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CENTRAL INTELLIGENCE AGENCY  
WASHINGTON, D.C. 20505

23 October 1973

MEMORANDUM FOR: The Director of Central Intelligence

SUBJECT : MILITARY THOUGHT (USSR): Soviet Assessment of  
Air Defense and Air Forces  
In the 1967 Near East War

1. The enclosed Intelligence Information Special Report is part of a series now in preparation based on the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought". This article attributes the Israeli victory in the 1967 war largely to her air superiority and analyzes the factors which led to Israeli air superiority. The Arab countries are criticized for lack of coordination, faulty deployment practices, inadequate protection of aircraft and air defense missile sites and poor training of personnel. The major factors leading to Israeli success are identified as surprise attack, radar jamming, and refined flight and bombing techniques. This article appeared in Issue No. 2 (84) for 1968.

2. Because the source of this report is extremely sensitive, this document should be handled on a strict need-to-know basis within recipient agencies.

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William E. Nelson  
Deputy Director for Operations

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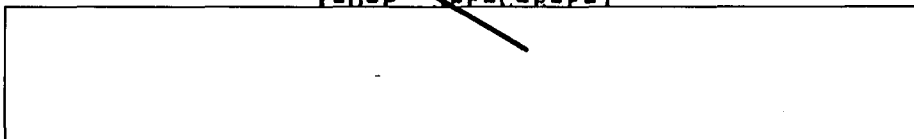
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Page 2



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## Intelligence Information Special Report

COUNTRY USSR

DATE OF INFO. Mid-1968

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DATE 23 October 73

SUBJECT

MILITARY THOUGHT (USSR): Air and Air Defense Forces  
in the Near East War

SOURCE Documentary

Summary:

The following report is a translation from Russian of an article which appeared in Issue No. 2 (84) for 1968 of the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought". The author of this article attributes the Israeli victory in the 1967 war largely to her air superiority and analyzes the factors which led to Israeli air superiority. The Arab countries are criticized for lack of coordination, faulty deployment practices, inadequate protection of aircraft and air defense missile sites and poor training of personnel. The major factors leading to Israeli success are identified as surprise attack, radar jamming, and refined flight and bombing techniques. A table of missile effectiveness against Israeli aircraft is included.

End of Summary

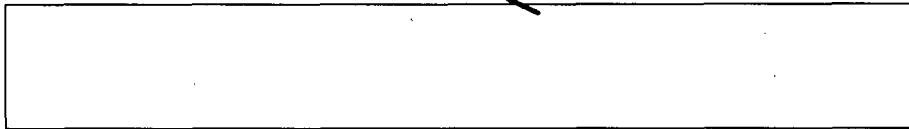
[REDACTED] Comment:

There is no information in available reference materials which can be firmly associated with the author. Military Thought has been published by the USSR Ministry of Defense in three versions in the past -- TOP SECRET, SECRET, and RESTRICTED. There is no information as to whether or not the TOP SECRET version continues to be published. The SECRET version is published three times annually and is distributed down to the level of division commander.

Page 3

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~~T-O-P S-E-C-R-E-T~~



Air and Air Defense Forces

In the Near East War

by

General-Major of Artillery H. Umnov

In planning its aggression against the Arab countries, the Israeli military command allotted a very important role to aviation. This arose from the "lightning war" doctrine existing in Israel, according to which aviation and airborne landing forces, jointly comprising the main strike force, were to eliminate the superiority in offensive and defensive means of the Arab countries in the first hours of the attack and thereby acquire an advantage in relative strength along the decisive axes of ground forces operations.

Accordingly it was planned to direct the main efforts of the Israeli Air Force toward the rapid defeat of the aviation grouping of the Arab countries in order to gain and retain air superiority. This was to be achieved with surprise strikes against the main bomber and fighter aviation bases of the Arab countries, first of all in the United Arab Republic, in order to destroy the aircraft and their control means on the ground, and also to put out of action their runways, munitions and fuel depots, command posts, and personnel. Then, taking advantage of its air superiority, the Israeli Air Force was to provide maximum support to the ground forces by delivering successive strikes against the Arab ground forces.

To counter Israeli aviation, the Arab states had at their disposal a considerable number of fighter aircraft and fighter-bombers (including some modern types), as well as SAM systems and various antiaircraft artillery and antiaircraft machinegun installations. In total numbers, the air defense forces of the Arabs were superior to the Israeli means of air attack. In quality, the Arab fighters and fighter-bombers were approximately equal to the Israeli strike aircraft, with the exception of the "Mirage", whose armament was superior to that of comparable fighter aircraft in use by the Arab states.



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Regarding the SAM systems, their combat capabilities enabled them to operate against Israeli aviation at altitudes ranging from 500 meters to their effective ceiling. An important role in the air defense system of the Arab states was played by antiaircraft artillery equipped with rapid-fire artillery and machineguns of different calibers which could operate against Israeli aviation at all altitudes, from ground-level flights up to ten or twelve kilometers. Radiotechnical units and subunits were equipped with radar sets of various types, including a certain number of radar sets for the detection and tracking of targets at low altitudes.

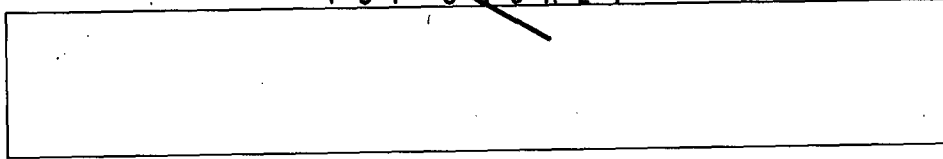
Why then, despite their numerical superiority and their completely modern armament and combat equipment, were the air defense large units and units of the Arab states unprepared to carry out their missions?

This was due, first of all, to the inadequate personnel strength of air units and to the poor training of flight crews for modern air combat, especially at night and at low altitudes. Combat crews of antiaircraft and radiotechnical units did not have adequate experience in conducting combat operations under conditions of intensive radio jamming and at low altitudes. In many antiaircraft artillery units and subunits, the fire control radar and fire control equipment were in disrepair because of the lack of qualified engineer-technical personnel.

The organization of the air defense system of the Arab countries also suffered from substantial shortcomings. The air defense structure of the UAR and Syria was far from complete, because of their failure to consider all aspects in estimating the importance of individual air axes and the probable tactics of Israeli air operations.

The main efforts of the UAR air defense forces were concentrated in the northeast and east. The air defense means on the northern (coastal) air axis were considerably weaker. The air defenses on the west and south were very weak. With only a limited amount of forces and means, the Arabs were naturally unable to set up equally strong air defenses on all air axes. They were apparently able, however, to establish a field of radar detection and

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guidance in the north, south, and west, and to provide for wide mobility of fighter-interceptors on these axes.

Since many of the most vital installations of the Arab states were within range of Israeli tactical aviation, the timely warning of enemy air attack became of great importance. Despite this, mutual notification through radiotechnical troops was never set up among the Arab states. Notification of troops regarding the air situation inside Egypt and Syria was handled for the most part only centrally, from the main command post of the air and air defense forces.

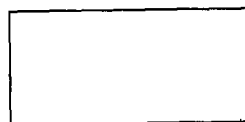
There was almost no decentralized notification using data from local radar stations, and in the final analysis this had a negative effect on the combat readiness of those SAM and antiaircraft artillery units and subunits which did not have enough radar reconnaissance and reconnaissance target designation sets of their own.

In organizing air defenses, Egypt and Syria did not give due attention to increasing the viability of troop combat dispositions: for example, command posts, vans of missile guidance stations, and antenna-feed and cable systems had only the most rudimentary cover, and part of the transceiver vans did not even have ordinary dirt revetments.

The Arab fighter aircraft were based only at main airfields, well known to Israeli aviation, with no dispersal in the airfield areas. The permanent UAR air bases had no emergency unpaved runways to be used in case the paved runways were put out of action. Fields for dispersal and covert basing of aircraft had not been prepared. Many of the unpaved airfields of local air routes were inadequate for the takeoff and landing of modern types of fighter aircraft.

Israeli air operations began on 5 June 1967 with a strike against UAR targets. This was preceded by intensive reconnaissance, as a result of which the Israeli command, by the start of the attack, was completely and reliably informed on the airfield network, the location of SAM units, and the grouping of ground forces and other important targets in Egypt and Syria.

Page 6



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To achieve surprise in their initial strike, the Israeli aircraft took off from their permanent bases at a time when the Egyptian pilots were at breakfast. The aircraft flew toward the designated targets at a low altitude, exploiting the screening features of the terrain. A considerable force of Vautour bombers and Skyhawk fighter-bombers followed over the sea at low altitude, at a distance of a hundred kilometers or more from the coast. For their orientation, radio buoys were dropped into the sea beforehand (at a distance of forty to fifty kilometers from the coastline). Approaching the radio buoys from outside the range of UAR radiotechnical means, Israeli aircraft deployed to the south and southeast and reached their designated strike targets without being discovered.

The first to be subjected to bombing and strafing attacks were the fighter aviation airfields situated on the Sinal Peninsula, air defense detection and control means, and the bridges over the Suez Canal. After a very short time interval, another group of Israeli aircraft raided airfields of strike aviation and air defense installations in northern, central, and southern parts of the country.

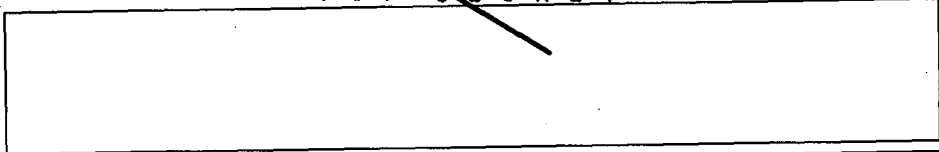
Over two hundred aircraft operated in these two groups, i.e. almost the entire Israeli combat air force with the exception of air defense fighters and military transport aircraft.

In only the first day, the Israeli Air Force flew more than 700 sorties over the UAR, achieving their main goal: to defeat the UAR air grouping and gain air superiority. These strikes were carried out by small groups of four to six aircraft approaching targets at the lowest possible altitudes.

Air operations were supported by intensive radio jamming which was conducted at first from ships positioned near the limit of UAR territorial waters and later from the air. Jamming was directed against the radio control networks and against the radiotechnical means of air and air defense forces, especially those in the centimeter band. The most effective jamming proved to be noise jamming which was apparently conducted from special jamming aircraft. It is also possible that individual strike aircraft, specifically

Page 7

~~T-O-P S-E-C-R-E-T~~



Vautour bombers, were equipped with jamming means. As a rule, the jamming equipment aboard Israeli aircraft was activated only upon entering the range of enemy radar stations, reaching its maximum emission when nearing the strike targets. Attempts to jam missile guidance stations and gun-laying equipment were not very successful.

When approaching their targets, Israeli aircraft usually slowed down abruptly, thereby increasing their firing and bombing accuracy. In their first pass over airfields, they destroyed the duty aircraft and put the runways out of action; in subsequent passes strikes were delivered against parked aircraft, taxiways, hangars, fuel depots, landing equipment, and other airfield targets. The runways were put out of action with special concrete-piercing bombs containing a braking device, dropped from an altitude of fifty to seventy meters, and the aircraft were destroyed with air-to-surface rockets and with gunfire.

The bombers usually attacked their targets from a horizontal course or, less frequently, from a shallow dive. Fighter-bombers usually attacked their targets from a dive, using simple or intricate maneuvers; they most often attacked from an angle of fifteen to thirty degrees. Aircraft often approached their targets at an altitude of thirty to forty meters, climbed in a chandelle, and attacked from a dive at an angle of sixty to seventy degrees. Some attacks were made from a horizontal course, ending in a sharp climb and change of course. The minimum altitude for pulling out of a dive was usually 600 to 700 meters; speed in attacking targets did not exceed 800 to 900 kilometers per hour. Attacks using intricate maneuvers were facilitated by the lack of clouds and by good visibility in the target areas, but such attacks were usually limited to single aircraft; no group attacks of this type were observed.

The initial Israeli air attack came as a surprise to the UAR air and air defense forces, since, in the days preceding the attack, the full combat readiness of these forces was actually only nominal: personnel were allowed to leave their units; radiotechnical posts in the border and coastal areas, which for the preceding twenty days had operated continuously to detect emanations, were put back on the





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regular combat duty schedule; and the duty watches of the combat detachments at command posts were cut back considerably.

The radiotechnical troops were therefore unable to detect the air attack while the enemy was still a long distance away and over the Mediterranean Sea, and they were thus unable to warn the air and air defense forces to prepare to repulse the attack. Strong jamming made it difficult for the radiotechnical troops to determine the strength of the attacking force and the objectives of its operations.

Because reconnaissance information had to go through many stages of transmittal between radar posts and notification points, and because its analysis at all of these intervening levels was handled inefficiently, the information was delayed five to eight minutes and more in reaching the active air defense levels, and they could not repulse the enemy effectively or in time.

Therefore, when the beginning of the attack caused a temporary interruption in the centralized transmittal of air warning information by UAR air and air defense notification points, aviation units based in the interior of the country were not made aware of the Israeli air strikes on the forward Egyptian airfields. The enemy strikes against interior areas of the country came as a surprise to many units.

Command posts which did not receive clear reconnaissance information were unable to make decisions or even to make use of their air and air defense duty means. Only on the Sinai Peninsula did two duty flights of fighters get into the air; at the remaining airfields the duty air crews were not at their planes.

SAM units reached combat readiness only after the initial attack had virtually ended; only two battalions of SAM troops managed to open fire in time and shoot down two Israeli aircraft. Some antiaircraft batteries deployed to cover airfields opened fire against enemy aircraft independently but were stopped by order of the central

Page 9

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~~T-O-P S-E-C-R-E-T~~



command post, where it was believed that the aircraft were their own.

All this enabled the Israeli aircraft to reach their designated targets without any particular difficulty and to deliver powerful bombing and strafing attacks.

UAR fighter aviation, having lost a large number of its aircraft on the ground, subsequently made only individual flights from airfields where runways were in operative condition.

During the Israeli attack, UAR SAM troops fired twenty-four times on composite and individual targets, usually destroying at least one aircraft per firing.

At the same time, however, it must be kept in mind that considerably more targets than could be fired upon came within the range of SAM battalions. Battalions not having their own means of reconnaissance and target designation had to use their missile-guidance equipment for target search (operating on all parameters); many targets were detected at such short distances from the launching positions that it was absolutely senseless to launch missiles against them. Table 1 (Page 15) indicates firing conditions, the number of targets fired upon and destroyed, and the total and average expenditure of missiles for each aircraft shot down.

As may be seen from the table, the effectiveness of fire against targets not protected by jamming (including those at low altitudes) was fairly high. However, effectiveness dropped sharply against targets flying at low altitudes and protected by jamming; of three unsuccessful firings, two failed because the manual target-tracking operators of the missile-guidance stations were poorly trained (tracking two targets at the same time and not concentrating on a single target), and one failed because of inadequate training in firing on maneuvering targets (after the first missile was launched, the target changed altitude abruptly, but the guidance officer did not notice this and did not set the missile guidance station at "H < one kilometer" in time).

The largest number of Israeli aircraft (over fifty) were shot down by antiaircraft artillery. The 57-mm systems were



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the most effective, although their capabilities were far from being fully exploited, because much of the gun-laying equipment was out of order and warning and target designation came too late. The following examples of combat with Israeli aircraft in the Suez Canal area testify to the effectiveness of the 57-mm systems.

On 5 June, two groups of six aircraft each made three attempts to deliver strikes from an altitude of 150 to 200 meters against the canal crossings south of Port Said. The aircraft came in with the sun behind them and used simple and intricate maneuvers in attacking their targets, but each time fire from antiaircraft batteries prevented them from bombing accurately. In the third run, three Israeli aircraft were shot down by the fire of 57-mm guns that were covering these crossings, after which Israeli aviation abandoned its attempts to destroy the crossings.

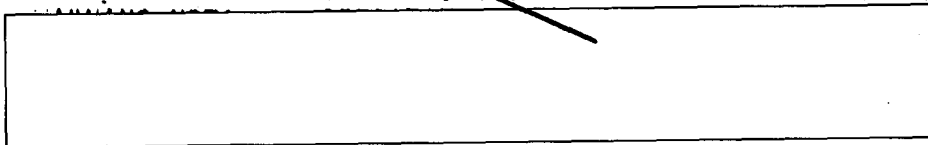
During 6 June, Israeli aircraft made several low-altitude strikes in an attempt to put out of action two SAM battalions deployed in the Suez Canal zone. As long as the battalions were covered by antiaircraft batteries, all of these attempts failed. Only after the antiaircraft batteries were transferred to cover an airfield did the enemy succeed in delivering a bombing and strafing attack against the battalions and putting them out of action.

Events in Syria developed in similar fashion. In the middle of the day on 5 June, after carrying out aerial reconnaissance, Israeli aviation made its initial strike against the airfields of the Syrian air force, and from then until 1900 hours of the same day carried out a number of raids on control posts, troops, depots, and supply bases. Aircraft in single flights or in small groups operated against fire positions of antiaircraft batteries. Making use of undetected approaches, areas shielded from radar by mountainous terrain, and gaps in radar coverage in desert areas, Israeli aviation was able to deliver initial strikes against the main Syrian airfields just as suddenly as against those in the UAR and to put almost the entire combat aviation out of action within a short time. Not only were airfields struck directly, but Syrian aircraft were also destroyed while landing at their airfields after fulfilling their combat missions, at a moment when antiaircraft

Page 11

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artillery could not fire because its own planes were in the air. The effectiveness of the antiaircraft artillery fire covering airfields was also insignificant, because there was no timely target designation; fire was conducted either by "overtaking" (without using fire control radar or antiaircraft tracking equipment) or against aircraft coming in for successive target runs.

Subsequent Israeli air strikes against Syrian troops and targets took place mostly during the daytime. Individual Israeli aircraft, using illuminating means also operated at night, mainly against tank and automotive columns and troop build-ups.

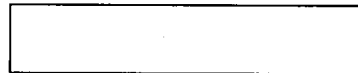
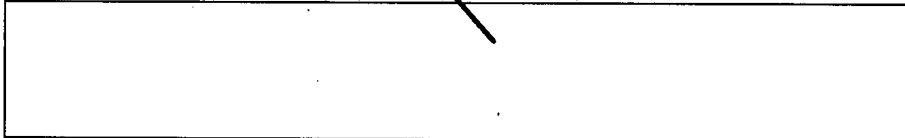
A brief review of the combat operations of air and air defense forces in the Near East in June 1967 and an analysis of the causes producing given results enable us to draw the following conclusions.

The Near East crisis confirmed that in non-nuclear war (and in various local conflicts) aviation represents a formidable force capable of fulfilling various combat missions and of sharply altering the overall combat situation in a theater of military operations. It can be used to defeat groupings of enemy armed forces, to provide support and, if necessary, cover for ground and naval forces, to isolate areas of combat operations, to conduct aerial reconnaissance, and to undermine the military-economic power of the enemy state (or group of states) by means of systematic air raids.

One of the most important uses of air power under modern conditions is to mount operations to defeat the enemy aviation grouping. The objective of such operations is to destroy the main body of enemy aircraft on the ground with sudden powerful air strikes, to put his control and communications means out of action, to inflict personnel losses, and, having thus gained air supremacy, to make it impossible for the enemy to mount a retaliatory strike.

Under these conditions air defense becomes a decisive factor in preserving the vital activities of the country and the combat effectiveness of its armed forces. The overall principles on which air defense is based include the



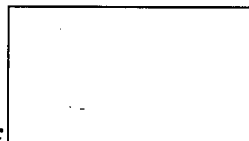


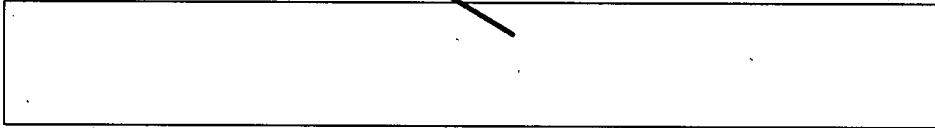
concentration of efforts in order to protect the main troop groupings and the wide mobility, viability, and stability of the air defense system.

In making decisions concerning the organization of air defense, we must correctly allow for the military-political conditions under which combat actions will develop; for the relative strength of the two sides; and for the level of preparedness and combat effectiveness of the enemy air forces which may have to be faced. An air defense plan must examine and consider different variants of enemy air operations, the most probable axes of enemy actions, and the methods the enemy will most probably use. Deficiencies in air defense forces and means on secondary air axes must be compensated for by advance preparation and subsequent execution of movements, above all by air defense fighter aircraft. As the Israeli attack showed, disregarding these factors or approaching them subjectively can have very grave consequences.

Repelling an initial air attack in which the enemy uses a maximum amount of air strike means becomes of decisive importance for successful air defense. If the air defense forces withstand the initial attack and at the same time inflict heavy personnel and equipment losses on the enemy attackers, the force of all subsequent enemy strikes will be considerably weakened. This did not happen in the Arab-Israeli conflict of 1967, however. The UAR air defenses, in repelling the initial Israeli air attack, did not inflict any appreciable damage, as a result of which the nature and extent of subsequent attacks were virtually unaffected. This enabled Israel to retarget its air efforts successively away from the UAR, first against Syria and then against Jordan.

The events in the Near East once again demonstrate the necessity for advance coordination of operations among the air defense forces of countries entering into military alliance (or groups of friendly powers). It is particularly important to coordinate actions among the air defense troops of those countries which operate on unconnected air axes. First of all it is necessary to coordinate the deployment of radiotechnical means, set up a mutual exchange of reconnaissance information, and organize mutual air warning





notification; it is then necessary to establish a procedure for moving fighter aircraft, establish an order of movement from one country to another in order to intensify efforts for defeating the air enemy, to establish methods for guiding fighters in long-range operations and supporting them in landing and taking off again; etc. There must also be coordination of measures for operational security and deception, and measures for eliminating interference by various emanating devices with the means of communications, control, radar, and radio jamming.

Increasing the viability of individual air defense elements and of the system as a whole, in the light of modern aerial reconnaissance and strike means, is one of a series of problems affecting the combat readiness of air defense forces and their ability to conduct intensive combat actions over an extended period of time. With the Arab-Israeli conflict as an example, one is easily convinced that underestimating the problems of increasing troop viability may have the most disastrous consequences. Troop viability may be increased by very diverse methods: dispersal of troops, engineer preparation of combat positions, ordinary and radar camouflage, protection of airfields, positions, and control posts by various active means, etc. The least viable air defense elements, as experience shows, are airfields, overhead and cable lines, radar means, and missile guidance stations (especially those situated on dirt embankments). Top priority must be given to protecting these elements. Parked and dispersed aircraft may be protected effectively with special aircraft shelters variously constructed of prefabricated reinforced concrete combined with dirt structures. Vans of radar installations and missile guidance stations have been successfully protected with shelters made of various materials including whatever may be at hand (so-called "canisters").

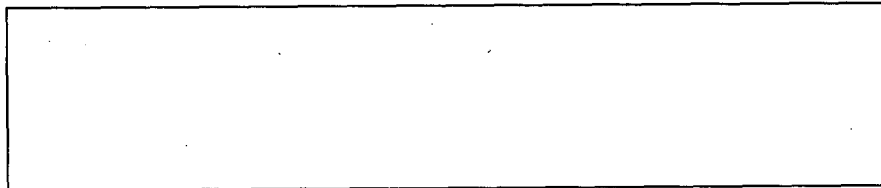
For direct protection of airfields and of positions of SAM units and radiotechnical subunits, small-caliber antiaircraft artillery and antiaircraft machinegun installations have been used successfully. Their fire not only inflicts substantial losses on the enemy in the air but also sharply reduces the accuracy of enemy bombing and strafing attacks.



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Firing Conditions	Number of Firings	Number of Aircraft Shot Down	Total Expenditure of Missiles	Average Number of Missiles Used to Shoot Down One Aircraft
Targets not protected by jamming, at altitudes:				
above 1000 meters	10	10	10	1.0
below 1000 meters	6	5	12	2.4
Targets protected by jamming, at altitudes:				
above 1000 meters	4	5	10	2
below 1000 meters	4	1	12	12
<b>Total</b>	<b>24</b>	<b>21</b>	<b>53</b>	<b>2.6</b>



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