it was allowed as a proposition that in most cases the combat composition of the air army of a front's aviation must include one division of fighter-bomber aircraft, two or three divisions of fighter aircraft and in exceptional cases one division of bomber aircraft, totaling up to 500 combat aircraft, excluding One word missing.

In our opinion this proposition does not accord fully either with the wide range of tasks which front aviation must perform during an offensive operation by the troops of a front (keeping in mind that front aviation is as yet the only means of combatting mobile enemy objectives), or with the views of our probable enemy on the role and place of tactical aviation in the operation of a group of armies.\*

\* Since we are examining the role and place of front aviation in an offensive operation, let us take, for comparison, the combat composition of the tactical air army of a group of armies of our probable enemy in an offensive. A Tactical Air Army may be composed of 10 to 12 wings of tactical fighters (720 to 864 aircraft), 3 to 4 wings of all-weather fighters (225-300 aircraft), 3 or 4 wings of tactical reconnaissance aircraft (216-268 aircraft) and one wing of tactical cruise missiles (samolet-snaryad); a total of 1161 to 1452 aircraft and of 240 to 360 "Matador" and "Mace" cruise missiles.

-15-

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We are living in the age of nuclear weapons, missile technology and rocket weapons (reaktivnoye oruzhiye). In order to determine the role, place and relative proportion of front aviation in an offensive operation, it is necessary, at least in general terms, to give the characteristics of the basic objectives of the enemy's defense, the destruction of which exercises a decisive influence on the progress and outcome of an offensive operation, and on the basis of an analysis of the positive and negative sides peculiar to modern missiles and antiaircraft-rocket (zenitno-reaktivnyy) troops, and also to front aviation, to solve the problem of the interrelation of these most important types of forces and arms of troops.

In an offensive operation the mission of the troops of a front consists of smashing the enemy's defense, of destroying his main grouping throughout the entire depth of the operational formation and his closest strategic reserves, and of capturing a line whose control creates conditions which are advantageous for the preparation of a new front offensive operation.

The experience of exercises shows, firstly, that the strength and stability of the enemy's defense are based on his reserves of various designations, allotted now in large quantities and echeloned in greater depth, and also on his second echelons (in a modern system of operational defense the second echelons and reserves make up from one-half to two-thirds of all the troops of the defender); secondly, a modern operational rear area is saturated with a very considerable number of objectives of a military and technical nature (airfields, missile and rocket units, radiotechnical means for the control of missiles and aircraft, command points and communication centers, all possible depots and assembly bases for nuclear ammunition, pipelines with pumping stations and points for issuing fuel, etc). There are now, therefore, more troops in the operational rear area than at the front. In these conditions, taking into consideration the need for the simultaneous neutralization of the entire depth of the enemy's defense,

-16-

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the primary role in an offensive operation belongs to the long-range weapons - missiles and aircraft.

The following tasks are foremost in the achievement of success in an offensive operation: the protection of troops and objectives of the rear area of the front; the destruction of nuclear weapons and of the means of delivering them to the target, and combat with the operational transport and reserves of the enemy.

Combat with the enemy's means of nuclear attack is, as has been noted, a completely new task of the first importance. Without making an analysis of the methods for discovering and destroying these means, we wish to point to one very important aspect of this task - its complexity and volume, which is caused by the large number of objectives and by their small size - and in connection with this, to the need to bring in considerable forces and means and to conduct combat without interruption. The total quantity of enemy weapons for nuclear attack in the offensive zone of the troops of a front who are opposed by a group of armies consisting of three field armies, can be characterized by the following data:

-17-

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Means of Delivery and Nuclear Ammunition	End of First Period (1945-1945)	End of Second Period (1954-1954)	Beginning of Third Period (from 1949)
Atomic artillery (203 and 280 mm) -----	12-18	166	242-248
"Honest John" free rockets -----	---	90	90-108
"Corporal" and "Redstone" guided missiles -----	---	28	48
<b>Total *</b>	<b>12-18</b>	<b>284</b>	<b>387-404</b>
Nuclear ammunition -----	30-40	100-150	100-200

\* In addition, until approximately the middle of 1959 there could be one or two stage (aviation) of delivery aircraft, and one or two groups of "Matador" cruise missiles (unmanned), from the middle of 1959 - one wing of "Matador" and "Voodoo" cruise missiles with 240 to 360 units, while fighters became the delivery aircraft for atomic weapons, their numbers being determined by the importance of the tasks of the group of aircraft in the defensive operation.

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Thus, compared with the first period, the number of means for delivering nuclear weapons to the target in a group of armies had increased 15 times in the second period and 22 to 27 times at the beginning of the third period. All these objectives can be considered as small and mobile. Besides, it should be taken into consideration that in a group of armies of the above-mentioned composition up to 2000 to 2500 radar and radio-navigation stations of different types may be deployed.

When examining the other tasks performed by aviation in an offensive operation, the following situation is revealed. If we take all the objectives against which it is expedient to operate from the air during an offensive operation as 100 percent, 50 to 55 percent of these will be small or mobile targets. Among the objectives destroyed during the disruption of communications, up to 45 percent will be small targets. In operations against reserves, which are not now located compactly, from 50 to 80 percent of the objectives will probably be in a mobile state.

Thus, under modern conditions, the majority of targets, both on the battlefield and in the operational rear area, are small and mobile. In order to determine which of the two types of armed forces (missiles or aviation) can destroy the targets mentioned with the greatest reliability and with the least expenditure of means, during an offensive operation, one must make an analysis of the positive and negative aspects of missiles at their present stage of development.

Missile weapons with special charges are one of the most powerful and long-range means of destruction. They are a most effective and promising weapon. However, an analysis of the positive and negative features of modern ballistic operational-tactical missiles enables us to draw the following conclusion: the use of these missiles, which have considerable speeds, great flight altitudes, and great ranges of operation, is advisable for the destruction of deep stationary objectives located over a large area, well protected by PVO weapons and for operations in difficult

-19-

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weather conditions. Under these circumstances the advantages of operational-tactical missiles over front bomber aircraft for operations against large stationary objectives in the operational rear area of the enemy are obvious and unquestionable, and for this reason, the correlation between front bomber aviation and operational-tactical missiles is characterized, already today, by the predominance of the latter.

However, missile weapons cannot carry out combat with small and mobile objectives, whose number is constantly increasing in troop and operational rear areas, and so far, fighter bomber and, to some extent, fighter aircraft are the indispensable means for the performance of these tasks. The need for aviation during the conduct of an offensive operation by the troops of a front remains great. The whole question turns upon which arm of front aviation it is more advisable to develop.

As we know, front aviation has performed and continues to perform two groups of tasks: on the one hand it protects the ground troops and itself against strikes from the air, and on the other, by operations against enemy ground objectives it assists the progress of the ground troops during the course of an offensive operation. Both groups of tasks can be fulfilled more successfully by aircraft capable of high speeds. At present, these aircraft are fighters and fighter-bombers. The latter are standard fighter aircraft with additional equipment for operations against ground targets. Experience teaches that the modern fighter, to say nothing of its performance in air combat, can successfully carry out the destruction of ground objectives and reconnaissance (with auxiliary tanks - podvesnoy tank) to the depth of the flight range of a front bomber.

An analysis\* shows that the maximum load capacity of

\* This estimate does not take into account future types of aircraft or aircraft undergoing testing. It should be noted that it is very desirable to have fighter aircraft and fighter bombers with a great flight range, especially at low altitudes, as front aviation.

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IL-28 front bombers has remained at its earlier level, while that of fighter aircraft has increased by 500 percent. At the present time the payload of a fighter is 1000 kg. The maximum flight range of bombers of the type mentioned has also remained at the level of propeller-driven aircraft, while that of fighters and fighter-bombers has increased by approximately two hundred percent without auxiliary tanks and by two hundred and fifty percent with auxiliary tanks, and in the latter case has become equal to the flight range of front bombers.

Since one part of the tasks formerly performed by front bombers can now be successfully carried out by operational-tactical missiles and the other part by fighter-bombers and fighters, it seems to us that the future need for front bomber aviation disappears. At the same time, all front aircraft become bomber aircraft and, moreover most economical besides, since some aircraft are not now kept exclusively for operations against ground objectives, (bomber aircraft), nor is the other part kept exclusively for operations against objectives in the air (fighter aircraft). All aircraft can successfully conduct combat with two types of targets: air and ground.

*Never really happened.*

For example, during the second period, the fact that fighters were only armed with cannons and free rockets fixed and limited their combat potentialities for the destruction of air targets, because, with the increase of the flying speed of bombers and fighters, attacks by the latter became possible only from the rear 180° (polusfera), and only in a very narrow area, and an attack on an air target from the front 180° became completely impossible.

The introduction, in the third period, of "air-to-air" guided missiles as fighter armament, with conventional and atomic charges, great range of fire, a high degree of accuracy in guidance to the target, and high destructive efficiency, not only restored but also considerably increased the combat potentialities of fighters. Moreover, fighter-bomber aircraft represent a reliable reserve of fighter aircraft for increased efforts to destroy various aerial

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targets during the performance of tasks of protecting troops and front rear area objectives during an offensive operation.

In the third period, antiaircraft missile weapons began to be introduced as armament for organic PVO units. The relative proportion of antiaircraft missile troops is not yet great, but it is planned that in the future the basis of the organic PVO and of the PVO of the objectives in a front's rear area will consist of antiaircraft missile troops, with high fire capabilities for the destruction of all enemy air attack weapons by day or night in any meteorological conditions, potentially including ballistic missiles.

To consider the increased role of fighter aviation in protecting the troops and objectives in a front's rear area, this task should be performed by the combined efforts of fighters and antiaircraft guided missile weapons, keeping in mind the main fault of the latter - low effectiveness in combat with air targets at low altitudes, limited capacity for simultaneous fire against aerial targets, inability to determine identity of aircraft, and inadequate maneuverability on the ground.

The advantages of fighter-bomber aircraft are due to one further factor. In an offensive operation, troops are now concerned with an overwhelming majority of small and mobile targets. For operations against such targets, aircraft with a small bomb load, with cannon and rocket weapons, are more economical, since such aircraft can destroy targets with the least expenditure of means.

In our opinion, the following factors should also be of no small influence in the development of front aviation:

--the use of fighters and fighter-bombers holds promise of fewer losses compared with that of bombers; thus, in a single air engagement during daylight with aircraft armed with cannons and free rockets, the probability of destruction, according to some calculations, is 0.6

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for bombers, 0.35 for fighter-bombers and 0.25 for fighters; the loss of a single bomber, in terms of money and flight crew costs approximately 2 to 3 times more than that of a fighter or fighter-bomber;

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--the lower cost and the speed with which fighters and fighter-bombers can be produced, compared with bombers, and the lower expenditures on the training and maintenance of flight personnel for these types of aircraft in comparison with those for bomber aircraft:

--the simplification of airfield support and supply, especially of fuel (smaller size of airfields and runways, reduced consumption of POL), the reduction in the work load of rear areas as a result of the great economy of fighter and fighter-bomber aircraft in comparison with bombers;

--the flexibility and maneuverability of fighters and fighter-bombers is greater than that of bombers, which will increase the power of front aviation as a whole, because more frequent strikes against the enemy are possible as a result.

Thus, the question of the combat composition of the air army of a front, both as regards the arms of aviation and the total amount of aircraft, is highly complex. Its resolution involves a whole series of special studies and painstaking theoretical research. However, the inclusion of one division of fighter-bomber aircraft in the composition of an air army is, in our opinion, clearly inadequate. Taking into consideration the large number of mobile and small ground objectives and the switch of the armament of the organic PVO to antiaircraft guided missiles, which has started, it can be considered that the ratio by percentage between fighters and fighter-bombers may be almost equal, and it seems that in the near future an all-purpose aircraft of the fighter type will become the basis of front aviation, with a capacity for vertical takeoff and landing, which will permit the solution of the most acute aviation problem -- airfield security.

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At present all types of forces and arms of troops are undergoing reequipment; they are mastering new equipment and are on the threshold of large organizational changes. These processes are very complex and cannot be of short duration. For this reason a period of coexistence between new and old combat weapons in each of the types of forces and arms of troops is natural. The length of this period will be determined mainly by the international situation, by the time taken for reequipment and for the mastery by the personnel of the extremely complex equipment which is arriving as armament for units, large units and formations, and by the qualitative condition of this equipment.

The ideas expressed in this article do not claim to cover completely the theory of the combat employment of front aviation in the postwar period. The main goal of the author has been to trace the basic stages of the postwar development of the theory of the combat employment of front aviation and to show the need for us to occupy ourselves in real earnest with its elaboration. In the analysis of actual facts the author has tried to show that the reduction of the relative proportion of aviation in operations and the changing of the relative proportion of the various arms of aviation are natural processes. However, aviation has not lost its significance. Success in an operation is achieved by the coordinated efforts of all types of armed forces and arms of troops.