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Massed Aviation Strikes
(Historical Experience and the Present)

by

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One of the most important factors for restraining the hegemonistic aspirations of the American imperialists is the constant combat readiness of the Soviet Armed Forces to repulse aggression from no matter where it may come. Its basis consists of the troops' skillful mastering of weapons and combat equipment, the high level of development of methods for their combat employment in accordance with the intended use of each of the military services in contemporary operations, and the ability of the leadership personnel to creatively use the achievements of military theory in actual practice during the planning of engagements, battles, and attacks, and to make decisions with consideration of our own and foreign combat experience.

The air forces, armed with supersonic aircraft of various types with an extensive tactical radius of action and equipped with modern weapons of destruction, are capable of quickly concentrating and shifting efforts from one axis to another, and of destroying any stationary or mobile target practically to the entire depth of the operational deployment of the enemy forces. In proportion to the extent of the development in the NATO armed forces of conventional weapons, reconnaissance-attack systems, drones and cruise missiles, aviation will play an ever-increasing role in combined-arms operations. This predetermines the need for constantly improving existing methods and searching for new ones for the fulfillment of aviation's combat missions.

An effective form of military operations for air forces is the massed air strike which takes the form of a short-term, powerful action by aviation against the enemy with the goals of destroying (or striking) the most important land (or sea) targets using various aviation munitions, and is carried out by one or

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several aviation large units in a unified operational-tactical formation on an operational (or strategic) axis or in an extensive area.* Its determining characteristics are: the composition of the employed forces, the operational significance of the strike targets, and the capability for reaching and destroying them in extremely short periods of time.

The massed air strike incorporates the requirements of the most important principles of the Soviet art of warfare: the concentration of the main efforts on the most important axis at the decisive moment to carry out the main tasks; the coordinated use and close cooperation of various types of forces and weapons; the reliable suppression of the air defense; the concealed nature of preparations and surprise in actions; and comprehensive support as well as stable command and control. Its effectiveness in combined-arms and air operations has been confirmed by the experience of the Great Patriotic War.

An objective precondition for the origination of this form of military operations was the achievement of the appropriate level of development of strike aviation in a qualitative and, mainly, in a quantitative respect.

Massed aviation strikes were considered in the West as the most effective method for implementing the well-known bourgeoise theory of "aerial warfare," which resulted in a sharp growth in the quantitative composition and a significant improvement in the combat equipment of bomber aviation in the armies of the main capitalist states before the Second World War. Thus, in 1940, its proportion in the air forces of Hitlerite Germany was over 57 percent,** and in comparison with the period of the First World War the bombing salvo increased by 22.3 times.*** Simultaneously, corresponding organizational measures were also carried out.

Actual experience has proven the unsoundness of relying solely on any one of the military services, but the principle of the massed use of air forces and

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* Voyennyy Entsiklopedicheskiy Slovar' (Military Encyclopedic Dictionary), Moscow, Voyenizdat, 1983, pp. 761-762.

** Sovetskiye Voyenno-Vozdushnyye Sily v Velikoy Otechestvennoy voyne 1941-1945 (Soviet Air Forces in the Great Patriotic War, 1941-1945), Moscow, Voyenizdat, 1968, p. 26.

*** Istoriya VVS Sovetskoy Armii (History of the Soviet Army Air Forces), Moscow, Voyenizdat, 1958, p. 377.

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corresponding forms of military actions has been theoretically and practically substantiated.

Soviet military thought in the prewar period concentrated the main attention on the development of methods of using air forces in combined-arms operations (or battles) in close cooperation with other branches of the armed forces and the arms of service. The results of military-scientific research and the experience of operational training found reflection in the "Provisional Instructions for the Independent Operations of the Air Forces," officially reinforcing a new form of using aviation -- the air operation. Its basis consisted of concentrated air strikes carried out by a unit (or several subunits) simultaneously or sequentially.*

In the practice of actual combat operations of the air forces in the military conflicts of 1938-1940, there had already been carried out strikes which by their scales and importance substantially exceeded concentrated strikes. Thus, in the course of battles in the area of Lake Khasan on 6 August 1938, 180 bombers and 70 supporting fighters participated simultaneously in the air support of our troops. The results of the aviation actions and the artillery preparation were used skillfully by the attacking units and large units in successfully carrying out their combat tasks.** Aviation was also similarly used in the actions at the Khalkhin-Gol River.

Thus, an important principle of Soviet military science on the massed use of aviation in a combined-arms operation (or battle) and also in the fight for air superiority was theoretically validated and verified in practice.***

In the Great Patriotic War the elaborated theory was validated and further developed in the very first combined-arms and air operations. Thus, in the air operations carried out by order of the General Headquarters [Stavka] 25-30 June 1941 on the Northwest axis, there were planned several powerful air strikes on airfields of the 5th Air Fleet of fascist Germany. The most effective of them turned out to be the 25 June strike, which was delivered in

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* Boyevoy ustav bombardirovochnoy aviatsii (BUBA-40) (Combat Regulations for Bomber Aviation), Moscow, Voyenizdat, 1940, p. 34.

** Istoriya vtoroy mirovoy voyny 1939-1945 (History of the Second World War, 1939-1945), vol. 2, Moscow, Voyenizdat, 1977, p. 213.

***Polevoy ustav Krasnoy Armii (Field Regulations of the Red Army), 1941, Draft, p. 178.

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anticipation of the operations of the ground forces and according to all indicators corresponded to a massed strike (236 bombers and 244 fighters took part in it).*

In support of the ground forces a massed air strike was carried out on 13 June 1941 in the area of Vitebsk with the goal of stopping the enemy offensive.**

However, this form of air force operations did not become very widespread in the first period of the war because of the small numbers of our strike aviation due to losses suffered during the treacherous enemy attack and the huge area in which combat operations were being conducted.

As bomber and ground attack aviation was developed, as its organizational structure was improved, and as combat experience was accumulated, the level of massing aviation forces during the fulfillment of combat tasks increased. Powerful strikes by several bomber and ground attack aircraft divisions under the cover of fighters became the basis of air operations as well as of the Soviet air offensive developed by Soviet military science.

In the air operations of the Great Patriotic War massed air strikes were delivered mainly against airfields of the opposing aviation groupings with the goal of winning air superiority. Of these, among the most instructive were the massed strikes in the 1943 spring-summer air operations on the eve of the battle at Kursk. Their successful implementation was attributable to the skillful conduct of a whole complex of measures.

The majority of the airfields of the enemy groupings was subjected to simultaneous pressure. For example, in the air operation carried out in May, the first strike was delivered against 17 airfields out of 22, and the second -- against 20. In the third, all 22 airfields were attacked.

Surprise was achieved through careful selection of the time of attack on the basis of a detailed evaluation of the combat activity schedule of the units based on the airfields. The first strike in the examined operation began at

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* TIMOKHOVICH, I. V. Operativnoye iskusstvo Sovetskykh VVS v Velikoy Otechestvennoy voyne (Operational Art of the Soviet Air Forces in the Great Patriotic War), Moscow, Voyenizdat, 1976, p. 71.
**Soviet Air Forces in the Great Patriotic War, 1941-1945, p. 51.

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dawn when preparations for combat sorties were being carried out on the airfields, and when flying and technical personnel were located by the aircraft on which bombs were suspended, and this aided in the effectiveness of the attacks. In the next air operation the first strike was planned for the evening with a subsequent shift to night attacks, which forced the enemy to take care of the bomb damage in the dark under extremely unfavorable conditions.

The operational-tactical structuring of the aviation forces provided for the allocation to each enemy airfield of a strike group (bombers and ground attack aircraft to destroy aircraft, runways, and other targets), a support group (direct escort fighters, ground attack aircraft for suppressing the airfields' air defense), and one or two crews to monitor attack damage. Altogether, an average of 300-400 aircraft participated in the strikes.

Depending on the situation, from 30 up to 60 percent of the forces was allocated for carrying out the main attack. The following pattern was normally used: in the first strikes when it was intended to achieve surprise, the main forces were concentrated in the strike groups, and in the subsequent strikes the number of support aircraft was increased. The calculation was based on a "forced" breakthrough to the targets through the air defense system. For this purpose there was envisaged the timely and systematic battle against enemy fighters on the ground and in the air by the blockade of their airfields, by the establishment of screening forces and groups for intercepting air defense fighters on the flight routes of the bombers and ground attack aircraft, by the direct escorting of the attacking aircraft, and also by the destruction of antiaircraft weapons. The number of aircraft allocated for a strike against one airfield fluctuated greatly -- from 10-20 up to 160, and this substantially influenced the results of the strike.

Preparation of massed strikes was carried out on the basis of the air operation plan prepared by the staff of the Air Forces of the Red Army and approved by Headquarters of the Supreme High Command.

In the divisions and regiments, during the organization of the battle, after receipt of the mission, there were selected the flight routes and profiles; and there were designated the methods for the assembly of the groups, the combat formation on the flight route, in the area of the strike targets, and on the return route, and also the kind of maneuvers to use and the number of approaches to the target. Special attention was devoted to working out the cooperation of the bombers and ground attack aircraft with the supporting fighters.

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Through combat practice there were worked out the main questions on the organization and maintenance of cooperation, and these procedures are still applicable under contemporary conditions. Among the most important of them can be included: determining the procedure for communications between staffs and group leaders (commanders) in the air, the part of the flight route where the fighters will join up with the bombers (or ground attack aircraft), their positions in the overall operational-tactical formation at stages along the flight route and in the target area, the methods of mutual recognition and for the exchange of information about enemy aviation, the lines where escorting will begin and end, the tactical methods for the coordinated fire of fighters and bombers (or of ground attack aircraft) in repulsing the attack of enemy fighters; specifying the organization for the escorting of aircraft which are damaged and forced to cease fulfilling of their combat mission, the possibility of bombers using fighter airfields on their return from a combat mission, and others. It should be noted that the commander of the supported large unit (unit) was always designated the leader of the overall combat formation.

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In preparing a massed air strike, great importance was attached to preliminary (or final) air reconnaissance of targets. It was carried out to reveal the types and numbers of aircraft at airfields, the locations of the parked aircraft, alert crews, antiaircraft weapons and storage areas, to establish the flight routine of the aviation units based there, and to determine the most advantageous directions for attacks. Using available aerial photos, the commanders and flight personnel studied the targets of the strikes, selected orientation points which could be used while carrying out the approach maneuver to the bombing run, and the aiming points, and they specified the procedure for withdrawal from the target area.

Massed air strikes in front operations began to be employed mainly in the second and third periods of the war. They were also the main form of operations used by air forces in an air offensive. Most often, massed strikes in support of ground forces were carried out by bombers. Ground attack aircraft operated primarily in small groups with a sequential build up of efforts. Strikes by a regiment or larger unit comprised 80 percent of the bomber operations and 15-18 percent of ground attack aircraft operations.*

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* TIMOKHOVICH, I. V. Operational Art of the Soviet Air Forces in the Great Patriotic War, p. 144.

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In offensive operations they were carried out and were most effective in the process of air preparation during the commitment into a battle (or a breakthrough) of mobile groups of armies and fronts, the forcing of water obstacles, the defeat of counterattacking and encircled enemy groupings, and the neutralization of strongly fortified centers of resistance. Near the end of the war massed strikes were also employed during the air support of attacking forces, especially in support of the breakthrough of the enemy's second defensive zone. In order to carry out a given mission, sometimes long-range aviation was also employed (for example, in the massed air strike of 16 April 1945 in the Berlin Operation).* Depending on the goals of such massed air strikes, it is possible to distinguish a number of their characteristic features, which must be taken into consideration in contemporary operations as well.

As a rule, air preparation was completed with massed strikes. The intensity of the pressure on the enemy continuously increased, reaching a maximum directly before the ground forces went over to the attack. In a number of operations the massed strikes were delivered at night or in the predawn twilight with a subsequent shift to daylight actions. The main targets were aircraft, enemy troops and weapons in the breakthrough sector, the strongest centers of resistance, and command and control points.

The composition of the forces participating in the strike depended on the scale and goals of the operation, and on the number of aviation groupings. The operational-tactical formation of the aircraft in this case also differed somewhat from the massed strikes in air operations. First, the targets of the bomber and ground attack aircraft were more varied (the former operated mainly against the troops on the forward edge of the battle area, and the latter -- against the more distant and fortified objectives). Fighter cover was carefully coordinated with the missions of the strike groups designated for various tactical assignments.(1) In support of the bombers, hunter aircraft operated in the target areas of the strike, and there were instituted fighter covering forces and direct escort groups.(2) The ground attack aircraft were more often supported over the battlefield by the fighters providing cover for the ground forces.

* Ibid, p. 149

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Second, the success of the massed strike to a considerable degree depended on the quality of the development of cooperation between aviation and the ground forces. Special attention in this was devoted to coordination on the following questions: defining the main targets and the sequence in which they would be hit by aviation; developing the methods for getting the strikes of the ground attack aircraft as close as possible to the forward edge of the battle area so as to eliminate any gap in the depth of firing pressure being exerted by the weapons of combined-arms armies and of aviation, for the reliable marking of the positions of friendly forces and for target identification for aviation during the strike, and for specifying the procedure to be used by antiaircraft artillery to differentiate between enemy fighters and friendly aircraft attacking enemy targets close to the front line.

All of these questions were worked out in advance and were reflected in the plan for the attack. An example of well-organized and effective execution was the massed strike in the course of the air preparation during the 26 May 1943 breakthrough by our forces of the "Blue Line" established by the Germans on the Taman Peninsula. Taking part in it were 338 aircraft (84 bombers, 104 ground attack aircraft, 150 fighters), and it lasted 40 minutes. As a result of their skillful and coordinated actions, substantial damage was inflicted on the enemy. Our aviation had no losses.*

Aviation was also similarly used to support the commitment into combat of tank armies and cavalry-mechanized groups for destroying enemy objectives which were blocking their forward movement. Thus, on 6 July 1943 in the Kursk battle the 16th Air Army used massed air strikes by nearly 450 aircraft against an enemy tank grouping before a counterattack on it by our ground forces.** The targets for aviation and their locations were precisely specified directly before the takeoff of the aviation units and large units based on the data from air reconnaissance.

Massed air strikes to destroy strong counterattacking and encircled enemy forces played an important role in ground forces' operations. In contrast to all of the strikes mentioned above, which were planned and prepared in advance,

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* Soviet Air Forces in the Great Patriotic War, 1941-1945, p. 167.

**KOZHEVNIKOV, M. N. Komandovaniye i shtab VVS Sovetskoy Armii v Velikoy Otechesvennoy voyne 1941-1945 (Command and Staff of the Air Forces of the Soviet Army in the Great Patriotic War, 1941-1945), Moscow, Nauka, 1977,p. 151.

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the necessity for carrying out such tasks arose, as a rule, during the course of combat actions when the time for detailed preparation and for coordination on questions of cooperation was very limited. Sometimes the task was specified and, at times, even assigned to the group leaders only after takeoff. For the qualitative and timely execution of the strike under these conditions, there were used previously developed variants of operations and operational-tactical formations of the different types of aviation forces and there were employed the already established methods of communications between the commanders of bomber, ground-attack and fighter units and large units. The role of aviation representatives in the ground forces increased sharply. In this area there were very fully displayed such characteristics of aviation as mobility and the capability to quickly concentrate efforts where needed. The opportunely delivered massed air strike at times decided beforehand the outcome of the ground battle. Thus, for example, to frustrate the attempts of the encircled German groupings to break out of the pocket in the area of Bobruysk on 27 June 1944, the forces of the 16th Air Army were effectively used. Its commander received this order: "G. K. ZHUKOV, A. A. NOVIKOV and K. K. ROKOSSOVSKIY know about the critical situation in the area of Titovka and are expressly assigning to aviation the mission of destroying the enemy column."*

Orders were immediately given to commanders of aviation corps and divisions. Launched for the attack were 175 bombers, 217 ground attack aircraft and more than 100 fighters. The strike lasted one-and-a-half hours and was exceptionally successful. Aviation destroyed 150 tanks, 6,000 motor vehicles, and much artillery.**

Deserving special mention is the massed use of long-range aviation in support of the ground forces. Whereas in air operations long-range aviation operated only at night and independently, in front operations there were employed both nighttime and daytime massed strikes by long-range aviation bombers.

A night massed strike of long-range aviation took the form of the sum of the actions of individual crews flying at established time intervals on strictly defined routes and carrying out strikes against designated objectives. Their

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* Voyenno-istoricheskiy zhurnal (Military History Journal), No. 2, 1971, p. 26.
**Arkhiv MO SSSR (Archives of the USSR Ministry of Defense), f. 368, op. 142206, d. 49, l. 41.

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main targets were strong points, troops in the second defensive zone, reserves moving on approach routes, and centers of communications.

In the daytime massed strikes of long-range aviation were carried out, as a rule, during the breakthrough of a strongly fortified enemy defense and on the approach routes to large populated areas. Their greatest effectiveness was achieved through efficient coordination with the activities of attacking ground forces. Such a strike was first used in the Great Patriotic War in the East-Prussian Operation to destroy the defensive installations of Koenigsberg.* Its distinguishing feature was the organization of reliable anti-fighter support for the long-range bombers in all phases of the combat flight. This was achieved through their direct escorting by significant fighter forces, blockading airfields where the fighter aircraft of the enemy were based, clearing the air space in the target areas of the operations, and having tactical bombers and ground attack aircraft carry out advance strikes on airfields. The efforts of long-range aviation were immediately augmented by tactical aviation bombers.

It should be noted that during the course of the majority of the daytime massed air strikes intense air battles took place as a result of the active counteractions by enemy fighter aviation providing cover for their own troops and rear area facilities.

Fighter support of massed air strikes was carried out through the assignment of special fighter aviation forces distributed on the basis of the methods and times of the operations.

The pattern followed was to have a larger percentage of fighters participating in massed air strikes than in an air offensive. This is explained by the great distances of the main targets from the front line and the corresponding increase in the opportunities for enemy air defense fighter aircraft to repulse the raid. Air battles broke out, as a rule, in the area of the strike objectives of the bombers and ground-attack aircraft, and this was the result of low informational capabilities of the fighter command and control system. Their introduction into battle most often began after the visual detection of the strike groups by ground observation posts, and by ground troops or the crews of airborne aircraft.

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* KOZHEVNIKOV, M. N. Command and Staff of the Air Forces of the Soviet Army in the Great Patriotic War, 1941-1945, p. 205.

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Combat operation methods for the supporting fighter aircraft were constantly being improved during the course of the war, and this also determined the procedure for the commitment into an air battle. At the beginning of the war, direct escorting was mainly used, but later more active methods such as blockading enemy fighter airfields and providing fighter screens in the air began to be introduced. In some cases, for this purpose "freelance" fighters were used, and they not only destroyed enemy aircraft in advance of the massed air strikes, but also provided target designations to the direct cover fighters. With the appearance of radar stations in troop units, fighters began to be committed to battle much sooner.

The success of the air battle, and correspondingly of the massed air strike as well, substantially depended on the level of reliability of the cooperation of fighters with bomber and ground-attack aircraft units and large units. The coordination of operations in an air battle involving different types of aviation forces was achieved through the selection of the location of fighters in the operational-tactical formation and the parameters of the overall combat formation based on ensuring the timely detection of enemy fighters and the repulsion of their attacks, and on the fact that maximum use would be made of the defensive firing systems of bomber and ground-attack aircraft.

Thus, in the Great Patriotic War the theory worked out by Soviet military science for preparing and carrying out massed air strikes both in operations in order to gain air superiority as well as in the air offensive was validated and further developed. Its main principles are still applicable under contemporary conditions.

Massed strikes were also a main form of using aviation in the Hitlerite army. Having a large number of bombers, the aggressor counted on creating the preconditions for achieving his goals with a treacherous attack on important objectives. From 200 to 1,000 aircraft participated in the massed strikes carried out both in daylight and at night. The most characteristic feature of fascist German aviation was the echeloned formation of forces (in 2-3 echelons) and the simultaneous raids from several directions.

Near the end of the war the Americans and the British also began the widespread use of massed air strikes with the participation of from 500 up to 1,200 aircraft for supporting amphibious landings (the Normandy Operation), destroying large cities and industrial centers in Germany and Japan, and for

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cooperative support of attacking troops. In their planning and execution it is possible to note the following special features:

-- the creation of decoy and diversionary groups in the operational-tactical deployment of aviation and the use of reflection jamming of radar stations for the purpose of concealing the direction of the raid;

-- the employment of so-called "carpet bombing" (over a designated area) from an altitude of 5,000-8,000 meters, which was often used for frightening and senselessly destroying the population. For example, as a result of the massed raid on Tokyo during the night of 9-10 March 1945 by more than 300 B-29 "flying fortresses" nearly 120,000 peaceful residents were killed or wounded by high-explosive and incendiary bombs, that is, more than from the atom bomb dropped on Nagasaki.* Based on the accomplishment of other missions, this method of attacking important objectives led to disproportionate expenditure of munitions and forces;

-- the maximum reduction of the time from the moment that a massed strike was delivered on enemy forces and objectives until friendly forces reached them (even at the risk of being hit by bombs);

-- the delivery of strikes using the method of "shuttle operations" (taking off from their own airfields and landing on Soviet airfields, and the other way around) with the goals of increasing the range of aviation.

Also characteristic was the fact that the evaluation of the effectiveness of the strike was calculated not on the basis of the damage inflicted on the enemy, but on the number of aircraft sorties and the tonnage of the bombs dropped.

The experience acquired by the Americans during the Second World War was later reflected in the appropriate air force regulations of the US and other NATO countries, which, to a significant degree, determined the employment methods and the aviation tactics of the American aggressors in local wars.

Massed air strikes in local wars also were one of the main forms of aviation actions.

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* History of the Second World War, 1939-1945, Volume 11, p. 145.

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In the Korean War the Americans relied on the massed use of strategic and tactical aviation and new weapons of destruction (tanks filled with napalm, bombs with parachute braking systems and with correctable descent trajectories) for achieving their aggressive goals. And although the calculations based on the "omnipotence" of American aviation, as is known, ended with complete failure, certain lessons were learned from the war on the preparation and execution of massed air strikes with the use of strategic bombers and first generation tactical jet fighters.

First, a conclusion was reached on the need for the timely receipt of accurate target coordinates for the effective use of bombers, equipped with SHORAN-type radioelectronic sighting and navigational systems, at night and during the day from behind clouds.

Second, the complexity of protecting slow-flying strategic bombers powered with piston engines from the attacks of air defense jet fighters and the inability to solve that problem by increasing the number of support fighters with the same kind of characteristics, which, because of the great difference in speed of flight, could not maintain their place in the overall combat formation and could not repulse the attack of North Korean fighters.

Third, there was confirmed the advisability of using varied aviation forces (strategic bombers, tactical fighters, carrier-based ground-attack aircraft) in massed strikes against specific target groups (power systems, bridges, troop concentrations) under the new conditions. Targets were assigned on the basis of the combat capabilities of the aircraft and the aiming-navigational systems. Thus, participating in the massed strike on the power system of North Korea on 23 June 1952 were 500 aircraft (230 from carrier-based aviation and 270 from the 8th Air Army). The operational-tactical formation of the forces included: an echelon for suppressing antiaircraft artillery (mainly tactical fighters) comprising up to 35 percent of the forces, two strike echelons (fighter-bombers) -- 45 percent of the forces, and more than 100 covering fighters -- 20 percent of the forces.*

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* STYUART, Dzh. Vodushnaya moshch' -- reshayushchaya sila v Koreye (STEWART, J. Airpower: The Decisive Force in Korea), Moscow, Inostrannaya literatura, 1959, p. 145.

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Fourth, the low effectiveness of massed strikes by strategic bombers in direct support of ground forces as a result of the complexity of organizing cooperation and detecting targets.

In the local wars in Southeast Asia and in the Middle East, in operation were second and third generation jet strike aircraft using fundamentally new guided "air-to-surface" weapons, armed with warheads filled with conventional explosives as well as with special casualty-producing elements. All this and also the increasing capabilities of the air defense and the development of the means for radiotechnical surveillance and radioelectronic warfare substantially influenced the composition and operational-tactical formation of forces in a massed air strike.

In the US aggression in Vietnam, as a consequence of the special features of the theater of military operations and the specific character of combat operations, the air strikes on troops and rear area objectives, based on the composition of the forces used and the targets selected, did not completely match those of a massed strike. However, in the opinion of foreign military experts, they could be viewed as a distinctive "model" for the operations of powerful aviation groupings equipped with supersonic aircraft armed with guided "air-to-surface" and "air-to-air" missiles while contending with the active counteractions of air defense systems consisting of antiaircraft missile systems, antiaircraft artillery, and fighter-interceptors.

In the process of such strikes there were tested aircraft tactics for penetrating air defenses, there were determined the optimal composition and tasking of strike groups and the variations of their operational-tactical formations for destroying various rear area objectives and troops with the use of specialized weapons of destruction, and there were developed methods for command and control and for providing support, with special emphasis on the conduct of radioelectronic warfare. In the course of actual combat operations it was determined that for achieving a high level of effectiveness with the strikes, to a greater degree than during the years of the Second World War there was needed a preemptive attack against the air defenses, whose capabilities had significantly increased. For this purpose there were designated special aircraft to operate as support groups (50-60 percent of the overall number of forces participating in the raid). They conducted reconnaissance, jammed the radioelectronic facilities of the enemy's air defense command and control systems, and also destroyed his antiaircraft artillery and antiaircraft missile systems with the use of unguided and guided weapons, and repulsed fighter

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attacks. A strike group was formed to carry out the main mission. Its composition depended on the features of the targets, the employed weapons of destruction, and the conditions for the combat actions. A conclusion was reached on the need for developing specialized and highly accurate weapons for combating air defense radar stations and antiaircraft missile systems, and for destroying targets on the battlefield (mainly armored) as well as in the enemy's rear areas.

The 16 April 1972 strike on objectives in North Vietnam can serve as one example for illustrating American views on the use of aviation under contemporary conditions. The formation of the aviation forces included a strike group consisting of 17 B-52 strategic bombers (a prototype strike echelon) and several support groups (or echelons): the aircraft responsible for passive and active jamming along the flight route of the strike aircraft, and also for radioelectronic surveillance as well as for the destruction of antiaircraft missile systems and antiaircraft artillery (F-105G "Wild Weasel" aircraft with air-launched antiradar guided missiles and A-7E ground attack aircraft), and the fighters providing cover both as "screening forces" and by direct escorting. As in the Second World War, the strategic bombers used the "carpet" bombing method in attacking targets. A similar organization of forces was also subsequently used during tactical aviation operations.

Thus, based on information in the foreign press, during the Vietnam war the Americans developed the tactics for carrying out massed air strikes under contemporary conditions with the use of conventional weapons. The main features of these tactics are: an echeloned formation of aviation (a support echelon and one-two strike echelons), the use of varied forces, the specific designation of support groups for destroying enemy air defense means and for deceiving the enemy relative to the intention of the strike, the use of diversionary and deception actions, and the concealment of the operational-tactical structure and the combat formations with the assistance of passive and active jamming of the radar stations of the air defense and of the command and control systems.

In the wars in the Middle East (1967-1982), the decisive striking force of the aggressor was tactical aviation. The attack by Israel on the Arab countries in 1967 began with a surprise massed air strike on 20 Egyptian airfields. In the process maximum use was made of the experience of past wars taking into account the new aviation equipment and command and control facilities. All available methods were used for the advance conduct of detailed reconnaissance of the objectives within the range limitations of aviation, and their

functioning was constantly observed. In selecting the time of day and the day of the week for the start of the aggression, the special national characteristics of the troops, the combat capabilities of the aviation and air defense systems, and the location of airfields of the opposing side were considered in detail. The surprise of the strike was achieved by approaching the targets at extremely low altitudes from directions which the air defense would not expect and out of the rising sun. All of the combat ready forces (except those designated as reserves) participated in the raid. The actions of each crew had been carefully planned on the basis of hitting the targets during the first run and were worked out during preparations for the raid. The targets of the strikes on airfields were determined by their significance: first priority targets were the bombers, next were the supersonic fighters, and then all the remaining aircraft and the take-off and landing strips. It should be noted that on several airfields the strikes were carried out on the basis of their subsequent capture and use, that is, the runways were destroyed only to the extent necessary to impede the takeoff of the alert fighters.

In 1973 the aggressor again placed his emphasis on surprise, but, as West German specialists pointed out, the Arab side made widescale use of more effective combat methods in its combat actions, and the Israelis ran into an amazingly effective air defense and suffered heavy losses from antiaircraft fire.* Under these conditions the command of the Israeli Air Force began to make maximum use of the American experience in Vietnam while taking into consideration the specific character of the theater of military operations and the goals of the war.

In the armed conflict in Lebanon (1982), in the massed strikes during the invasion the Israeli aggressors used airborne command posts and fighters of different types (F-15 and F-16) for the sole purpose of combating the opposing aviation. The airborne command posts in the E-2C Hawkeye AWACS aircraft patrolled in zones beyond the range of the air defense fighters. They conducted surveillance of the air situation, guided the strike aviation to ground targets, fixed the location of the air defense fighters taking off to repulse the raid, and committed to combat their own F-15 and F-16 aircraft carrying out the support mission, and controlled their operations. Each strike was preceded by a detailed reconnaissance of the air defense system and by the violation of air space at regular intervals by individual aircraft and remotely piloted vehicles

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* Wehrkunde (Military Affairs), No. 2, 1974, pp. 79-81.

to blunt vigilance and exhaust the combat crews in the command posts and at the antiaircraft missile sites.*

The experience of combat operations in local wars is being widely used by the Americans in the training of their air forces. In accordance with the "air war" doctrine adopted in NATO, the American concept of an "air-land operation" envisages the massed use of aviation, cruise missiles, and reconnaissance-attack systems for achieving aggressive goals. The calculation for this is based on the conduct of offensive air and air-land operations, including a number of massed missile-artillery and aviation strikes with the combined use of drones, cruise and ballistic missiles, operational and tactical reconnaissance-attack systems, and radioelectronic warfare facilities for the top priority disruption of the air defense system with the subsequent shift of efforts to other objectives in a wide area to the entire depth of the operational deployment of enemy forces.

The efforts of the air forces are to be concentrated for combating aviation in the air as well as the second echelons and reserves. It is planned to destroy stationary objectives mainly with various types of missiles. The implementation of such a concept, according to foreign military specialists, is possible only with the availability of reliable data on the location and functioning of the strike objectives. For this purpose a detailed model for the allocation of the main enemy objectives according to depth and importance within the boundaries of the Central European theater of military operations has been developed in the allied air forces of NATO.** Based on this plans are being prepared for the operational-tactical deployment of the forces in a massed air strike, the composition of the echelons, the tactical assignment and combat formations of groups, and the support measures.

According to the foreign press, in the regularly conducted "Cold Fire" exercises, there is being worked out the eventual structure for a massed air strike with the use of conventional weapons. The operational-tactical formation of the aviation forces includes two to three echelons. The first echelon (for penetrating the air defense) is assigned the suppression of the antiaircraft facilities and the air defense fighter aviation on air alert with the use of weapons fire and radio jamming within a zone of up to 120 km wide. It consists of groups with various tactical assignments: the destruction of antiaircraft

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* Military Thought, No. 5, 1984, p. 42.
**Interavia, No. 1, 1981, p. 19.

guided missile systems and antiaircraft artillery ("Wild Weasel" fighter-bombers with air-launched antiradar guided missiles, and aircraft armed with air-to-surface guided missiles and guided aerial bombs), radioelectronic warfare aircraft, and fighters for clearing the air space and for direct escorting to repulse the attacks of air defense interceptors.

The strike echelons (one-two) carry out the mission of destroying aviation in the air and on the airfields, destroying takeoff and landing runways, isolating areas of combat actions and combating reserves. The strike groups approach the assigned targets along corridors in the air defense system which have been "opened up" by the support echelon flying at a wide range of altitudes -- from very low to high. Attempts are made to reduce the time interval between echelons to a minimum.

The number of aircraft (or groups) in each echelon depends on the planned number of objectives to be destroyed (or suppressed) in the massed strike, the strike weapons to be used, the expected counteractions and capabilities of the enemy air defense, and the composition of the aviation groupings.

According to the experience of local wars and regularly conducted exercises, the Americans have determined the optimal detail of aircraft for striking "typical" objectives. Thus, for example, 12-16 tactical fighters and ground-attack aircraft have been designated for striking an airfield, and up to a wing for attacking an antiaircraft missile system.

Taking into account the above-mentioned model for assigning objectives in the Central European theater of military operations and the composition of the NATO allied air forces in a massed strike, up to 800 aircraft of various types could participate in a massed strike (100-150 in the support echelon and 600-700 in the strike echelon).*

At the present time, in connection with the intensive development of highly accurate weapons and of aviation and air defense command and control systems, there is clearly noted a new tendency in the views of the US Air Force leadership for the operational-tactical deployment of forces in massed strikes and in their missions. In particular, it is considered advisable to decrease the size and increase the number of groups of various tactical purpose in the echelons so as to deliver strikes simultaneously on the main objectives to the

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* Foreign Military Review, No. 10, 1980; No. 5., 1982.

entire depth of the operational deployment of enemy forces,* and, in the echelons for suppressing the air defense, to include cruise and ballistic missiles and remotely piloted vehicles to destroy stationary targets of the air defense and command and control systems, to destroy airfield runways, and for jamming. In this case the tactical fighters carry out strikes from their territory without entering the firing zone of the antiaircraft missile systems.

It is intended to ensure the necessary effectiveness of aviation actions by using guided weapons with a "fire-hit" capability. In order to accurately guide the numerous strike groups to the targets, it is planned to use on-board precision sighting and navigational systems with the data transmitted to them from the TR-1 aircraft of the reconnaissance-attack and AWACS systems.

Thus, under contemporary conditions, in connection with the significant increase in the combat power of aviation groupings, in massed air strikes it is intended to carry out a much wider scale of tasks than during the Second World War. Foreign military specialists consider that the use of remotely piloted air strike vehicles along with piloted aircraft, the striving to deliver a strike on the main objectives with a minimum amount of forces, the widescale use of radioelectronic means for the command and control of subunits and crews from ground and airborne command posts, and intensive radioelectronic warfare represent a new tendency in the development of the theory and practice of the massed use of strike aviation.

However, during the preparation and execution of massed air strikes the following principles developed through actual combat in past wars are also taken into account:

-- as in the past, massed strikes are one of the main forms of using air forces in the battle for air superiority and in destroying the enemy by weapons fire;

-- the increase in the role of reconnaissance in selecting the time and place of a strike;

-- the differentiated use of various aviation forces in accordance with the characteristics and level of importance (or danger) of the strike objectives;

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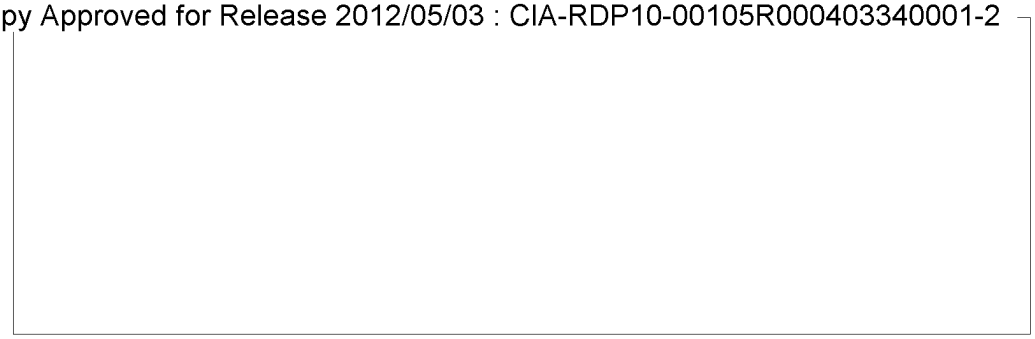
* Military Thought, No. 2, 1984, p. 54.



-- the purposeful preemptive combat against the air defense;

-- the skillful command and control of aviation units and large units in every stage of the combat flight and cooperation between air forces and ground troops (or naval forces).

The experience of using air forces in past wars and in contemporary armed conflicts, where aviation sometimes played the decisive role, and the training exercises regularly carried out in NATO must be constantly studied, analyzed and creatively used in carrying out combat and operational training measures in order to combat the probable enemy's new means and methods for air attack with no less effective forces and methods for repulsing his strikes.