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CENTRAL INTELLIGENCE AGENCY
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6 July 1973

MEMORANDUM FOR: The Director of Central Intelligence

SUBJECT : MILITARY THOUGHT (USSR): Increasing the
Viability of Transport Aircraft in Airborne
Operations

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." The article defines the operational profile of an airborne operation in nuclear/chemical and conventional warfare conditions and recommends measures for overcoming air defenses up to the drop zone. The profile under nuclear conditions has 360 aircraft flying at an altitude of 200 to 500 meters to drop an airborne division at a depth of 600 kilometers on the first day of war. In addition to suppression of air defenses by Strategic Rocket Force strikes and supplemental aircraft from adjacent fronts, the author proposes that some of the transports be configured for electronic warfare, including anti-radar weapons systems. This article appeared in Issue No. 2 (84) for 1968.

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

W. E. Colby
Deputy Director for Operations

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SUBJECT

MILITARY THOUGHT (USSR): The Overcoming of Enemy Air Defenses by Military-Transport Aircraft

SOURCE Documentary
Summary

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The following report is a translation from Russian of an article which appeared in Issue No. 2 (84) for 1968 of the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought." The author of this article is Lieutenant Colonel A. Borisov. The author defines the operational profile of an airborne operation in nuclear/chemical and conventional warfare conditions and recommends measures for overcoming air defenses up to the drop zone. The profile under nuclear conditions has 360 aircraft flying at an altitude of 200 to 500 meters to drop an airborne division at a depth of 600 kilometers on the first day of war. In addition to suppression of air defenses by Strategic Rocket Force strikes and supplemental aircraft from adjacent fronts, the author proposes that some of the transports be configured for electronic warfare, including anti-radar weapons systems. A table of possible support forces gives figures for nuclear/chemical and conventional warfare under various weather conditions.

End of Summary

[Redacted]

Comment:

Lieutenant Colonel A. Borisov was identified by Krasnaya Zvezda on 3 December 1970 as commander of a missile battalion. He also coauthored an article appearing in Issue No. 1 (89) for 1970 of the Collection of Articles of the Journal "Military Thought" titled "Combat with Enemy Air Defense Means to Support Flights by Military-Transport Aviation to Drop Troops." 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.

[Redacted]

The Overcoming of Enemy Air Defenses by
Military-Transport Aircraft

by Lieutenant Colonel A. Borisov

The overcoming of enemy air defenses by aircraft is constantly allotted an important place in the military press.

The present article will refine and develop individual previously published positions and will make some new recommendations on the overcoming by military-transport aircraft of countermeasures of enemy air defense forces and means.*

In estimating the conditions for overcoming air defenses by military-transport aircraft while dropping troops, great significance is given to how long after the beginning of combat actions the drop (landing) is made. In a nuclear war, large-scale airborne landings may take place soon after massive nuclear strikes (for example, during the night between the first and second day of the operation) or during followup combat actions. In a non-nuclear war, the most favorable conditions for a drop may be expected on the third or fourth day after the war begins, i.e., when our success in developing the offensive appears certain.

In a nuclear war, the drop (landing) of airborne forces will be preceded by strikes by our strategic and front means against enemy targets, including his means of antiair defense. It is considered that during the first day of an operation the effectiveness of the enemy air defense system in the Western Theater of Military Operations may be lowered by fifty to sixty percent by massive nuclear strikes.

In warfare using conventional strike means, the possibilities of destroying (neutralizing) air defense targets are substantially

*See the following articles: A. Mironenko and T. Mezentsev, "The Overcoming by Aircraft of Enemy Air Defense Countermeasures in the Initial Operations of a War;" P. Bogza, "The Overcoming by Aviation of Enemy Air Defenses in a Theater of Military Operations;" and A. Drozhzhin, "The Overcoming by Aviation of Enemy Air Defense Countermeasures;" published in Collections of Articles of the Journal "Military Thought" No. 3 (79), 1966; and No. 1 (80) and No. 2 (81), 1967.

lower. Research shows that the extent to which its effectiveness is lowered by the end of the first day of combat action will be no more than twenty percent. In a non-nuclear war, the task of striking enemy air defense targets will be assigned mainly to front and long-range aviation. Under these conditions, it is advisable to drop troops after an air operation to rout the enemy air grouping in the theater of military operations, as a result of which the degree of neutralization of various targets in the air defense system may reach thirty-five to forty-five percent of their original complement by the end of the third or fourth day of the operation.

The quantity of enemy air defense weapons (taking into account their preliminary neutralization) expected to be capable of taking counteraction against military-transport aircraft dropping troops in the Western Theater of Military Operations may be expressed in the following terms.

If, in a nuclear war, troops are dropped to a depth of 600 kilometers during the first night after an operation begins or during the daytime under complex weather conditions (the drop group of transport aircraft comprising three to four divisions and flying at an altitude of 200 to 500 meters along three routes, with an operational disposition 500 to 550 kilometers deep and 60 to 80 kilometers wide), counteraction may be expected from three to four squadrons of all-weather fighters, eight to ten batteries of "Hawk" missiles, ten to twelve batteries of antiaircraft artillery, four to eight batteries of "Chaparral" missiles, and fifty to sixty "Red Eye" crews.

Under non-nuclear conditions, when a drop is made to a depth of 200 kilometers during the night between the third and fourth days of an operation (with the drop group structured the same as above), military-transport aircraft may be opposed by five to seven squadrons of all-weather fighters, four to six batteries of "Hawk" missiles, eight to ten batteries of antiaircraft artillery, eight to twelve batteries of "Chaparral" missiles, and up to 170 "Red Eye" crews.

For drop flights during daytime under favorable weather conditions, military-transport aircraft may meet counteractions

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from up to ten squadrons of tactical fighters in addition to the air defense means given above.*

Despite the significant extent to which the effectiveness of the enemy air defense system is lowered as a result of nuclear strikes and of combat actions by aviation and by troops of fronts prior to a drop, the surviving air defense means which have not been neutralized will be capable of inflicting heavy losses on military-transport aircraft. Thus, under complex daytime weather conditions, one battery of "Hawk" missiles or one squadron of fighter-interceptors can put out of action up to a regiment of military-transport aircraft flying toward the drop zone. The overall losses of military-transport aircraft may be very significant.

At the present time, military-transport aviation does not have its own (active) means of combat with enemy air defenses, and the various precautionary measures (flying at low altitudes and at night, etc.) are often insufficiently effective for reducing losses to any appreciable extent. Therefore, in planning the use of airborne landings in the Western Theater of Military Operations, it is not always possible to count on creating favorable drop conditions as a result of neutralizing air defense installations during earlier combat actions. Success in making drops in this theater is inescapably linked to additional neutralization of enemy air defense targets in support of military-transport aircraft.

This additional neutralization may be assigned to the rocket troops and artillery of the front and to front and long-range aviation. Rocket troops of fronts are capable of destroying (neutralizing) air defense targets located at a depth of 800 to 1000 kilometers, and front aviation at a depth of 400 to 500 kilometers from the front line. Neutralization of targets at a greater depth may be assigned to the rocket troops of strategic designation and to long-range aviation.

Aircraft will be entirely responsible for supporting military-transport aviation flights in a non-nuclear period.

In performing operational calculations, the probability of military-transport aircraft overcoming enemy air defenses is taken as 0.85 to 0.9, which corresponds to losses of ten to fifteen percent. In order to keep military-transport aircraft

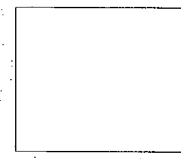
X losses from exceeding this level during troop drops, a very large quantity of forces and means must be detailed for their support. The table shows the number of various types of troops (aviation) necessary for destroying the quantity of air defense targets given above in support of military-transport aircraft so that their losses do not exceed ten to fifteen percent. [See table on page 8.]

It can be seen in the table that the requirements for aircraft sorties by various types of support aviation, particularly in dropping troops in a non-nuclear period, reach such dimensions that the front air army cannot carry out all of the missions in support of transport aircraft flights with one sortie of its own units and large units. The performance of repeated sorties increases the level of losses of fighter-bombers and bombers of the front air army and makes it necessary to remove other important tasks from front aviation. The great need for front aviation necessitates drawing in significant numbers of long-range aircraft to support military-transport aviation.

X As a result of additional neutralization of enemy air defense installations, we may expect a decrease of approximately eighty to ninety percent in their effectiveness in the flight zone of military-transport aircraft. It is practically impossible to achieve greater reduction in the effectiveness of air defenses, as is shown by military-scientific research and the experience of combat actions in Vietnam. The absolute losses of military-transport aircraft under these conditions, when dropping an airborne division in one flight, will be 35 to 55 aircraft (out of 360). This level of losses cannot be recognized as acceptable. Moreover, it has a constant tendency to increase, since separate undetected, and consequently undestroyed, air defense installations may remain within the flight zone of military-transport aircraft (particularly SAM batteries, light antiaircraft artillery, and "Red Eye" crews; also SAM batteries which have changed their location before the strike was mounted or have recovered their combat effectiveness by the time the military-transport aircraft fly over).

X For the reasons given, the actual level of absolute losses suffered by military-transport aircraft, depending on the specific circumstances of flight through a zone of enemy air defenses, may exceed calculations by a factor of two to three. It therefore becomes necessary to overcome air defenses more effectively by

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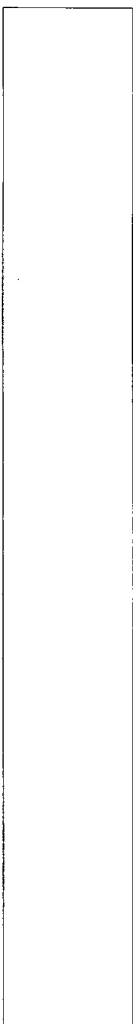
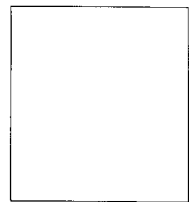


Table

Drop Conditions	Required Forces and Means of Support					
	Rocket Troops of the Front		Long-Range Aviation		Front Aviation (Fighter-bombers and bombers)	
	Number of launches	Number of nuclear/chemical warheads	Number of flights	Number of nuclear/chemical warheads	Number of flights	Number of nuclear/chemical warheads
In Nuclear Warfare Depth of landing-- 600 km, flight altitude of transport aircraft-- 200 to 500 m, drop made on D2	35-40	8-12 27-28	25-50	6-8 10-20	70-120	7-13 24-36
In a Non-Nuclear Period Depth of landing-- 200 km, flight altitude of transport aircraft-- 200 to 500 m, drop made on D3 to D4	-	-	80-120	-	220-310	-

Note: The first figures apply to supporting military-transport aircraft flights during complex daytime weather conditions and at night; the second figures to flights during daytime under favorable weather conditions.

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implementing a series of technical measures making it possible not only to lower the level of military-transport aircraft losses but also to significantly reduce requirements for forces and means to protect them. The content of these measures comes down basically to arming military-transport aircraft with onboard weapons systems and equipping them with means for combat with enemy radioelectronic systems (BRESP).

Research shows that the onboard weapons system of military-transport aircraft must include a gun defense system with mixed units of fire and missiles of the "air-to-radar station" class dedicated to defense against "air-to-air" missiles and against fighters armed with guns and rockets, as well as for striking enemy ground radar stations.

The principal elements of this system are: a set for radio-technical reconnaissance of emissions (RTR); a radar sight; an infrared direction finder; an optical (or television) sight; a computer of angular corrections of fire; and a rear installation of automatic guns with mixed units of fire, including anti-radar, anti-infrared, and contact rounds.* To defeat one missile or salvo of missiles, 280 to 300 rounds are required from the mixed unit of fire.

✓ Evaluation of the effectiveness of the gun defense system shows that, if military-transport aircraft are armed with it,

*The working principle of the gun defense system of military-transport aircraft in repulsing fighter attacks is as follows. Upon receipt of a signal from the radiotechnical emission reconnaissance set of illumination of the aircraft from the rear hemisphere, the rear radar sight switches on and makes a target search in the appropriate zone. After the attacking fighter is discovered, the infrared direction finder orients itself on this axis, determining the exact moment for launching missiles. Upon receipt of the missile launch signal from the infrared direction finder, or if the fighter comes into the zone of effective fire, it is locked on through automatic tracking by the rear radar sight. Using the data from the radar system, the computer of angular corrections of fire determines the angles at which the weapons must be oriented and the distance at which they will open fire.

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X there will be an increase probability of their penetrating through the air defense zone and a thirty to forty percent lower level of losses from enemy fighters attacking from the rear hemisphere. The gun defense system will apparently not lose its importance even in combat with projected new fighters, since it is planned for almost all of them to have guns mounted.

In addition to gun installations, it is advisable to arm some of the military-transport aircraft with missiles of the "air-to-radar station" class in order that combat formations of transport aircraft can apply firepower directly against the radar sets of fighter aircraft, SAM, and antiaircraft artillery located in their flight zone. Calculations indicate that one such missile is capable of striking a radar station which is operating on a schedule of continuous emission with a probability of 0.6 (taking return fire into account). Thus, for the neutralization of one battery of "Hawk" missiles, for example, two or three missiles are required. The number of aircraft in a military-transport aviation combat formation which must be armed with "air-to-radar station" missiles will be determined by the number of targets (radar stations) to be neutralized.

Combat with enemy radioelectronic systems in the context of military-transport aviation must be carried out with combined as well as individual means. A system for individual combat with enemy radioelectronic means designed for installation aboard medium military-transport aircraft of the AN-12 type must include:

- equipment for active jamming of the range and speed channels of radar aboard fighters and of radar for guiding SAM, and for jamming the radar warheads of "air-to-air" and "surface-to-air" missiles;
- equipment for passive jamming of radar sets aboard fighter aircraft (for activating their MTI systems) and of antiaircraft gun-laying sets;
- thermal emitting (or towed) decoys for influencing the infrared direction finders aboard fighter aircraft and on "air-to-air" missiles with thermal homing heads.

X All military-transport aircraft must be equipped with individual means for combat with enemy radioelectronic systems.

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The system of combined means for combat with enemy radio-electronic systems includes equipment for jamming enemy air defense radar stations used for target detection, direction-finding, and guidance. It is advisable to equip part of military-transport aviation (for example, one squadron per division) with combined means. In making drops, it will be necessary to use these aircraft of "special function" (spetsnaz), without any drop load.

It appears sensible to assign these jamming aircraft the added function of carrying missiles of the "air-to-radar station" class.

We can state, on the basis of calculations, that the use onboard military-transport aircraft of the whole complex of defense means--defensive armament and individual means of combat with enemy radioelectronic systems plus the inclusion in airborne groups of "special function" aircraft (the delivery vehicles of "air-to-radar station" class missiles)--will make it possible to lower the level of aircraft losses during drops by a factor of three to four, i.e., bring losses to three to four percent. Along with this, the stated measures make possible a substantial decrease (up to forty percent) in the number of forces which must be allotted from the branches of service and the arms of troops for the destruction (neutralization) of enemy air defense targets in the flight zone of military-transport aircraft. We cannot fail to take account of the favorable psychological influence of onboard defensive armament on the morale of the crews of transport aircraft and on the troops to be dropped.

In conclusion, it is necessary to dwell on various points of view concerning the armament of military-transport aircraft in the United States and the USSR.

It is known that military-transport aircraft which are part of the equipment of the military-transport air command and of transport-drop aviation in the United States do not have onboard defensive armament (defensive fire weapons and means of combat with enemy radioelectronic systems). Nor is it planned, according to available data, to install defensive armament on newly developed aircraft.

The difference in approach to the question of installing defensive armament on military-transport aircraft in the United

States on the one side, and the USSR on the other, is explained by the difference in the main tasks facing the military-transport aviation of the two countries and the conditions for carrying them out.

The main task of military-transport aviation in the United States in time of war is to airlift troops across the oceans to the European and Afro-Asian Theaters of Military Operations. This task can be carried out without their coming into contact with our air defense system. Dropping troops in theaters of military operations is, for American military-transport aviation, an important but not a top-priority task, to be carried out, according to the views of the American command, under conditions of full neutralization of enemy air defenses. However, as pointed out above, it is hardly possible to lower the effectiveness of a modern air defense system by more than eighty to ninety percent. Dropping troops under these conditions will involve large losses of military-transport aircraft. For this reason, the absence of defensive armament aboard American military-transport aircraft must be considered their weak aspect, which is also recognized in the field manual of the US Army (FM-57-30).