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CENTRAL INTELLIGENCE AGENCY
WASHINGTON, D.C. 20505

2 March 1977

MEMORANDUM FOR: The Director of Central Intelligence
FROM : William W. Wells
Deputy Director for Operations
SUBJECT : MILITARY THOUGHT (USSR): Features of
the Combat Employment of Rocket Troops
and Artillery in an Offensive Operation
of a Combined-Arms Army in Mountains

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 explores several features unique to an army offensive operation in mountainous areas, based on experience acquired in the Turkestan Military District. The main emphasis is on the employment of rocket troops and artillery and the problems involved in establishing the groupings of these forces, reconnaissance and selection of siting areas, and the planning of missile strikes and artillery fire. The problems of relocating missile units and their heavy equipment in mountains and the engineer operations required for this, delivering missiles and artillery ammunition, and certain aspects of control and communications, also are examined. This article appeared in Issue No. 1 (80) for 1967.

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. For ease of reference, reports from this publication have been assigned

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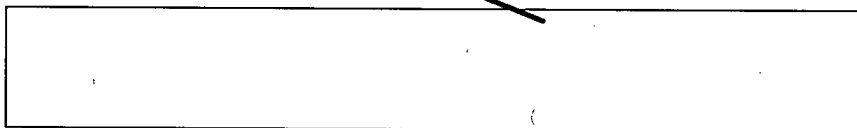
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Intelligence Information Special Report

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COUNTRY USSR



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MILITARY THOUGHT (USSR): Features of the Combat Employment of Rocket Troops and Artillery in an Offensive Operation of a Combined-Arms Army in Mountains

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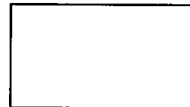
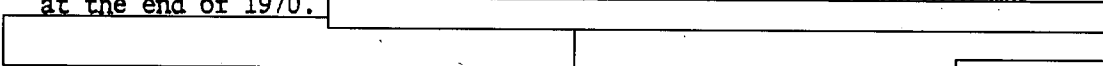
Summary:

The following report is a translation from Russian of an article which appeared in Issue No. 1 (80) for 1967 of the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal 'Military Thought'. The author of this article is General-Leytenant of Artillery G. Peredel'skiy. This article explores several features unique to an army offensive operation in mountainous areas, based on experience acquired in the Turkestan Military District. The main emphasis is on the employment of R-300 missile units and artillery and the problems involved in establishing the groupings of these forces, reconnaissance and selection of siting areas, and the planning of missile strikes and artillery fire. The problems of relocating missile units and their heavy equipment in mountains and the engineer operations required for this, the use of helicopters to deliver missiles and artillery ammunition, and certain aspects of control and communications, also are examined.

End of Summary

Comment:

Marshal of Artillery Georgiy Yefimovich Peredel'skiy is Commander of the Rocket Troops and Artillery of the Ground Forces. The SECRET version of Military Thought was published three times annually and was distributed down to the level of division commander. It reportedly ceased publication at the end of 1970.



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Features of the Combat Employment of Rocket Troops
and Artillery in an Offensive Operation of a
Combined-Arms Army in Mountains
by
General-Leytenant of Artillery G. Peredel'skiy

Experience from a great number of exercises and from training, as well as specialized research conducted in the Transcaucasus Military District, have shown that the combat employment of rocket troops and artillery under conditions in a mountainous theater of military operations involves certain unique characteristics which the command and staff must consider when planning the organization and conduct of operations.

The establishment of a grouping of rocket troops and artillery of an army. When making a decision for an offensive operation and for the establishment of groupings of army troops by axes, it should be kept in mind that the regrouping of large units and units, including missile and artillery units, to other axes during combat operations entails great difficulties and, in a number of instances, is impossible due to the lack of routes which would allow the passage of columns.

The initial grouping of rocket troops and artillery of the army must be set up so that it can provide continuous action against the most important enemy targets on the axis of the main attack of the army and maneuver fire to protect the flanks during the entire operation without having to regroup. In resolving this matter it is necessary to consider in detail the capacity of axes, the possibility for relocating large-size missile equipment over the routes, and also conditions for the organization of missile technical support. These provisions were quite strikingly corroborated during war games conducted at the end of 1966 on the southern axis.

The main and alternate siting areas and deployment areas for missile and missile technical units of the army for the accomplishment of tasks in the initial operation are determined under peacetime conditions. Extremely rugged mountainous terrain having a large number of areas which are difficult to negotiate considerably complicates the conditions for selection of these sites. The need for alternate siting areas for maneuvering rocket troops and artillery in mountain regions increases in

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connection with the rates of advance of the troops which are lower than upon unbroken terrain.

The experience of exercises shows that in the initial position, in addition to the main siting area, an army R-300 missile brigade needs at least two designated alternate areas. This is made necessary by the fact that it is not desirable for a missile large unit to be positioned in the same siting area for more than 24 hours since the enemy, having determined the location of our missile means, is able to deliver a strike against them. For this reason, the brigade must be capable of moving from the main to alternate siting areas after the accomplishment of tasks in the initial nuclear strike. It is desirable to select one of these siting areas close to the permanent deployment point of the missile brigade at a distance of 10 to 12 kilometers from it.

The unique characteristics of mountain relief quite often make it necessary to echelon the brigade siting area along the axial roads which, as a rule, pass through mountain ranges, and along river valleys and ravines. The brigade battle formation, accordingly, extends up to 50 or 60 kilometers in depth, hindering the organization of stable communications with battalions and decreasing the available range of fire.

Sometimes, when a brigade is deploying from the march in mountain areas it is necessary that a siting area be designated which has less than the prescribed area (eight to ten kilometers wide and 20 to 30 kilometers deep) and subunits positioned at short distances with maximum use of protective terrain features. In this case, main and launch positions are chosen which lie on the spurs of hollows and in ravines at a distance of 1.5 to 2.5 kilometers, and sometimes as much as five kilometers, from one another. Some reduction of the distance in comparison to that which is prescribed does not, in fact, increase the danger that the two launch positions may be destroyed by one nuclear burst since there are protective crests between the two positions.

In view of the difficulties involved in selecting launch positions, as well as approach routes to the positions in mountain areas, the work of reconnaissance groups acquires particular importance. Their main tasks are: the selection of level areas for location of launch positions (for this purpose, they are equipped with devices for measuring possible listing of the launcher); designation of helicopter landing sites in the siting areas of each battalion and near the deployment areas of the brigade technical battery and the army mobile missile technical battalion, and preparation of these sites (landing sites must measure 400 by 100 meters);

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reconnaissance of the launch positions of the tactical missile batteries with regard for launches against targets over the crests of the elevations; determination of whether it is possible for equipment to pass over viaducts and through tunnels, the width of bridge passageways (for which it is necessary to have special measuring poles with dimensions corresponding to those of the missile equipment); the selection of the shortest maneuvering routes within the siting area; assessment of the possibility of moving large-size equipment on the routes (in passes and canyons), especially when the turning radius is short, and also the seeking out of fords across mountain rivers since a majority of bridges have small load capacities.

The selection of artillery fire positions is also based on the unique features of operations in mountain areas. For gun artillery, it is better to have such positions on the flanks of the offensive zones of the large units and, at times, to pull them back into the depth so that destruction of targets on the forward edge of the enemy defense will be ensured. In some instances, the artillery batteries will occupy not one, but two positions (by platoons) echeloned with the elevation. When selecting fire positions for direct-aiming guns it is necessary to determine the possibility for tiered positioning of them for the simultaneous destruction of targets at all tiers of the enemy defense.

We should not select launch and fire positions which are too close to mountain rivers and streams, in dry river beds, in depressions or hollows, or in the immediate vicinity of a precipice since, in the event of heavy rainfall in the mountains or intensive melting of snow, the channels of even dry rivers and streams may be rapidly transformed into rushing mountain torrents and cause landslides.

In order to reduce the time required for preparing siting areas under mountainous conditions, it is necessary to make broad use of demolition techniques in the conduct of engineer operations and to utilize natural cover.

Judging by the experience of exercises, the optimum distance of siting areas from the national border in mountainous terrain is six to 15 kilometers for tactical missiles and 40 to 60 kilometers for operational-tactical missiles. In deploying missile brigades near a garrison point, this distance may be as much as 150 to 200 kilometers. An army missile technical unit is deployed on the main axis of army troop operations at a distance of 40 to 50 kilometers from the border.

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Planning rocket troop strikes and artillery fire. In planning missile/nuclear strikes, the effect of mountain terrain on the casualty-producing elements of a nuclear burst must be taken into consideration. In certain instances, this permits employing lower yield nuclear warheads to destroy enemy targets, without lessening the damage inflicted. This is occasioned, in particular, by the following circumstances. The atmospheric transmittance contributes to an increase in the radius of zones of destruction by direct thermal radiation flashes. Repeated reflection of the shock wave in mountains may lead to a considerable increase in its effective duration, and in a number of instances to an increase of overpressure. Thus, the destructive effect of shock waves on the slopes facing the ground zero (center) of the burst is, depending upon their steepness, almost doubled (on the reverse slopes it decreases 10 to 50 percent); when a shock wave spreads along a ravine as opposed to even terrain, the destructive force increases four to six times.

Considerable damage will be inflicted on the enemy target when the air burst occurs at the most favorable altitude, that is, at a point which, when projected upon the slope's surface, coincides with the center of the target to be destroyed. In order for an air burst to destroy targets located on the slopes or at the foot of a ridge, the aiming point must be brought toward the slope to by one to 1.2 times the range probable error when the slope is more than 45 degrees.

Destruction of the enemy in narrow passes and ravines presents considerable difficulties: the majority of these areas are less than one to two times the deflection probable error in width, and for this reason, due to the dispersion of missiles, the probability of obtaining a burst over the pass (ravine) is small -- for a ravine with a width of one to two times the range probable error (deflection probable error) $P = 25 \div 50$ percent. Consequently, in destroying enemy columns, it is desirable to establish an aiming point over the widest sections of the ravine (pass) or to deliver strikes against them as they emerge from the ravines and passes.

It is possible to inflict great destruction on enemy troops when they are winding through mountain pass sectors where, within a small area, the road spirals for a distance of up to several tens of kilometers, creating an artificial massing of troops.

When planning ground nuclear strikes it should be remembered that radioactive fallout levels on mountain slopes on the windward side will be higher, and on leeward slopes -- lower than upon level terrain: two to three times lower at a distance of 10 to 15 kilometers from the center of

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the burst, five times lower at a distance of from 50 to 100 kilometers and 10 times lower at a distance greater than 100 kilometers. Ground nuclear bursts in mountainous areas may cause landslides, obstructions and the formation of artificial reservoirs in the ravines (canyons), and thus impede the advance of the troops. Therefore, recourse to such strikes is possible only in situations where there can be no doubt as to their practicality.

For the delivery of a strike using a missile with a nuclear warhead, the subunit allocated first is the one whose strike will ensure the attainment of the required results with a nuclear warhead of the lowest yield.

When employing chemical missiles, it is necessary to consider the possibility of prolonged stagnation of the contaminated air in defiles, hollows, and forests as well as penetration through ravines and valleys to the disposition area of one's own troops.

Artillery in mountain areas plays an important role in the destruction of the enemy where nuclear and chemical weapons are not employed or cannot be employed due to the conditions of the situation and terrain; as before, it remains the primary means of close fire support for tanks and infantry in close combat.

In mountainous areas, artillery usually is used in a decentralized manner. Preparatory fire is organized along the axes of the actions of combined-arms large units. The primary role in its immediate organization belongs to commanders and staffs of large units, and the key individual responsible for the accomplishment of the tasks of preparatory fire and fire support for the offensive is the chief of artillery of the division with his staff.

To support the crossing of a national border by large units of the army's first echelon in the initial period of war, it is desirable to determine the duration and structure of preparatory fire in the army, whereas fire planning should be carried out in the divisions. On the axis of the main attack this planning may be carried out by the staff of the rocket troops and artillery of the army, especially in the event that the main attack is delivered by the adjacent flanks of two divisions.

The duration and structure of preparatory fire is determined by the nature of the enemy defense in the border zone and by the necessary degree of its neutralization, by the number and yield of nuclear strikes

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delivered, and also by the presence of conventional means of destruction, though when a breakthrough from the march occurs, which is most characteristic of the initial period of war, another determining factor is the time needed by first-echelon large units for movement to the national border and deployment. According to the experience of exercises, the duration of preparatory fire was 25 to 50 minutes.

The principal method of fire support of a troop offensive in mountainous areas is successive neutralization of enemy personnel and fire means through concentration of fire in combination with fire against individual targets by batteries and direct-aiming guns. When selecting targets for destruction by artillery it is necessary to consider the nature of the propagation of the shock wave from our nuclear bursts on the mountain slopes and ravines. A lesser expenditure of warheads should be planned against individual targets which have received partial destruction from nuclear bursts. It is advisable to destroy personnel and fire means deployed on the reverse slopes, in ravines, canyons and other shelters with mortar fire, high-angle fire and high-explosive howitzer shells.

It is more advantageous to employ chemical warheads against artillery batteries and especially mortar batteries, as well as against personnel and fire means on the flanks of attacking troops and against approaching reserves in ravines, canyons and mountain passes.

During an operation in mountainous areas, army troops must break through fortified areas which are sometimes equipped with permanent defensive installations. Thus it is necessary ahead of time to plan for nuclear strikes to be delivered against them by the rocket troops, to form special fire groups (including guns with a caliber of 100 millimeters and greater) for the destruction of permanent strong points with direct fire as well as with fire from indirect positions, and to allocate large-caliber artillery to assault groups. The control of such a group in the division must be carried out by the division chief of artillery.

The expenditure of ammunition for the destruction of targets in mountain areas is determined by taking into account the incline of the slopes upon which the target is located and the direction of fire. When firing for effect upon unobserved personnel and fire means deployed in the open and situated on slopes with a 20-degree or greater pitch angle, the ammunition expenditure rate is decreased one and a half times (if directed toward the fire positions) or increased one and a half times when the targets are located on the reverse slopes. Under the same conditions, when firing for effect upon unobserved sheltered personnel and fire means, the

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ammunition expenditure rates decrease or increase by one quarter.

If the firing is conducted along a slope of 20 degrees or more, then the ammunition expenditure rate increases one and a half times for the destruction of both sheltered personnel and fire means and those situated in the open.

To destroy enemy strong points at the most important key positions situated on the mountain slopes in the vicinity of passes and gaps, and also to support the actions of flanking detachments, it is desirable for commanders of the combined-arms units and large units to have small nuclear weapons on hand. The employment of these weapons against enemy strong points and other important targets in the vicinity of mountain passes and gaps does not cause great damage to the sections of road that are in the passes and at the same time provides reliable destruction of the enemy.

Planning the relocation of battle formations. In view of the limited number of routes for the relocation of the missile brigades of an army operating in mountains on the axis of the main attack of a front, it sometimes is desirable to do the planning in the front, as was done, for example, in a war game during the fall of 1966. This is especially important if the army and front missile brigades are relocated along a single route.

It is recommended that the relocation only of army missile and missile technical units be planned in the staff of rocket troops and artillery of the army, but that divisions be advised of the times the missile battalions are to be ready for the delivery of strikes when the army is carrying out the most important tasks of the operation, and of the number of launch batteries allotted from them in accordance with the army's plan.

As the experience of exercises shows, missile units in mountainous terrain may be moved at the following rates of speed:

- columns of tracked vehicles being moved on heavy-load trailers: daytime -- 10 to 12 kilometers per hour, at night -- eight to ten kilometers per hour;
- columns of wheeled vehicles and mixed columns when following launchers under their own power: daytime -- 15 to 20 kilometers per hour, at night -- 12 to 15 kilometers per hour;
- all columns on mountainous pass sections of roads and in canyons: six to eight kilometers per hour.

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A considerable portion of the mountain roads do not permit normal carrying out of a march without special engineer preparation. For this reason, there must be advance preparation of the routes: widening of road sections on turns, leveling of steep up and down grades, patching of potholes, repairing of bridges, construction of bypasses and clearing of obstructions and debris. The experience of exercises shows that, in mountains, the preparation and maintenance of one 400-kilometer route having one or two passes will require up to two engineer road battalions. It is necessary to include the organic engineer-combat engineer subunits of the missile brigade in the reconnaissance groups, and to allocate some of them to the battalions for immediate engineer support of their march during relocation of battle formations.

Judging by the experience of exercises, when organizing the relocation of missile units in mountains it is necessary to: indicate precisely the profile and length of the route and to determine the possible movement speed of the columns; to carry out a number of measures for special equipping of combat and transport vehicles; to supply units and subunits with means to facilitate negotiation of up and down grades, sharp turns and sections of the route which are difficult to negotiate and without roads; to organize the provost and traffic control service, movement control, security, and belaying of vehicles on difficult sections of the route (passes, canyons); to arrange short halts not on a time basis, but depending on route difficulty and the availability of suitable sections on the route for stopping the columns. Along with this, requests for aerial photography of the prospective relocation route must be submitted.

Mountainous terrain greatly affects the technical capabilities of launchers, prime movers, motor vehicles, helicopters and other means powered by internal combustion engines, and this, in turn, affects their combat employment. Experience indicates that with an increase in the altitude above sea level, the power output of launcher engines drops an average of seven to eight percent, and of motor vehicle engines -- 10 to 11 percent -- for each 1,000 meters of altitude.

The physical demands on mechanic-drivers of launchers and on truck drivers in the mountains are exceptionally great. Time studies have shown that for movement along a paved mountain road, the mechanic-driver is required to use the operating levers 18 to 20 times more often than when driving on flat terrain, and for off-road driving -- 100 to 200 times per kilometer of travel. Hence, in order to provide uninterrupted movement in the most intense periods of battle, each crew must have an alternate mechanic-driver (driver).

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The relocation of an army missile brigade in the mountains may be carried out either by battalions or in two groups: a battalion and the brigade minus a battalion. In the course of an army offensive operation in the mountains with a depth of from 300 to 350 kilometers and a duration of eight to nine days, an R-300 brigade may be relocated three or four times in 80 to 100-kilometer moves.

Missile battalions of motorized rifle divisions are relocated in such a manner as to ensure constant readiness to carry out the fire tasks of not less than two launch batteries. This is achieved only when battalions are relocated by batteries. When the rates of advance of the troops are higher (more than 30 to 40 kilometers in 24 hours) another relocation variant for the above-mentioned battalions is possible: first, one battery or a battalion minus a battery is relocated, then the other parts of the battalion as they become ready.

Communications play an important role in the successful resolution of this problem. Mountain terrain conditions and the screening effect of mountain ranges on the operation of radio means require that separate radio links be set up for communications with the army missile brigade, with the mobile missile technical base and with the missile battalions of divisions, and for this it sometimes is necessary to allocate additional radio-relay sets.

In mountains, the maneuvering of rocket troop strikes and artillery fire acquires great importance. Thus, during a war game in 1966, the front allocated a missile unit from another distant axis to carry out tasks on the axis of the main attack.

It is an extremely complex matter to provide continuity in the destruction of the enemy by means of missile/nuclear and chemical strikes and with artillery fire in the course of an offensive in the mountains. The greatest difficulty here is in organizing the delivery of missiles to the army missile brigade and the missile battalions of the divisions. From the standpoint of speed and reliability, the delivery of missiles in mountains is best accomplished by using MI-6 helicopters. For distances of from 150 to 200 kilometers they are able to deliver missiles three or four times faster (and sometimes even faster) than motor transport. Thus, for ground delivery of tactical missiles from the front mobile missile technical base to a missile battalion of a division over a distance of 354 kilometers, negotiating two passes and canyons along an unused prepared route required 25 hours, whereas an MI-6 helicopter covered the distance in only six hours and 20 minutes, which included the time it took to deliver

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the missiles to the airfield, to load, unload and deliver them to the missile battalion.

When helicopters are used, the personnel of the missile transport subunits, technical batteries and missile technical support platoons of the battalions must be instructed in the loading and unloading of missiles transported by helicopters. In the military district such instruction is accomplished with the use of special trainer equipment.

In order to prepare missiles in a timely manner and deliver them to the missile brigades of an army operating on a separate, isolated axis, it is desirable in some instances to maneuver the missile technical subunits. Essentially, one group of the assembly brigade of the mobile missile technical base is attached to a missile large unit, and works in close cooperation with the technical battery of the large unit under the direction of the deputy commander of the missile engineer service.

In mountainous terrain, especially at night, it is quite difficult to find deployment areas for the technical batteries of the missile brigades and for the technical servicing points of the battalions. To facilitate the delivery of missiles from the mobile missile technical base to the missile units it is necessary to establish rendezvous points for missile transports, placing them near distinctive local features which are easily seen on the terrain at any time of day.

In the course of the operation it may be necessary to redirect (to maneuver) missile transports which are en route onto other axes of troop operations. Instructions to carry this out may be sent through the control points of road-traffic control units of the army on the route or by special liaison helicopters. The experience of exercises has shown that for the most reliable communications with missile transports (combat units) it is desirable to have radio means in each transport. In these cases a special radio communications scheme is worked out which includes the following subscribers: the mobile missile technical base, the missile transport, the missile unit to which the missile is delivered, and the chief of the rocket troops and artillery of the army. To accomplish this task, the matter of reinforcing missile technical units with communications means must be accomplished.

In view of the special difficulties of maneuvering antitank reserves along the front in mountains and the occasional requirement for reinforcing separate, isolated axes with antitank means, it is advisable for the army to have an antitank reserve consisting of a battery (battalion) of antitank

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guided missiles adapted for helicopters.

When organizing ammunition supply to the artillery, the fact that the army depot will be located on the axis of the main attack must be considered. For uninterrupted supplying of ammunition to the large units operating on separate, isolated axes, it is desirable to deploy a branch of the army depot and in some instances to deliver ammunition from the nearest branches of the front depots. In the troops, increased reserves of ammunition must be formed with an eye to support of a division battle over one or two days. Helicopters are an especially effective means of delivering ammunition in mountains.

Control of the rocket troops and artillery of the army during an operation is carried out, as a rule, in a decentralized manner, with the exception of the missile brigade and the mobile missile technical base. In some cases (in carrying out the most important tasks) the chief of the rocket troops and artillery of the army may centralize the control of all missile units on the axis of the main attack of the army. Communications with mobile missile technical base subunits which are supplying missiles (warheads) to the troops must be continuous along the entire route through mountainous terrain. The accomplishment of this matter must be given primary attention in the army staff.

In view of the absence of reliable radio communications means capable of providing communications during movement, the control of missile units during relocation of the battle formation is especially complex, particularly if it is necessary to deploy a missile brigade (battalion) from the march or change the siting area in connection with a refinement of the relocation plan. For this, as well as for the solution of other problems which may arise suddenly during an operation, helicopters on alert must be placed at the disposal of the commander of rocket troops and artillery of the army.

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