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MEMORANDUM FOR: The Director of Central Intelligence

SUBJECT : MILITARY THOUGHT (USSR): The Use of Helicopters to Increase the Mobility of Tactical Rockets and Antitank Guided Missiles

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 makes a comparative evaluation of the use of helicopters in conjunction with tactical rockets and antitank guided missiles in an effort to illustrate how the mobility of the latter two could be increased. In addition to transporting these rockets and missiles, the authors discuss the possibility of utilizing helicopters as launch platforms. They admit that the helicopters in service at that time were not designed for such combat missions and propose what design changes should be made in helicopters, tactical rockets, antitank missiles, and support vehicles if these weapon systems are to be utilized in the manner proposed. This article appeared in Issue No. 2 (69) for 1963.

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.

[redacted]

William E. Nelson
Deputy Director for Operations

[redacted]

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MILITARY THOUGHT (USSR): The Use of Helicopters to Increase the Mobility of Tactical Rockets and Antitank Guided Missiles

SOURCE Documentary

Summary

The following report is a translation from Russian of an article which appeared in Issue No. 2 (69) for 1963 of the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought." The authors of this article are Colonel-General of Artillery M. Parsegov and Engineer-Colonel K. Belyayevskiy. The study discusses the use of helicopters in conjunction with tactical rockets and antitank guided missiles in order to illustrate how the mobility of the latter two could be increased. In addition to transporting these rockets and missiles, specific helicopters are cited as possible launch platforms. Since the helicopters were not designed for such roles, the authors propose what design changes should be made and in addition indicate what improvements should be made in the tactical rockets, antitank missiles, and related equipment if these weapons are to be utilized in the manner proposed.

End of Summary

Comment:

Colonel-General M. Parsegov was identified in his obituary on 28 April 1964 in Krasnaya-Zvezda as Commander of Artillery of the Leningrad Military District in the post World War II period. The obituary also stated that from 1962 until his death, he devoted his experience and energy to the training of personnel of the rocket troops and artillery. There is no information in available reference materials which can be firmly associated with the other 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.

THE USE OF HELICOPTERS TO INCREASE THE MOBILITY OF TACTICAL ROCKETS AND ANTITANK GUIDED MISSILES

by
Colonel-General of Artillery M. Parsegov
and
Engineer-Colonel K. Belyayevskiy

The presence of operational-tactical rocket large units and units in the ground forces permits them, as is known, to deliver strikes against enemy targets at a considerable depth; but in order not to fall behind the troops, the rocket large units and units must carry out the displacement of their battle formations very quickly. This is especially important in the case of tactical rocket and antitank guided missile subunits.

The mobility of these subunits in many ways depends on the condition of the road network. A poorly developed road network causes considerable difficulties in organizing the displacement of rockets to new firing positions and affects timeliness in supplying nuclear charges and materiel to rocket subunits. The inevitable destruction of roads when nuclear/missile weapons are employed by both sides will undoubtedly contribute to a decrease in the pace at which rocket troops can move and, consequently, may become the reason for their inability to fulfil their combat tasks.

One must also consider the capabilities of the means of transport. Available wheeled motor transport does not provide the necessary degree of mobility for rockets and antitank guided missiles, since it does not fully meet the requirements for conducting operations under conditions in which nuclear weapons are used and is not capable of moving rapidly over terrain with no roads. It is in need of continuous improvement, first of all, in its cross-country mobility and maneuverability.

However, providing tactical rocket and antitank guided missile subunits with ground transport only, even if it has high cross-country mobility, still does not fully solve the problem of increasing their mobility. With the mass use of nuclear weapons, the radioactive contamination of terrain becomes one of the factors which may exclude the possibility of conducting

combat actions using ground transport. Aside from this, if troops have to be moved very quickly, it will not always be possible to rapidly restore destroyed roads, bridges and crossings, which may lead to a decrease in the pace of the offensive and inhibit the movement of tactical rockets and antitank guided missiles. Under these conditions, if the launchers of rockets and antitank guided missiles are mounted on helicopters, the tactical rocket and antitank guided missile units and subunits will be able to successfully negotiate destroyed road sectors, areas with no roads, and contaminated areas, and move forward rapidly to the threatened axes to hit enemy targets.

In a combat situation, the tasks that can be fulfilled by troops with the help of helicopters are extremely varied. For example, helicopters can be used to move personnel, armament, combat equipment, ammunitions, provisions and other cargo. Helicopters can also be adapted for use as mobile means of launching missiles. With flight speeds of 100 to 150 kilometers per hour, a helicopter can cover a distance of 300 to 400 kilometers in two to four hours, while ground transport would take ten to sixteen hours.

At the same time, we should also mention a number of serious shortcomings of helicopters. For instance, their limited operating radius does not allow using them over any great distances to transfer troops, technical equipment, and other supplies. Furthermore, they are highly vulnerable to enemy fire, and their use depends on climate and weather conditions. Helicopters also have a number of negative operational features. For example, one must remember that the cargo capacity of a helicopter varies considerably depending on the altitude, the distance of the flight, the size of the cargo, etc. And helicopter maintenance requires the use of highly qualified specialists.

Also, despite the great need for helicopter launchers, the complete replacement of ground rocket armament by helicopter armament is, in our opinion, inadvisable. Helicopter armament should only supplement ground rocket armament and be integrated with the other.

Let us examine the possibilities of using helicopters to increase the mobility of tactical rockets and antitank guided missiles.

Helicopters can be used in tactical rocket subunits for transporting rockets, launchers, transport vehicles, and cranes. They can also be used in exactly the same way for increasing the mobility of antitank guided missiles. However, considering the lighter weight and the smaller dimensions of the missiles and combat vehicles as compared to tactical rockets, the possibility of transporting the former is much higher. For example, one heavy cargo helicopter can transport a complete combat vehicle together with the crew and the missiles. This is the best method if antitank guided missiles are used in a landing force.

The principal characteristics of helicopters used as transport means are the cargo capacity and the size of the fuselage. Thus, for example, the cargo capacity of the MI-1 and MI-4 helicopters is not sufficient for transporting tactical rockets and launchers, or even the transport vehicle. Yet it is perfectly suitable for transporting antitank missiles.

The helicopters YAK-24 and MI-6 possess excellent capabilities. Because of its cargo capacity, shape, and fuselage dimensions, the YAK-24 helicopter can be used to transport one tactical rocket, while at the same time retaining its basic performance characteristics (range, altitude and speed). If we remove part of the auxiliary equipment from the helicopter and reduce its fuel supply, i.e., reduce its range, it can then transport two tactical rockets. The MI-6 helicopter can transport from two to four rockets. As regards the subunits armed with antitank guided missiles, the YAK-24 and MI-6 helicopters can easily transport combat vehicles even with their crews and a full unit of fire of missiles.

There are also good possibilities for using helicopters as launchers. Of course, not any kind of rocket can be launched from a helicopter. For example, it is practically impossible to use a helicopter to launch tactical rockets from the air, because the helicopter is not stable enough. The thrust of the rocket engine, which reaches fifty to sixty tons, creates an extremely unstable moment which cannot be compensated by the helicopter rotor. As a result, the helicopter loses its stability, which in turn can lead to a marked decrease in the accuracy of fire, or even to an accident in the air.

The best solution to the question of using helicopters as launchers is achieved when the rocket is launched while the helicopter is on the ground. In this case, it is possible to carry out all the work connected with topographical survey and laying of the rocket on the target.

One of two methods can be employed in using helicopters as launchers to fire rockets from the ground. The first method is to have the artillery element (launching rail, laying mechanisms, and the launch-control electrical equipment) installed directly on the helicopter and structurally integrated with it. The second method is to have the launching rail in the form of a light mounting and the laying mechanism (launch equipment) structurally independent from the helicopter, while the launch-control electrical equipment is installed on the helicopter and is electrically connected with the launch equipment and the rocket. In this case, the launching equipment and rocket are transported, and installed at the launching site, by helicopter while the rocket is launched by means of an apparatus installed on the helicopter.

The YAK-24 and MI-6 helicopters can be used as launchers for firing rockets from the ground by using one of the two methods mentioned above. At the same time, it is important that the weight of the artillery element installed on the YAK-24 helicopter not exceed 1700 kilograms. This will allow a helicopter to transport one rocket along with the artillery element.

The cargo capacity of the MI-6 helicopter allows it to carry one to three artillery elements with the rockets. However, considering the fact that the helicopter has to shift its launching site after each rocket firing, it is advisable to install in it not three but only one artillery element weighing three tons. Reducing the weight of the artillery element will allow more rockets to be transported.

Far greater capabilities are attainable by using helicopters as delivery vehicle/launchers for firing antitank guided missiles. Considering the low force of thrust of the antitank missiles and the short length of the launching rails, the antitank missiles can be fired not only from the ground but also from the air with no risk to the flight stability of the helicopter. It is also

appropriate to note that antitank missiles are fired by direct laying, therefore not requiring topographical survey; this greatly simplifies the design of the laying mechanism and improves the accuracy of fire, which is assured by control of the missile in flight (through the use of wires or radio). The following are methods for the integrated use of helicopters and antitank guided missiles.

1. The helicopter is used as a launcher for firing from the air (and from the ground) against detected targets. In this case, the missiles will be carried in the helicopter directly on their launching rails.

2. The helicopter is used to control the missile in flight, the missile being launched from a combat vehicle on the ground; and it is guided to its target by a controller using a device mounted on the helicopter.

A comparison of the basic tactical and technical characteristics of antitank guided missiles and helicopters indicates that the MI-4, YAK-24, and MI-6 helicopters can be used as launchers for firing from the air (and from the ground).

It is possible to install as many as several dozens of launching rails in the YAK-24 and MI-6 helicopters. But this is impractical because such a large number of launching rails will interfere with their arrangement, the firing procedure, and the combat use of missiles. The maximum number of launching rails, in our opinion, should not exceed eight to ten. On the other hand, the installation of a lesser number of launching rails on the YAK-24 and MI-6 helicopters is inadvisable, because it does not take full advantage of the cargo capacity of these helicopters.

Along with their positive features, the YAK-24 and the MI-6 helicopters also possess some serious deficiencies: they are very large and, therefore, present easy targets for enemy antiaircraft fire. This deficiency is of such serious proportions that it may cast some doubts on the feasibility of using these helicopters as launchers for antitank guided missiles.

The cargo capacity of the MI-4 helicopter, its size, and the shape of its fuselage permit the installation of eight launching rails. This makes it the most suitable platform for launchers of these missiles.

To control the flight of missiles, it is best to use helicopters which have a small cargo capacity and which have the smallest dimensions. These requirements are best met by the MI-1 helicopter. Its use in this capacity is advantageous both economically and tactically. Its comparatively small size makes it less vulnerable than other helicopters to enemy antiaircraft fire.

The above-mentioned possibilities for using helicopters to increase the mobility of rocket troops and artillery require some design changes in the helicopters now in service. The helicopters presently in service do not fully meet the requirements for their integrated use with tactical rockets and antitank guided missiles. Their design does not provide for the mounting of launching rails, rockets, combat vehicles, electrical equipment, etc. They lack devices for maintaining stability while launching rockets on the ground.

The reequipping of helicopters must be carried out in accordance with their functions and the conditions under which they will be used.

Let us mention the necessary additional equipment that we think helicopters need to increase the mobility of tactical rockets.

Rockets can be transported either inside or outside the fuselage. In both cases they are placed and secured in compartments installed either directly on the sides of the fuselage or on special dollies.

Transporting rockets in compartments inside the fuselage makes loading and unloading them difficult. Special equipment is needed to load and unload them. If the rockets are secured on the dollies, such special equipment is not needed. In addition, the dolly facilitates the transport of rockets not only by air but also on the ground, although the latter applies only to short distances (from the point of loading to the helicopter, from the helicopter to the launching site, etc.). A serious disadvantage in transporting rockets with dollies is that this increases the size and weight of the cargo being transported, which in turn noticeably reduces the transport capabilities of the helicopter. Nevertheless, this method must be given preference.

Carrying rockets outside the fuselage with the use of compartments and dollies secured to the helicopter does not present any particular difficulties even during loading or unloading. If

it has the appropriate equipment installed, the helicopter itself can function as a crane. Therefore, the shortcomings we mentioned in discussing the arrangement of rockets in compartments inside the fuselage do not apply when they are placed outside the fuselage.

It follows from the above, that in using helicopters as means for transporting rockets the most practical method is the one in which the rockets are placed outside, and not inside, the fuselage.

Another serious problem is the very arrangement itself of rockets in the helicopter. It is necessary to consider the location of their center of gravity in order to prevent an unstable moment which would affect the stability of the helicopter. This requires that the center of gravity of one rocket (or of several rockets) be along the vertical axis which passes through the center of gravity of the helicopter.

As already mentioned, there are two ways that a helicopter can be used as a launcher: in the first one, the artillery element of the launcher is attached directly to the helicopter and structurally integrated; in the second one, it is only transported by the helicopter and is not structurally integrated.

If the artillery element is attached to the helicopter, the helicopter will have to have installed on it one launching rail with all the devices (plug connections, locking device, pneumatic system, trunnions for vertical laying, etc.), turntable with a horizontal laying mechanism, a lifting mechanism, sighting device, heating system, launch-control electrical equipment, and auxiliary equipment.

The length of the launching rail must be six to seven meters, the weight approximately 500 kilograms, and the diameter 415 millimeters. If it is not possible to install a launching rail of this length, a closed type can be used. In this case its length will be shortened to 4.5 to 5 meters and its diameter will increase to 1100 millimeters.

The lifting mechanism must meet certain definite requirements. When laying the launching rail in azimuth limits between 0 to 60 degrees, the mechanism must assure movement to the maximum elevation in no more than thirty seconds.

A helicopter used only to transport the launching device must have the capability to fasten the device quickly and reliably.

This will permit loading and unloading to be carried out, provided that the auxiliary mechanisms are mounted directly on the helicopter.

When the launching device is used apart from the helicopter, the launch-control electrical equipment is located in its cabin.

Entirely different auxiliary equipment is needed for helicopters which are to be used to increase the mobility of antitank guided missiles.

To transport these missiles, the helicopters must be equipped (in case the missiles are being loaded without crating) with special racks with compartments. When reequipping the fuselage with these devices, it is necessary to take into consideration the size and the shape of the missile and also the size and the shape of the cargo section itself in order to make the most effective use of the cargo capacity of the helicopter. By transporting missiles without their packaging, it will be possible to arrange them in the limited space of the cargo section. However, this method of transport is recommended only if the missiles are to be delivered directly to the combat vehicles and used soon thereafter without prolonged storage or additional transfers on the ground.

A simpler method is to equip the helicopter so that the missiles can be arranged with their packing. Special fastenings will prevent the boxes from shifting either longitudinally or laterally. Such fastenings are extremely important, especially if the fuselage does not have a full load.

Transporting combat vehicles with crews and missiles should in no way lower the combat readiness of antitank guided missiles. This combat readiness is achieved by creating favorable conditions for the crews to work in after landing, by reducing to a minimum the time of loading the combat vehicles and then unloading them from the helicopter, and by strictly controlling the activities of occupying the firing position and bringing the combat vehicles to combat readiness.

Combat actions involving the use of helicopters can be conducted during any time of the year and under any climate and weather conditions. In this regard, it is quite important to maintain the correct temperature inside the helicopter, because the temperature affects not only the efficiency of the crew members, but also the launching conditions, the normal performance of the combat vehicle engine, and the serviceability and readiness for action of the missile flight control equipment.

Experience in operating tractor equipment shows that to effectively start a combat vehicle engine without a starter heater or a preliminary warm-up of the engine, the temperature must not be below four or five degrees centigrade. This means that the temperature inside the helicopter cannot be lower than this.

If it is impossible to maintain the correct temperature inside the helicopter, especially in winter, the combat vehicle engine should be warmed up periodically by having it idle. Therefore, in reequipping the helicopter, it is important to install an outlet for the exhaust gas to escape to the outside.

In addition to having gas exhaust systems installed in helicopters, provisions must be made to enable the combat vehicles to drive into and off the helicopter and to arrange and secure them inside the helicopter. It should be noted that a winch is very useful for loading a combat vehicle into a helicopter. It should require a minimum of effort for personnel to secure the combat vehicles, and the operation itself should take very little time, while, at the same time, assuring that the combat vehicles are reliably secured.

While their combat vehicle is inside the helicopter, the crew members can either remain in the vehicle or in the cabin. As for transporting missiles (besides those in the combat vehicle), the equipment in the helicopter can be similar to that used by helicopters when transporting only missiles.

To fire missiles from the air, an artillery element must be installed in the helicopter to ensure the preparation of missiles for launching, and the launching itself. In our opinion, the artillery element must consist of launching rails, laying mechanisms, devices for the preparation and conduct of launching and auxiliary equipment.

The helicopter can have the same number of launching rails that the combat vehicles have. When installing launching rails in a helicopter it is necessary to make certain that their direction of fire corresponds to the direction of flight of the helicopter, and that they are installed symmetrically in regard to the helicopter center of gravity to ensure reliable stability when launching missiles. Launching rails must be arranged to ensure ease in loading and fulfilment of preparatory work before the launching. The launching rails are installed either inside or outside the fuselage.

When installing launching rails outside the fuselage, the following constructive suggestion is made: to each side of the fuselage attach one frame, and install a cluster of four launching rails to each frame. The installation of launching rails outside the fuselage has the following advantages: first, combat readiness is increased, because it takes less time to prepare and open fire; second, relative simplicity in the design of launching rails is achieved, as well as greater reliability in performance; and third, useful space is gained inside the fuselage for arranging missiles.

At the same time, it must be noted that locating the missiles outside the fuselage precludes loading the launching rails while in flight; and increases the probability of a breakdown in the launching rails, the plug connections, and the electric circuits. In addition, the repair of malfunctions becomes more difficult in flight; the aerodynamic characteristics of the helicopter deteriorate; its mission is exposed; and, finally, the launching rails and missiles must be protected from the effects of atmospheric precipitation, icing, etc.

Placing the launching rails inside the fuselage requires a considerable amount of structural work. It is practically impossible to launch missiles from launching rails installed inside the fuselage because of the serious difficulties in removing powder fumes when launching. Therefore, an eight missile cluster is installed on a retractable frame which is extended outside prior to launching; for example, through the lower hatch of the fuselage. This arrangement is much more difficult than mounting the launching rails and missiles on the outside. However, this should not be advanced as an argument against using helicopters in this manner.

If helicopters are used as platforms from which to launch guided missiles, there is no need for installing laying mechanisms. However, given the characteristics of combat actions and the integrated use of antitank guided missiles and helicopters, it may well become necessary to conduct fire from a helicopter while it is on the ground (forced landing, lack of fuel, etc). In this case the artillery element of the antitank guided missiles must have a device for the approximate laying of the launching rails on the field of fire. The installation of such a vertical laying mechanism will assure an angle of elevation up to 18° for the cluster of launching rails; and the horizontal laying mechanism will assure an angle of traverse in the horizontal place of $\pm$ 15°. Laying mechanisms should be mounted on a special frame and must be kinematically integrated with the cluster of launching rails.

The missile laying apparatus can be entirely the same as the one used in regular combat vehicles. It will, of course, assure laying also for those missiles which will be fired not from the launching rails installed in the helicopter but from combat vehicles.

In our opinion, these are the kind of auxiliary devices we need in order to be able to use helicopters to increase the mobility of tactical rockets and antitank guided missiles.

At the same time that helicopters are being adapted for use as delivery vehicles for rockets (missiles) and as platforms for launchers, it is also necessary to introduce certain improvements in the rockets and missiles themselves.

The existing types of tactical rockets possess a number of characteristics which limit the possibilities of making integrated use of them with helicopters (the great weight of missiles, launching mechanisms, transport vehicles, cranes, etc.). Therefore, we feel that in order to increase the mobility of tactical rockets, it is necessary to reduce the size and weight of the rockets without reducing their range or accuracy, or the force of their charge; to assure safety in the handling of rockets and their trouble-free operation; to simplify the design of the rocket warhead in order to improve its reliability of operation; to shorten the time needed to prepare the rocket for firing; and to improve the operational characteristics of rockets (so that they could be used under any climate and weather conditions at any time of the year without any detrimental effects to the chemical-physical properties of the fuel or the charge).

The quality of rockets can be improved by using a more improved fuel with a greater heat valve and a more effective type of burning; reducing its overall weight and the size of its warhead and engine unit; using small but powerful nuclear charges; improving the mechanisms installed in the rocket and its manufacturing technology; and using new units and parts in the apparatus of the warhead and new sources of energy requiring less time to bring them into operational condition.

It is impractical to develop rockets that would be fired only from helicopters, because it is undesirable to increase the number of models of this type of weapon already in service (it will impede production, supply, and repair). Consequently, when designing new models of rockets, we must proceed from the premise

that they should be capable of being fired from conventional launchers as well as from helicopters.

A basic requirement of new models of launchers is that they must be transportable by helicopter. To meet this requirement we must reduce the size and weight of the launcher. The weight of launchers can be reduced, first of all, in its self-propelled component, by using the chassis of a wheeled vehicle with high cross-country mobility rather than the considerably heavier tank chassis.

At the present time the automobile industry is able to produce a new model of high cross-country mobility with a wheel formula 8 X 2*. The use of durable tires on these vehicles and regulated air pressure will open up ways of significantly reducing the ground pressure of the tires and, consequently, result in sharp improvement of their cross-country performance in roadless areas. Additionally the wheeled undercarriage does not possess the deficiencies of a tracked undercarriage (low viability, comparatively low speeds, damage to roads, and loud operating noise).

The weight of launchers can also be reduced by reducing the weight of the artillery element (the use of lighter metals and their alloys, the use of parts and mechanisms with optimum dimensions, improvement in the design of the mechanism of the artillery element). At the same time, the dimensions of the launchers, above all the size of the launching rails, must also be reduced. The weight of the launchers will be reduced considerably if it is designed without the self-propelled part, i.e., only the launching device. The latter, in our opinion, can represent a mount on which are installed the turntable, the launching rail, the laying mechanisms, the aiming device, and other auxiliary equipment. The mount must be the base of the artillery element and can be in the form of a cross with jacks.

When integrated use is made of tactical rockets and helicopters the need for transport vehicles and cranes may be eliminated (transporting of rockets and loading and unloading

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* Translators' Note: Numbers not clear.

will be done by the helicopter). But transport vehicles and cranes should not be completely withdrawn from tactical rocket subunits. It may always become necessary to use transport vehicles to move the rockets and then to use the cranes to load and unload them. Therefore, transport vehicles and cranes must be retained, but they must be transportable by air. With this in mind we should come up with a design in which the transport vehicle and the crane are consolidated into a single transport-loading vehicle. Such a unit will be able to transport one or two missiles and carry out the loading and unloading connected with the loading of a launcher and the loading of a transport-loading vehicle.

Finally, a few words about the basic requirements concerning antitank guided missiles. Although the existing models of antitank guided missiles can be integrated with helicopters, nevertheless some of their tactical-technical characteristics reduce their effective combat use when used integrally with helicopters. Thus with the present range of missile fire, a helicopter must remain for a considerable period of time in the strike zone of enemy anti-aircraft means (large caliber machine guns, tanks and self-propelled guns); and this is dangerous. Factors which could adversely affect the use of antitank guided missiles from helicopters are the comparatively large size of missile stabilizers and the cumbersome packing of the missiles. Another serious shortcoming is the lack of missiles with nuclear charges. It is clearly necessary to improve the tactical-technical characteristics of the missile (increase its range of fire, for example, up to five kilometers and its speed up to 300 meters per second; increase the force of the warhead by using a nuclear charge; reduce the dimensions of the missile by using shorter, or folding, stabilizer wings; and improve the laying mechanism).

Improvements in antitank guided missiles will allow a helicopter to carry a large unit of fire; will shorten the time needed to fire all the missiles installed on the launching rails; will reduce the possibility of the missiles being destroyed in flight; will shorten the length of time the helicopter must remain in the zone of enemy antiaircraft fire; and will also permit it to strike group targets. Calculations show that an antitank helicopter

reserve of two to four helicopters carrying four antitank guided missiles, with a nuclear yield of two kilometers each, can put out of action up to four enemy tank companies in a short period of time.

It is our view that, on the basis of a comparative evaluation of helicopter armament and of tactical rockets and antitank guided missiles, it is possible to prove the possibility and need for their integrated use. This will allow an increase in the mobility of tactical rockets and antitank guided missiles.