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MEMORANDUM FOR: The Director of Central Intelligence

SUBJECT : USSR GENERAL STAFF ACADEMY LESSON: Aerial Reconnaissance in a Front Offensive Operation

1. The enclosed Intelligence Information Special Report is part of a series now in preparation, classified ~~TOP SECRET~~, prepared in 1985 for use in the Voroshilov General Staff Academy.

25X1, E.O.13526

2. [redacted] this document should be handled on a strict need-to-know basis within recipient agencies.

[redacted]
Richard F. Stolz
Deputy Director for Operations

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Page 1 of 14 Pages

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Intelligence Information Special Report

Page 3 of 14 Pages

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COUNTRY USSR

[Redacted]

DATE OF INFO. 1985

DATE 13 May 1988

SUBJECT

USSR GENERAL STAFF ACADEMY LESSON:
Aerial Reconnaissance in a Front Offensive Operation

SOURCE Documentary

Summary:

The following report is a translation from Russian of the text of a lecture given at the Voroshilov General Staff Academy on the subject of aerial reconnaissance in a front offensive operation. After enumerating the tasks of reconnaissance, the paper describes in some detail the numbers of aircraft and drones available and the number of reconnaissance sorties they can make. The remaining sections, one on organization and planning, and the other on actual conduct of reconnaissance are somewhat more general.

End of Summary

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Page 4 of 14 Pages

Aerial Reconnaissance in a Front Offensive Operation

Principles of preparation and conduct of front offensive operations and their support. One of the most important forms of support of front offensive operations is aerial reconnaissance. Aerial reconnaissance is one of the basic forms of operational reconnaissance.

The first point is the objectives and tasks of aerial reconnaissance, its forces and means, and its capabilities. The second point is the principles of organization and planning of aerial reconnaissance in a front offensive operation. And the third point is the conduct of aerial reconnaissance during the preparation and conduct of a front offensive operation.

Objectives and tasks, forces and means, and capabilities

Depending on the tasks, the depth, and the forces and means called on, aerial reconnaissance is either operational or tactical. [Rest of paragraph illegible.]

-- Determine the location of nuclear attack means and elements of precision-guided weapons systems.

-- Detect enemy groupings of ground forces. This means to determine the location of various formations, the nature of actions and battle, and the axes of movement of reserve groupings, all of which pertains to the grouping of ground forces.

-- Detect enemy air forces groupings. This involves a number of subtasks, such as identification of the airfields and airfield system of the enemy and the protection of aviation at airfields. Particular attention focuses on detection of airfields with delivery vehicles based at them. Also identification of the system of control and the depots that support actions of aviation.

-- Detect enemy air defense groupings. This is the location of air defense subunits and units, both in the common air defense system and over targets which are to be destroyed [in depth?].

-- Do reconnaissance of enemy radioelectronic troop and weapons control systems.

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Page 5 of 14 Pages

-- Do reconnaissance of the operational preparation of the zone of combat actions or the zone of offensive of front troops. This includes reconnaissance of the operational rear area and lines of communication, photographing of engineer structures, and photographing of defense lines.

-- Do reconnaissance of enemy movements of all kinds -- rail, motor vehicle, air, and sea.

-- Determine the results of our own troop actions, i.e., strike results, doing follow-up reconnaissance.

-- Do reconnaissance of the air enemy and vectoring of our own aviation to destroy the air enemy.

These are the tasks of aerial reconnaissance in a front offensive operation. To perform these tasks, front aerial reconnaissance has manned aircraft and helicopters as well as reconnaissance drones. These are the two basic means of doing air reconnaissance. There are also automatic aerostats, which are still experimental and being tried out principally in the Far East. We shall dwell on these means separately.

Manned means of aerial reconnaissance are the separate operational reconnaissance air regiment and the separate tactical reconnaissance air regiment. A front may have one or two each of these; most often there will be one of each. Right now there are no districts which have two regiments of any kind of reconnaissance. The front may also have separate reconnaissance drone squadrons, one or two to a front, and non-TO aircraft -- non-TO subunits of fighter, fighter-bomber, and bomber aviation. One squadron in each regiment trains to do reconnaissance tasks. We shall consider each of these in turn.

The separate operational reconnaissance air regiment. They are not now called operational or tactical, simply a separate reconnaissance air regiment. The separate operational reconnaissance air regiment is meant for aerial reconnaissance in the operational depth in whole front zone. It includes two 12-plane squadrons; one is equipped with MIG-25RBs, which are termed high-altitude single-seat reconnaissance aircraft; the other is equipped with SU-24SRs, dubbed multi-seat reconnaissance aircraft. It has two seats and a crew of two. There are also 12 of these, giving the regiment a total of 24 planes. They have airborne general radiotechnical reconnaissance receivers, an airborne television reconnaissance system, and infrared equipment for reconnaissance.

The regiment is based 150-200 km back; it has a tactical radius of 600-1000 km, and can do reconnaissance to a depth of 700-800 km. For all practical purposes, it provides aerial reconnaissance to the entire depth of a front offensive operation and a bit more.

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Page 6 of 14 Pages

The average combat workload is two or three sorties per day per aircraft. The daily capabilities of the regiment, if [2 words illegible] in one sortie one aircraft can do reconnaissance of two targets, will be roughly 77-115 targets.

The separate tactical reconnaissance regiment is meant for aerial reconnaissance in the tactical and immediate operational depth. It consists of two 12-plane squadrons of MIG-21Rs and SU-17M3Rs, one squadron of each. There are now SU-17M4Rs. This is an excellent plane; for range it is getting close to the SU-24, and it possesses a very good radio navigation system. It is obviously going to replace the MIG-21R. The regiment has a total of 24 aircraft. They have airborne general and long-range radiotechnical reconnaissance receivers, and photographic equipment for day and night photography; and there is also an airborne television reconnaissance system for close television reconnaissance, something [on the order of?] about 100-150 km.

The airborne radiotechnical reconnaissance receiver is located in a pod just as on operational reconnaissance aircraft. Therefore their technical characteristics are the same. The basing depth is 100-150 km, and the tactical radius is 400-500 km. The advent of the SU-17M4R will bring this up to 600-800 km. The average daily workload is 3-4 sorties, and the average daily results are 86-115 targets.

The reconnaissance drone air squadron is illustrated by the VR-2 (-3) reconnaissance drone. It is made up of three detachments with four launchers apiece, or a total of 12 VR-2s. They have cameras, televisions, airborne radiotechnical receivers, infrared equipment, and equipment for radiation and chemical reconnaissance. This does not mean they can use all five in one flight; only one can be employed at a time.

Its basing depth is 40-60 km from the front line, and its tactical radius is 500 km. Sometimes its total range is described as something on the order or 1000 km, but the depth of reconnaissance is up to around 400 km. The average combat workload is difficult to specify. The average norm of employment of this asset is 6-8 launches a day; if necessary, perhaps 12 and even 16 launches can be carried out. The basic load is 36 of these drones for a front offensive operation.

The new reconnaissance drone complex VR-2 is meant for doing aerial reconnaissance in the tactical and immediate depth of the enemy defense for the front air forces and troops. The technical specifications of the drone and the reconnaissance equipment it carries make it possible to do reconnaissance of nuclear missile means, airfields of tactical and army aviation, means of air defense, reconnaissance/strike complexes, control posts, troops and combat equipment, troop movements, lines of communication, population centers, and terrain in the zone of combat actions.

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 U.S.C., section 403g)

Page 7 of 14 Pages

The VR-2 provides aerial reconnaissance in the face of strong opposition from enemy air defense and possible RBC contamination of the air and terrain. The complex includes the STRIZH reusable reconnaissance drone, the technical means of preparation of the drone for use, the means of preliminary preparation, recovery, and evacuation, the means of preflight preparation and launch, means of collecting, processing, and interpreting the aerial reconnaissance materials, and means of processing navigational information and controlling the flight of the drone [illegible]. The drone flies at a speed of 1000-1100 km/hr. The flight altitude is broken down into nine [illegible word]: 50 m, 100 m, 200 m, 300 m, 400 m, 500 m, 600 m, 800 m, and 1000 m. All nine possible altitudes can be used in one flight.

The reconnaissance drone has a tailless aerodynamic configuration with a low delta wing and a high air scoop. The fuselage is divided into four sections. The [word illegible] section has two cameras, one for wide-angle photography, the PA-4-90, and another for oblique photography, the [A-86-P?]. Aerial photography is done in the altitude range of 100 to 1000 m; the swath of terrain for wide-angle photography is 1000 to 10,000 meters, and that for oblique photography is 700 to 7000 m. The maximum length of route for wide-angle photography is 520 km, the maximum for oblique photography is 800 km. Compartment R2 is a triangle; it accommodates the on-board control system that, together with the airfield equipment and the long-range radiotechnical navigation system, provides three flight regimes.

In the autonomous flight regime, control of the drone is done according to a [prewired?] program. After launch, the drone proceeds to an altitude of 500 m and accelerates to the set speed. To negotiate enemy air defense, it descends to an altitude of 60-100 m and switches on its repeater jamming gear. On approaching the first reconnaissance sector, the drone assumes the prescribed reconnaissance altitude and switches on the camera. In one sortie it can do reconnaissance of 2-3 sectors of terrain or 3-5 targets. After finishing, the drone goes back to the recovery site. Thirty kilometers before recovery, it assumes the best altitude for a [illegible] maneuver and executes a landing.

The first regime, autonomous flight with automatic radio correction, provides greatest accuracy. Control in this regime is also done according to a program [wired?] into the control system before launch. Correction of flight within visual contact is effected by signals of the [POLYE-N?] radio beacon, beyond visual contact by signals of the radiotechnical long-range navigation system PROFIL'-2P. The third regime, manual control, is implemented in the event the onboard digital computer fails or the drone exceeds the acceptable departure from the desired flight profile [line illegible] recovery site.

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Page 8 of 14 Pages

The combat instruction, besides [2 words illegible] of the enemy and the combat task of the unit, can indicate the procedure for negotiating the enemy air defense, for cooperation with friendly air defense, the sortie rate, and the time and method for presenting reconnaissance data. The unit commander clarifies further, assesses the situation, and issues preliminary instructions to the subunit. At the unit command post, staff officers prepare the data and calculations necessary for the commander's decision. The route and flight profile are keyed in, and the possibilities of negotiating the enemy air defense and matters of cooperation are reviewed. After the decision on the conduct of aerial reconnaissance has been made, the commander of the unit issues an oral combat order to the subunit commanders.

The launch detachment, on arrival in the siting area, takes its position. The commander of the launch detachment indicates the sequence and exact time of launches.

The commander of the navigation and control squad is given the order set up the radiotechnical equipment. The navigation and control squads are given the launch time and bort numbers of the drones, the radio beacon channel numbers, and the time and procedure for presenting the results of reconnaissance.

The equipment detachment is given the number of drones, readiness times, and the procedure for delivering them to the launch detachments.

The technical maintenance unit is given the task of preparing the drones for use.

In keeping with the task and the decision made by the unit commander, the launch detachment prepares to carry out a launch of three drones. The information collection and evacuation group is prepositioned in the recovery site area. At the prescribed time the drones are launched. The control post monitors their flight on the prescribed route.

As a rule drones are used to do preliminary and follow-up reconnaissance. After a mission the drones land at the recovery site. The film cassettes are taken to the developing and interpretation post. Then the drones are evacuated to the technical position for preparation for reuse. The reconnaissance materials are processed with special developing machinery. After processing, the films are interpreted and target coordinates taken.

The reconnaissance data acquired are sent to the command post of the front air forces. In keeping with combat instructions on reconnaissance a photo diagram is prepared. The chief of intelligence of front air forces reports the results of reconnaissance to the commander. In keeping with the situation, the squadron is given a new task. To do it the unit commander makes a decision for repeat launches. For newly detected targets [rest of line illegible]. The

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 U.S.C., section 403g)

Page 9 of 14 Pages

reconnaissance data obtained are used by the ground forces. Follow-up reconnaissance is done to assess strike results. After completing an assigned task, the unit changes position and carries out drone launches from a new siting area.

The mobility of the VR-2 complex and its high probability of negotiating enemy air defense make it an effective means of getting data on the enemy forces.

Finally, there are the non-TO reconnaissance squadrons intended for doing reconnaissance principally on behalf of the front air forces; i.e., the front air forces provide reconnaissance data for themselves. Some 10-15 percent of the flight resources of non-TO reconnaissance subunits can be tapped on behalf of the front staff. What does that mean in actual numbers? The total number of aircraft, taking 12 planes per squadron, and 9 regiments, 9 x 12 gives about 108 planes in fighter aviation, 72 in fighter-bomber aviation, and 30 in bomber aviation, or a total of 210 in non-TO reconnaissance aviation. They are equipped with cameras and radiotechnical reconnaissance receivers, and they can also employ pods with television and infrared equipment. The pilots are trained to use these means of aerial reconnaissance.

The basing depth for fighters is at least 80 km, for fighter-bombers 100 km, and for bombers 150 km. The radius is, respectively, 300, 350-400, and 500-600 km. For all practical purposes, these means can do reconnaissance to the full depth of a front offensive operation.

The average day's work typical of aviation is: fighters and fighter-bombers 3-4 sorties, and bombers 2-3 sorties. Reconnaissance capabilities are 10-15 percent, i.e., that which is supposed to be done on behalf of the front staff. Despite that fact that 108 aircraft do such reconnaissance, this gives 49-65 sorties; 32-43 sorties from the 72 aircraft; and [9-14] from bomber aviation. The complement of reconnaissance aviation has total capabilities for aerial reconnaissance of 265-360 targets in a day.

If you will recall the other types of reconnaissance, agent reconnaissance does about 100 targets a day, radiotechnical reconnaissance about 100, and special reconnaissance also about 100 -- in round numbers. In total, all these forms of front reconnaissance do about 300 targets a day, and aviation also does about 300, as much as all the other type combined.

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Page 10 of 14 Pages

**Principles of organization and planning of aerial reconnaissance
in a front offensive operation**

Aerial reconnaissance is the acquisition of data on the enemy, the terrain, and the weather; and the organization of aerial reconnaissance is the aggregate of measures aimed at acquiring information on the enemy, the terrain, and the weather, with the available manned and unmanned reconnaissance means of aviation.

The organization of aerial reconnaissance includes determination of the reconnaissance objectives and tasks, and also of the forces and means to fulfill them; planning of aerial reconnaissance; assignment of tasks; organization of cooperation between combat and special support; organization of the control of reconnaissance forces and means; monitoring of and assistance with the performance of assigned tasks; and, last but not least, the collection, processing, and reporting of reconnaissance data, which is the reason all the other things are done.

Who organizes aerial reconnaissance? The principal organizer of aerial reconnaissance is the front staff. The front staff determines the tasks and objectives of aerial reconnaissance, the deadlines, and the procedure for and form of presentation of reconnaissance data. These are the three main points which the staff determines. Detailed organization of aerial reconnaissance is done in the staff of front air forces. Based on what the front staff plans, the starting point for aerial reconnaissance is the front staff's combat instruction on reconnaissance. Besides that, the decision of the commander of front air forces on combat actions is also a starting point, and so are the available data on the enemy and the status of reconnaissance forces and means. This is the same as with the planning of operational reconnaissance in a front offensive operation.

The commander of front air forces determines the targets and tasks on which to focus the main efforts, i.e., he works out the front tasks in more detail; and then he determines the forces and means of aerial reconnaissance and allocates them by tasks. Then he organizes support of the cooperation of reconnaissance aviation.

One of the most important aerial reconnaissance organization measures is planning. The front does overall planning at the level of tasks defined by the front commander, i.e., the tasks and targets of reconnaissance and the nature, form, and place for submitting reconnaissance data. Detailed planning is done by the staff of front air forces. This involves specification of the tasks of aerial reconnaissance and determination of priorities.

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Page 11 of 14 Pages

Another very important measure is the allocation of reconnaissance forces and means by tasks. This includes determination of the reserve which must be set aside for unforeseen reconnaissance tasks as well as, if combat actions are conducted with conventional weapons, the reserve which must be set aside for aerial reconnaissance on behalf of the first nuclear strike.

A third task is determination of the timing and regularity [periodichnost'] of aerial reconnaissance. Regularity is necessary with reconnaissance of enemy reserves which may be on the move [so as not to lose them]; and it is also necessary to keep track of the location and movement of various targets, chiefly the means of nuclear attack.

A fourth task is development of measures to support the sorties of reconnaissance aviation. The experience of war has shown that these measures were given very little attention, with the result that aerial reconnaissance flights were just as risky as strafing runs. There were very many reconnaissance/attack pilots lost. For 200 sorties, regardless of what he did, an attack pilot was awarded Hero of the Soviet Union.

Organization of the collection, processing, and reporting of reconnaissance information to the interested staffs is a fifth measure included in detailed planning.

The main aerial reconnaissance planning document is the plan of aerial reconnaissance in an offensive operation. It is worked out in graphic form on a map with attachment of an explanatory text. It is worked out by tasks and targets to the full depth of the offensive operation. It is worked out in detail for the first day or two; for the next days of the operation, tasks are usually determined, zones or areas indicated, and the overall requisition of forces determined. More detailed updating of the aerial reconnaissance plan is done during the operation for each day of combat actions. The aerial reconnaissance plan is signed by the chief of staff and the chief of intelligence and approved by the commander of front air forces.

Special care is accorded to the planning of simultaneous sorties to do aerial reconnaissance on behalf of the first nuclear strike. The needs for aerial reconnaissance on behalf of the first nuclear strike are determined on the basis of the following postulates. It is best that a first nuclear strike begin during combat actions, for then it is possible to consider and do reconnaissance with available forces and means, not just the forces and means of aerial reconnaissance, but all the aircraft carrying out missions can do reconnaissance incidentally to the performance of combat tasks. In addition, they are not hampered or constrained by the fact that a border has to be violated. But if the first nuclear strike is delivered at the start of combat actions, it will be necessary to organize aerial reconnaissance, specifically a simultaneous flight of all available aerial reconnaissance means.

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 Central Intelligence Agency Act of 1949 (50
 U.S.C., section 403g)

Page 12 of 14 Pages

How is it organized, what tasks does this involve, and what are the flight resources for these tasks? The first thing is to organize visual surveillance of the main axes in the zone of tactical aerial reconnaissance. Why tactical aerial reconnaissance? Because that is where most of the targets slated for a nuclear strike are. This will require, at the very minimum, 20-30 aircraft. Then to [one or more lines missing] ... 25 areas of the likely location of targets. This will also take 20-25 aircraft.

To do aerial reconnaissance in the zone of operational aerial reconnaissance, a depth of some 300-350 km to about 600-700 km, i.e., the entire depth of the offensive operation, will likewise require 20-25 aircraft to be launched. [1 word illegible] first-echelon reconnaissance aircraft 20-30 aircraft and leave a 15- to 20-plane reserve for other unforeseen aerial reconnaissance tasks. In all, it will be necessary to launch 95-130 aircraft. These are the requirements for reconnaissance on behalf of the first nuclear strike. But we have already seen that 24 + 24 + 12 = 60 aircraft are all we have. This means, whether we like it or not, we are forced to launch the non-TO reconnaissance subunits; this is what they are intended for.

The simultaneous flight of reconnaissance aviation is executed according to a specially developed plan, called the "Plan of Simultaneous Flight of Reconnaissance Aircraft." This plan is signed by the chief of staff of front air forces and the chief of intelligence of the front staff, and is approved by the chief of staff of the front.

One of the most important planning issues is control of reconnaissance forces and means. Control of aerial reconnaissance forces and means is effected through a single [or "unified"] system of combat control of front air forces. This is the combined front air forces and air defense command post, the combined reserve front air forces and air defense command post, the airborne control posts, and the forward control posts, all of which are in the front control system. An army has the combined aviation and air defense command post, combat control groups, and vectoring and target designation posts.

Notice how reconnaissance data are gathered and reported to the interested staffs. All front air forces and air defense command posts have a data collection and processing center (TsSO). Reconnaissance units and aviation large units have data collection and processing posts. Motorized rifle and tank divisions, through the chief of intelligence, organize data reception posts to get reconnaissance data from the aircraft; and these posts are likewise organized in the intelligence departments of combined-arms and tank armies. Thus, all information obtained from on board the aircraft, from reconnaissance aviation units and aviation large units, flows in to the information collection and processing center and goes to the front staff, the front intelligence

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Page 13 of 14 Pages

directorates, and the staff of the air forces in the theater of military operations.

A final point here -- for reconnaissance data transmission from the aircraft and reception at ground receive points, the staff of front air forces works out common [coded?] charts and radio signal tables. These are delivered in advance to the appropriate staffs of ground forces and air large units and units.

**Conduct of aerial reconnaissance during the preparation
 and conduct of a front offensive operation**

Aerial reconnaissance before the start of combat actions is conducted with limited forces and means without violating borders. It will be principally radiotechnical, visual, and photographic reconnaissance of what is in range of our equipment. The depths will be: radiotechnical reconnaissance 350-400 km, radar reconnaissance with side-looking radar 75-80 km. (Now, with the appearance of our precision-guided weapons, these depths are greater: radar reconnaissance is somewhere on the order of 150-200 km.) Photo reconnaissance reaches 10-15 km with the aid of oblique photography, and it requires the aircraft to fly along the border.

As the threat of an outbreak of war grows, the intensity of aerial reconnaissance without border violation is stepped up. The main task in this period is to establish a movement of enemy troops toward the border. In this period, reconnaissance may, with the authorization of the General Staff, involve border violation and intrusion into territorial waters. These flights will be made by lone aircraft with the best trained crews and by reconnaissance drones. Such flights are specially prepared, comprehensively supported, and carried out in strict radio silence.

Aerial reconnaissance during combat actions is conducted with consideration of the specific conditions of the operation. Of course, the most difficult conditions will occur during the conduct of reconnaissance for the first nuclear strike, when it will be necessary in a limited period of time to obtain the maximum amount of data on the targets for the first nuclear strike. This period will involve all the aerial reconnaissance forces and means which the front air forces have. So that reconnaissance is successful, it is organized in the operational-tactical disposition of forces of the forces and means of front air forces in the first nuclear strike. This means the distribution of efforts is as follows. The forces and means of aerial reconnaissance for the first nuclear strike are used in a two-echelon disposition. The first echelon will have 60 percent, principally tactical reconnaissance aircraft. Their task will be to detect targets for [word illegible] strike forces of front air forces, as well as for the second [?first] missile launch.

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Page 14 of 14 Pages

The second echelon will have 30 percent of the tactical reconnaissance aircraft and 90 of the percent operational reconnaissance aircraft. Their task will be to check on the nuclear strike on enemy targets and detect unhit targets for the second launch and for the nuclear reserve which will come in a 10- to 15-minute interval after the strike echelon. Ten percent of the forces and means of tactical and operational aerial reconnaissance travel with the forces of the nuclear reserve. After the delivery of the first nuclear strike, the main task of reconnaissance will be to determine the results of this strike.

If military actions have begun and are conducted with conventional weapons, the main task of reconnaissance will be support of an air operation to smash the aviation, nuclear missile, and air defense groupings of the enemy. In this case, aerial reconnaissance may also make a simultaneous flight of a large number of reconnaissance aircraft. But it is necessary at this point to take into account the fact that roughly 15-20 percent of the reconnaissance aviation will be in the reserve to support a nuclear strike during combat actions.

Aside from the conduct of aerial reconnaissance in a simultaneous flight, reconnaissance, when it must be conducted systematically and constantly, will be done by singletons and pairs, principally according to the aerial reconnaissance plan or on call.

Thus, aerial reconnaissance is the most mobile and productive form of operational reconnaissance. It is capable of providing the command and staffs with timely data necessary for the preparation and conduct of a front offensive operation.

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