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The Combat Utilization of Front Cruise Missiles
in a Front Offensive Operation

by

Colonel P. Plyachenko

As is known, the main role in achieving the goals of a modern offensive operation is played by the missile troops. Their significance is particularly great in fulfilling basic fire tasks and winning fire superiority over the enemy. In connection with this, very rigid demands are made on modern missiles as regards their technical and operational-tactical suitability. The missiles must possess adequate range, accuracy of fire, rapidity of fire, and maneuverability on the battlefield; the yield of their nuclear charges must ensure the destruction of various targets -- both point and group -- in the entire depth of the offensive operations of combined arms and tank formations; in addition, the missiles must be capable of besting the enemy's most powerful antiair defense.

The ballistic missiles of operational-tactical and tactical designation that are presently in the armament still do not fully answer all the indicated requirements, especially as regards dispersion and the yield of the nuclear charges. The dispersion of operational-tactical ballistic missiles with a self-contained (avtonomnaya) guidance system has parameters that are too large (one Vdp is 0.4 to 0.8km, and even more, sometimes), as a result of which it is necessary to expend nuclear charges with too large a yield to destroy enemy objectives. In those cases when small enemy objectives (such as nuclear/missile weapons at launching sites, depots of nuclear warheads, control points, bridges) are located at the maximum range of fire of the ballistic missiles, the latter will not always be able to destroy them even with a nuclear charge of maximum yield, because of the deviation, that increases sharply with the range. And as is shown by the analysis of the defense of our probable enemy, and the possible grouping of his forces and means, more than 50 percent of the objectives subject to destruction by the fire means of a front are small targets and point targets. A significant part of them

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is located in the tactical rear and in the operational depth, i.e., at the maximum range of the tactical and operational-tactical ballistic missiles. Research and calculations show that, in order to destroy point targets with 90 percent probability, using ballistic missiles, it is necessary that one Vdp of these missiles be reduced two, three, or more times in comparison with the probable errors of existing missiles. This problem has not yet been resolved.

In connection with the above, it becomes quite apparent that operational-tactical and tactical ballistic missiles cannot yet be the single fire means capable of fully destroying targets that vary in their nature, in an offensive operation; front missile troop operations (especially operational-tactical missile units) must be supplemented by operations of front aviation and front cruise missiles (frontovaya krylataya raketa).

A series of exercises with troops, and research, show that the best results in operations are achieved in those cases where all fire means of the front, such as ballistic missiles, cruise missiles, aviation and artillery - operate in close conjunction.

In this article we would like to examine in greater detail the combat characteristics, potentialities and the combat employment of front cruise missiles in a front offensive operation, since these questions have not yet been elucidated adequately in the pages of our military press.

As is known, our army is armed with short- and medium-range front cruise missiles. They are intended for the destruction of important, and, as a rule, fixed, ground installations of the enemy, located in his tactical and operational depth.

The great destructive power of the combat charge of the front cruise missiles, the great accuracy, and the possibility of flying to the target at high speeds and at low altitudes, permit them to inflict powerful strikes against enemy objectives. The significant range and the mobility of the technical means of launching and guiding the flight of the missiles guarantee that the front cruise missile units will have the opportunity to shift strikes from one axis (objective) to another, both along the front and in the depth.

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One of the most important positive qualities of the front cruise missiles is their great accuracy in hitting the target. The accuracy of front cruise missiles, especially the short-range missiles, is already, at the present time, higher than that of bombing by horizontally flying aircraft. The mean error of short-range front cruise missiles at maximum ranges is 0.1km. Because of the high accuracy of the front cruise missiles, they can effectively destroy^a small targets, which advantageously differentiates cruise missiles from ballistic missiles.

Front cruise missiles also have other positive characteristics. Their combat launching may be executed from comparatively small launching areas that can be found on any terrain. All the technical means of assembly, check-out, and launching of missiles, and for guiding their flight, are mounted on motor vehicles that have increased cross-country ability and maneuverability in field conditions.

Front cruise missiles, the same as ballistic missiles, may be utilized in any meteorological conditions, excluding cases when there are heavy thunderstorms on the axes of their operations or when the wind velocity (on the ground and at the altitude of the flight) exceeds the limit for a given type of missile. Short-range missile fire is not permitted with a wind velocity of over 15 to 20 meters per second, but such winds are a fairly infrequent occurrence.

Front cruise missiles have a rather high flight speed and, as a rule, proceed to the target at low altitudes, which promotes surprise of strikes. During flight to a target at altitudes of 400 to 500m, modern radar means can track the missile only 15 to 20km from the line of the front. In order to deliver a strike against an objective located 100 to 150km from the line of the front, the cruise missile will require about 5 to 7 minutes. This circumstance makes it difficult for the enemy antiair defense to combat cruise missiles.

Front cruise missiles are equipped with a conventional or nuclear charge. The nuclear charges may have various yields, which permits the use of front cruise missiles (FKR) against the most varied targets. It does not pay to use cruise missiles with conventional charges. Thus, in order to destroy one hardstand of fighter or fighter-bomber aircraft, up to 20 cruise missiles with high-explosive charges are necessary, while

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with a small-yield nuclear charge one missile is adequate. Therefore, cruise missiles are used primarily as a means of delivering nuclear charges to targets.

The design of the cruise missile warhead permits carrying out air as well as surface bursts.

The possibility of using front cruise missiles with chemical charges is not ruled out. Calculations show that missiles with toxic combat substances (nerve-paralyzing and general toxic action) with high concentrations are fully justified.

Finally, one of the positive characteristics of the cruise missiles is their ability to neutralize detection and guidance radar sets independently during flight. This is achieved by installing an active jamming set in the missile and equipping it with means for setting up passive jamming. In addition it is possible to create cruise missiles in which the programmed flight will provide for course and altitude maneuvers which will significantly complicate their discovery and destruction.

The most substantial fault of the front cruise missiles is their much lower capability to penetrate enemy antiair defenses than that of the ballistic missiles. The experience of firings and calculations shows that the losses of front cruise missiles (flying at an altitude of 400 to 600m) from PVO weapons may sometimes reach 30 percent, while losses of ballistic missiles in this respect are practically equal to zero. Often this circumstance may eliminate the advantages of the cruise missiles over the ballistic missiles in other parameters.

Front cruise missiles, like other pilotless weapons, are constantly in need of accurate reconnaissance data about the objectives to be destroyed, of the jamming of enemy electronic means, of the neutralization of his PVO means, and of other measures of combat and special support which they are not able to carry out fully with their organic forces and means.

Now let us examine the combat capabilities of cruise missiles to destroy various targets. As an example, let us take the most characteristic, in our opinion, targets - the enemy means of delivery of nuclear warheads, since they are small, and consequently, not very vulnerable, and are also very important from the standpoint of their combat significance. Atomic artillery, guided missiles and free rockets, and nuclear-bomb-carrying aircraft, are included in these targets.

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As is known, enemy atomic artillery, free rockets (NURS), and some types of guided missiles (URS), at the firing positions are some of the basic objectives of tactical missile and artillery operations. However, in a number of cases tactical missiles and artillery alone may not be able to cope with the mission of destroying the tactical nuclear weapons of the enemy, especially when a large number of them are uncovered simultaneously on a broad front. Therefore, in order to destroy tactical nuclear weapons of the enemy, the operational-tactical, ballistic, and front cruise missiles, and aviation, will often be brought in.

What is the difference in the expenditure of nuclear charges and missiles - ballistic and cruise, that are necessary for destroying each individual target? In order to destroy fully a battery of atomic artillery in its firing position (an area 1 x 2km), with the guns and personnel located in shelters, it is necessary to have one cruise missile with a nuclear charge of 15 kilotons or two tactical ballistic missiles with a nuclear charge of 20 kilotons each. In order to destroy the launching mounts and rockets (reaktivnyy snaryad) of an "Honest John" NURS battery in its firing position (an area 1 x 0.3km), it is necessary to use one cruise missile with a 10-kiloton nuclear charge or 1 or 2 tactical ballistic missiles, each with a 20-kiloton nuclear warhead.

In order to combat enemy operational-tactical means of using nuclear weapons, front cruise missiles (FKR) will be used jointly with operational-tactical missiles (OTR) and aviation. Let us examine their capabilities. In order to put out of action completely the launching mounts and missiles (reaktivnyy snaryad) of a "Corporal" URS battery in its firing position (an area 1.5 x 2km), one FKR with a 30-kiloton nuclear charge is necessary, or five ballistic OTR, each with a 40-kiloton nuclear charge.

One cruise missile with a 20-kiloton nuclear charge can destroy all the cruise missiles (samolet-snaryad) and launching mounts of a squadron of "Matador" or "Mace" cruise missiles (samolet-snaryad) in their launching zone (an area 3 x 2km). In order to fulfil this same mission, it will be necessary to expend six operational-tactical ballistic missiles, each with a 20-kiloton nuclear charge, or two missiles with 100-kiloton nuclear charges.

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In examining the potentialities of missiles for destroying aircraft carrying nuclear weapons, it is necessary to take the following into consideration. Inasmuch as our probable enemies are striving to have each tactical bomber or fighter equipped to use nuclear bombs, it is necessary to deliver strikes against tactical aviation airfields, calculating on destroying all the aircraft on the airfield without exception. As a rule, the aircraft on a modern airfield are located in a dispersed manner, on hardstands in two or three zones set aside for them. The size of one hardstand of tactical bombers is equal to approximately 600 x 100m, and for fighters - 400 x 100m.

When delivering a strike against a tactical fighter airfield (an area 3 x 3km, with a runway 1.6km long), in order to put out of action the aircraft on hardstands, it will be necessary to launch one cruise missile with a 30-kiloton nuclear charge or four operational-tactical ballistic missiles, each with a 40-kiloton nuclear charge.

In order to put tactical bombers located at an airfield (area 4 x 4km, with a runway 2.3km long) out of action, it will be necessary to use one FKR with a 15-kiloton nuclear charge or two ballistic OTR's, each with a 40-kiloton nuclear charge.

In this way the potentialities of front cruise missiles in the effective destruction of small targets, in particular the enemy delivery means of nuclear warheads, exceed the analogous potentialities of tactical and operational-tactical ballistic missiles by several times.

Front cruise missiles, depending on the situation, can be used to destroy any targets (varying in size, shape, durability etc). Sample potentialities of front cruise missiles for destroying typical targets with nuclear charges are shown in the table.

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Sample Potentialities of One Short-Range Cruise Missile with a Nuclear Charge to Destroy Typical Targets with an Air Burst*

| Type of Target | Yield of Charge (kt) | Expected Result |
|------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------|
| A ZURS battery in its firing position (200 x 300m). | 5 | Weapons put completely out of action. |
| A division or corps command post (3 square km). | 5 | Destruction of shelters and up to 100 percent of the personnel. |
| A command post (field army or group of armies) (6 square km or more). | 15 | Destruction and liquidation of various type structures, means of control and up to 100 percent of the personnel. |
| Tactical aviation control center (1500 x 1500m). | 5 | Up to 40 to 60 percent of technical means and 100 percent of the personnel are put out of action. |
| An infantry company of a battle group (1500 x 1500m). | 5 | Destruction of up to 100 percent of the personnel. |
| A motorized infantry battalion of an armored division in the concentration area (4000 x 2500m), the personnel without cover. | 20 | Up to 100 percent of the personnel are put out of action. |

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| A tank battalion in the concentration area (4000 x 2500m). | 30 | Up to 100 percent of the personnel are put out of action. |
| Ammunition dump (1500 x 2000m). | 30 | Destruction of ammunition located in the open. |
| An army POL depot (1000 x 2000m). | 30 | Destruction of tanks and barrels of POL located in the open. |
| A wooden bridge 400m long. | 10 | Destruction |
| A crossing 200m long. | 5 | Destruction |

* The combat potentialities of front cruise missiles for destroying the nuclear means of the enemy are not included in the Table. They are examined above. All data used in the text and the Table were obtained by means of calculations.

However it should always be remembered that in practice, owing to the powerful countermeasures of the PVO means and some other circumstances (powerful radio interference with the guidance systems, of a thunderstorm and of a storm with gusts of wind higher than 15m/sec.), the use of cruise missiles may often be disadvantageous. This convinces us once again that the existing missile weapons - operational-tactical and tactical ballistic missiles and front cruise missiles - must be used in close conjunction with one another, with well-organized coordination of all arms of front aviation, and sometimes with the artillery.

The combat missions, actual objectives of operations, the sequence of delivering strikes for the front cruise missile units, are usually determined by the front troop commander, or on his orders by the army troop

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commander, taking into consideration the operations of tactical and operational-tactical designation ballistic missiles, aviation, and other means, and in accordance with the missions being fulfilled by the front troops in the offensive operation.

Front cruise missiles may be used when delivering both the initial and the subsequent strikes.

When delivering the initial strike, the targets for the front cruise missiles used together with the ballistic missiles may be: guided missiles and free rockets at standby and fire positions; nuclear warhead dumps and areas for the assembly of missile weapons; enemy division, corps and army reserves in concentration areas; aircraft of tactical aviation on hardstands (airfields); division, corps, and army command posts; radio-technical means of the enemy (communications centers, control centers and guidance centers for antiaircraft artillery (ZA), antiaircraft guided missiles (ZUR), fighter aviation (IA), etc); supply bases, railroad centers, stations, junctions of surfaced and unsurfaced roads, bridges, ports, and others.

Using cruise missiles, it is first expedient to destroy small (point) fixed targets, located at a distance of 15 or 25 to 150km or more from the front line. Ballistic missiles usually draw the large targets screened by powerful PVO. Fighter-bombers, using conventional and nuclear weapons, operate mainly against mobile and small targets of special importance (missiles on launching mounts, points of assembly for nuclear charges, control and guidance stations, and others).

The use of cruise missiles jointly with ballistic missiles achieves special significance when delivering the first strike in complex meteorological and atmospheric conditions, when the operations of the bombers and fighter-bombers are limited.

Depending on the time available, meteorological conditions, the ground and atmospheric situation, and other factors, it is expedient to use cruise missile units in the first strike with the maximum permissible fire output. This will permit the freeing of aviation for the air support of troops and the reduction of flight personnel and aircraft losses to the minimum.

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As a rule, the objectives of cruise missile operations, when delivering the first strike, will be located in the depth of the enemy defense. However, in some cases their use in close coordination with tactical missiles, rocket and field artillery, and against objectives located in immediate proximity to friendly troops, cannot be ruled out. In connection with this, it will be necessary to determine the minimum safe distance (\underline{U}_{bez}) of objectives of front cruise missile operations from friendly troops by the formula-

$$\underline{U}_{bez} = \underline{R}_{bez} + 4\underline{VO},$$

where \underline{R}_{bez} - is the safe distance from the epicenter (center) of the nuclear burst (taken from the tables);

$4\underline{VO}$ - the value which takes into account the possible deviation of the cruise missile from the intended center of burst in dispersion (one \underline{VO} of a short-range cruise missile is equal to 0.1km).

When delivering subsequent strikes during a front troop offensive, front cruise missile units can be used together with ballistic missile units for the following purposes: to destroy and neutralize army and corps reserves in the concentration areas; to destroy enemy means of nuclear attack; to disrupt the control of his troops by means of strikes at command posts of army corps and field armies, and also against control and guidance centers of tactical aviation; to disrupt the work of the rear area by means of strikes against army depots and ammunition, fuel, foodstuffs, and other supply points.

Front cruise missiles can be used when repelling enemy counter-strikes, by delivering strikes against his troops in concentration areas or on lines of deployment. However, this mission can be fulfilled only with the advance determination of the exact coordinates of the areas and lines, and also the times during which enemy troops will be located in them.

In a number of cases, front cruise missiles can be used during an operation to destroy bridges, crossings, and other analogous objectives (targets), especially when it is necessary to hinder the withdrawal of the enemy troops.

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In an overwhelming majority of cases, all of the objectives of operations listed will be located at a considerable distance from the advancing troops, and it will be much more difficult for an airplane to reach them in order to deliver strikes than for cruise missiles. Therefore, during a front troop offensive it is expedient to use the fighter-bomber aviation for strikes against mobile targets and objectives of special importance located in immediate proximity to the advancing troops, and ballistic and cruise missiles - against the more distant and stationary objectives, and the cruise missiles specifically against the small targets.

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When the air situation is favorable, front bombers will deliver strikes against targets located in the enemy rear area. Moreover, their operations may be carried out in the operating zone of the front cruise and ballistic missiles. In this case, coordination is organized between the missile weapons and front bombers. The latter are usually assigned objectives with weak PVO cover and targets that have not been reconnoitered sufficiently from a geodetic standpoint.

In our opinion, the best use of front cruise missiles and their greatest combat effectiveness is achieved with the centralized control of FKR units on the scale of a front, without attaching them to combined-arms or tank armies.

However, it should be kept in mind that in a number of cases it may be necessary to deliver nuclear strikes by front cruise missiles according to decisions of army commanders, and sometimes commanding officers of divisions. For example, this can occur when the need arises for the reliable destruction of small, important fixed targets (for example, nuclear/missile weapons of the enemy or his control points), located beyond the firing ranges of artillery and tactical missiles, in which aviation, because of powerful PVO or complex meteorological conditions, cannot fulfil this mission, and the operational-tactical ballistic missiles, because of their great deviation, are found to be ineffective when used against point targets with charges of certain yields. In such cases, the commanders of combined-arms or tank formations will need cruise missiles as the most dependable means for destroying small and point targets that are of special importance.

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In order to deliver front cruise missile strikes in operating areas of a combined-arms or tank army, at the decision of their commanders, it is not at all obligatory to attach units or subunits of cruise missiles to these armies. It is sufficient to envisage the necessary forces and means of front cruise missile units to support the armies. The detached forces and weapons must constantly be at increased combat readiness for immediate operations at the requests of army commanders. The latter must know in advance how many cruise missiles, with nuclear charges of what yield, are put at their disposal by the front, and by when they will be prepared for launching. In the plans of the combat utilization of fire means of the armies, the use of the FKR should be planned accordingly by missions of troops, and the timing of operations, methods of specifying the objectives of the strike, and the call for cruise missile fire from the command post of the army, must be worked out in detail. 50X1-HUM

As practical use of front cruise missiles in offensive operations shows, the army commanders may successfully carry out the specification of the objectives of the operations, the timing of delivery of strikes, and the call for fire by cruise missiles, within the framework of the allotted limit, through the operational group of the air army or the aviation representatives or, in their absence, directly through the command post (KP) of the air army or of the front. Moreover, the commander and staff of the army, on behalf of which the front cruise missile units are carrying out combat operations, must transmit the following data to the executors each time:

- the objectives (targets) of the operations and their exact location;
- time and method for delivering the strikes and what destructive results must be achieved;
- the yield of the nuclear charge and the altitude of the burst;
- alternate objectives (targets);
- the method of calling for the fire of cruise missiles at the primary or alternate targets, and others:

According to experience, the assignment (specification) of tasks

to cruise missile units or for the passing of the request for a strike from the KP of the combined-arms or tank army to the KP of the air army, and further to the KP of the cruise missile units, requires little time (5 to 15 minutes).

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Very important questions for the planning of combat utilization of front cruise missiles are the selection of objectives for the operations, taking into consideration the combat and technical capabilities of the missiles in the actual situation and the organization of coordination of the front cruise missiles with the missile troops and front aviation. As the experience of troop exercises and command-staff games has shown, the greatest number of errors and inaccuracies of the participants were tolerated in these very questions.

When selecting targets for destruction by front cruise missiles, it is necessary to be guided by the following basic conditions.

First of all, targets for destruction by front cruise missiles should be selected beyond the extreme ranges of the tactical missiles and artillery of the ground troops.

The great accuracy of front cruise missile fire, especially the short-range ones, permits, as was previously indicated, their use for destroying small, important objectives, on which strikes with other weapons have little effectiveness or demand a great expenditure of forces and weapons.

And finally, it is expedient to utilize front cruise missiles against the most important fixed objectives, the coordinates of which are accurately established, irrespective of radar contrast and the degree of their camouflage.

With front cruise missiles it is hardest to destroy those targets that are immobile for only a short time. First of all, these targets include missile weapons at the launching sites and aircraft on airfields. In order to destroy them it is necessary to discover the locations of aircraft hardstands at airfields and prepared missile launching sites (primary and alternate), to determine their coordinates, to prepare all the calculated data for the launching of missiles against each target, and constantly keep individual duty subunits in readiness for launching, carrying on constant observation of the designated

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objectives from the air. With the identification of any launching site for missile weapons, or of aircraft on airfields, the launching of a missile is carried out with minimal expenditure of time for its preparation.

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Front cruise missiles, as indicated above, may be used with nuclear charges of various yields, so one of the important tasks when carrying out calculations for the destruction of selected objectives (targets) is the correct determination of the yield of nuclear charge necessary to achieve the prescribed degree of target destruction. The yield of the charges is determined by selecting the required radius of destruction depending on the size and nature of the target and corresponding to the fire mission that was received (destruction, neutralization), and also taking into consideration the dispersion of the missiles. The expected results can be determined graphically or by calculations with the aid of special tables. On the whole, the methodology of calculating destruction by front cruise missiles does not differ basically from the calculations of destruction by other types of nuclear warheads.

The great significance of coordinated, joint utilization of tactical and operational-tactical ballistic missiles, front cruise missiles, and front aviation to achieve success in an operation has been pointed out above. However, at exercises there have been cases when cooperation between these weapons was organized without taking into consideration all their weak and strong points, and without thorough analysis of the actual situation. Often the cooperation of front cruise missiles with ballistic missiles in the initial and subsequent strikes was actually limited to the distribution of targets between them, depending on their range of operation. Moreover, the nature of the targets, and especially the status of anti-air defense along the routes (trass) of flight and in the target areas were not fully evaluated. During the organization of joint operations of front cruise missile units with units of front aviation, lack of coordination was permitted in the timing of operations against objectives located in general areas or on the aircraft flight routes.

As is known, the cooperation of front cruise missile units with formations and large units of front ground troops, with front (army) ballistic missile units and front aviation, is organized by the front troop commander and his staff.

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When assigning combat missions to the operational-tactical ballistic missile and front cruise missile missile troops, the senior commander informs the commanding officers of missile large units and units about matters that are subject to coordination and specifies the method for working out the prescribed cooperation.

When organizing the cooperation of front cruise missile units with combined-arms (tank) formations and large units, the timing and objectives of missile strikes and ground troop operations are coordinated. The maximum use by combined-arms (tank) large units and units of the results of missile strikes is achieved in this way, and the possibility of delivering strikes on friendly troops is excluded, especially during an offensive operation carried out at high tempos. The commanding officers of missile units must specify, in a timely manner, the positions of ground troop units and large units by the moment of the delivery of missile strikes, the timing and objectives of missile and artillery strikes delivered by large units (units) cooperating in the same area with front cruise missile units, and the method of mutual information.

Cooperation between missile and aviation units and large units consists of delivering joint strikes against objectives in the same area simultaneously or at different times. Besides, on behalf of aviation, front cruise missiles can deliver forestalling strikes, neutralizing the means of antiair defense, and disrupting control and guidance of fighters and antiaircraft guided missiles of the enemy. In turn, aviation can support missile units with aerial reconnaissance data about enemy objectives and the results of missile strikes delivered against them, and also with the means of radio countermeasures.

When assigning missions and organizing cooperation between front cruise missile units and piloted aviation, such factors as the time necessary to prepare missiles for combat launchings and aircraft for take-off, the possibilities of delivering simultaneous strikes with missiles and delivery aircraft, the possibilities of retargeting missile and aviation units, the capability of the missiles and aircraft to deliver strikes against targets suddenly discovered during operations (unplanned targets), vulnerability to enemy PVO, etc, must be taken into consideration with special thoroughness.

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During joint delivery of nuclear strikes by front cruise missiles and ballistic missiles against objectives located in the same enemy area, it is necessary to coordinate strictly and adhere to the timing of the strikes, taking into consideration the direction of flight of the cruise missiles in order to avoid damaging the latter with the bursts of the ballistic missiles. For example, if the objective of the ballistic missile strike is located closer than the objective of the cruise missiles and is located on the flight path of the latter, then the strike with ballistic missiles must be delivered after the cruise missiles have flown by, or a little before they fly by.


Front cruise missiles, as was pointed out before, have considerably greater potentialities for overcoming antiair defense means than have piloted aircraft, but are inferior in this respect to ballistic missiles. Therefore, when organizing the combat utilization of missile weapons, it is necessary to provide for the neutralization of the PVO means by ballistic missiles, and sometimes by artillery, for the benefit of the cruise missiles. When attacking enemy objectives with extremely strong cover of PVO means, the strikes of the operational-tactical ballistic missiles must precede the strikes with other weapons (cruise missiles and aviation).

The capability of the front cruise missile units to deliver strikes against newly discovered and mobile objectives is significantly lower than the capabilities of bomber and fighter-bomber aviation. When allocating tasks between aviation and cruise missiles the commander of the air army and the staff must take this into consideration and leave for the cruise missile units the objectives and targets that cannot move to a new area during the time necessary to prepare the FKR unit or subunit, and assign the tasks of the neutralization of highly mobile targets to aviation units, and especially fighter-bomber aviation.

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Front cruise missiles have come into being as a result of the development of our science and technology. The need for this new means of aerial attack arose because the fulfilment of certain tasks by aviation, in particular by the front bombers, became difficult and even impossible.

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Cruise missiles have a number of advantages over ballistic missiles and aviation. Possessing great accuracy, cruise missiles with a nuclear charge can effectively destroy targets of any size, including point targets. In this they are superior to ballistic missiles. Significant capabilities for overcoming the enemy PVO, and independence of meteorological conditions and time of day, give the cruise missiles an advantage over piloted aviation.

Front cruise missiles have a number of faults, that are inherent, by the way, not only to them, but also to ballistic missiles. The basic ones are insufficient effectiveness against targets that are moving, and the considerable time to prepare for action after the objectives to be destroyed are discovered by reconnaissance. As these faults are eliminated, the relative proportion of front cruise missiles will be increased and the sphere of tasks fulfilled by them will become ever broader.

The further improvement of front cruise missiles may follow the path of creating low-flying missiles with various ranges and flight speeds, with autonomous and combined guidance systems, which will reduce their vulnerability to enemy PVO weapons to the minimum.

The introduction of new equipment, specifically the control checkout apparatus, into front cruise missile units, and the delivery of ready missiles from the rear to the launching sites by air transport, will considerably reduce the time for preparing the missiles for combat use.

The introduction of new radiotechnical means and calculating machines (schetno-reshayushchaya mashina) into the armament of the missile units will reduce to a considerable degree the topographical-geodetic work time and preparation of data for firing.

And finally, the further improvement of the organizational structure of front cruise missile units can ensure the continuous preparation and delivery of ready missiles to the launching sites, which will greatly increase the mobility and fire capabilities of missile units.

The study of the combat qualities and capabilities of front cruise missiles, the acquisition of knowledge and skills in their most effective utilization in modern offensive operations - this is a most important task of the officers and generals of our Armed Forces.