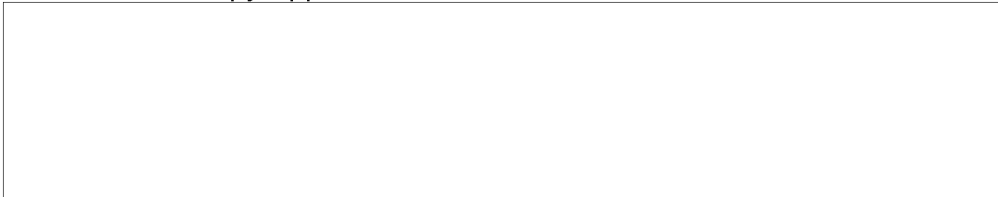


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Urgent Tasks for the Improvement of Aerial Reconnaissance  
Under Modern Conditions

by

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It is generally known that the degree of troop control is directly dependent on the timeliness with which the various command echelons of the armed forces receive necessary intelligence information.

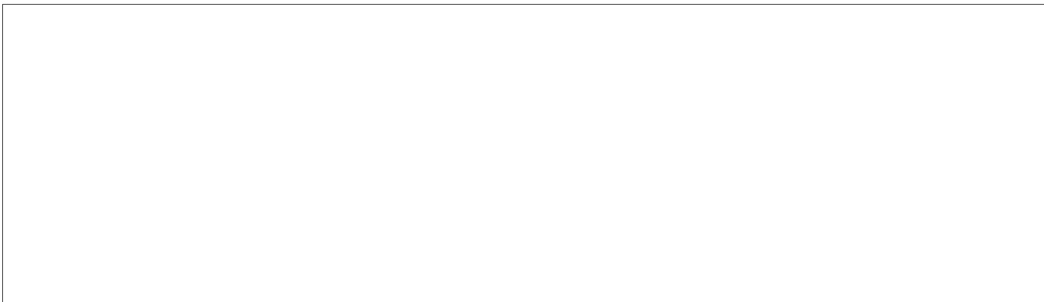
The demands of military art for all types of intelligence are constantly increasing in proportion to changes in the nature of armed combat, and the equipping of troops with the newest types of weapons and combat equipment. This emphasizes the problem of further technical improvement of the present means of reconnaissance and the creation of new models of reconnaissance equipment.

On the basis of a study of experience from the combat training of troops and the state of the means of reconnaissance, it can be said that the troop demands levied on the organs and means of reconnaissance significantly exceed the capabilities of the latter. This pertains mainly to aerial reconnaissance, the status of which causes us particular alarm.


Aerial reconnaissance performs its tasks with the aid of a whole complex of various technical means which are organically inter-connected and which together constitute a single intelligence system.

It is necessary to consider the vehicles of reconnaissance equipment as the first element of this system.

Aerial reconnaissance must have at its disposal a great number of sophisticated flying equipment: manned and pilotless, fast and slow, high and low flying and having various ranges of operation. Up to the present, however, we have had only manned aircraft, mainly of obsolete construction (TU-16R, IL-28R, MIG-15R bis), with low performance characteristics and extremely limited capabilities for overcoming an enemy PVO system.



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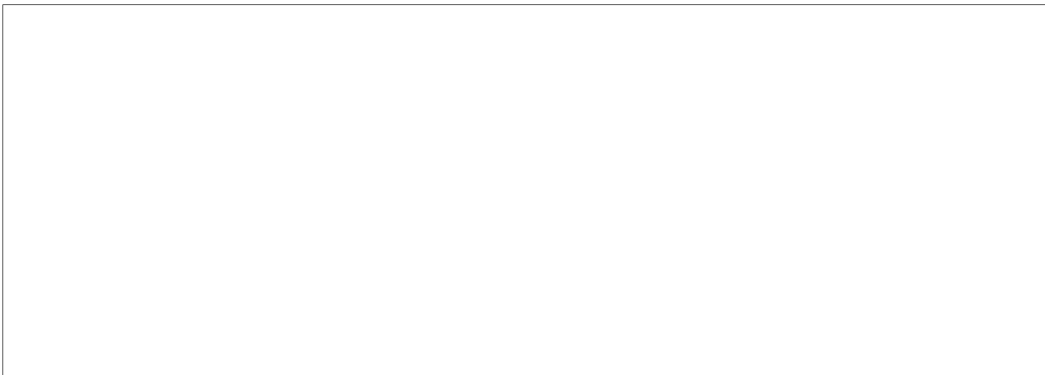
The reconnaissance aircraft which are available can only partially perform their tasks. Moreover, their reconnaissance equipment does not provide for detection of small and mobile targets, for determination of their geographical coordinates, or for transmission of information from the aircraft.

The YAK-27R, which is in series production, has limited performance characteristics and the equipment installed on these aircraft permits only visual observation and aerial photography reconnaissance during daylight hours under favorable weather conditions.

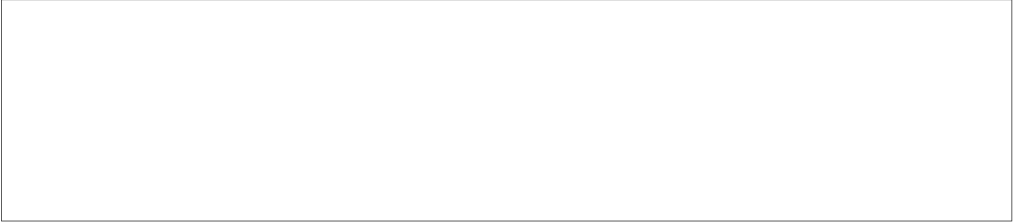
The second most important element of the system of aerial reconnaissance means is the complex of technical equipment of reconnaissance aircraft, including reconnaissance, navigational and communications devices designated for detection and identification of targets, determination of their geographic coordinates, and transmission of the intelligence information from the reconnaissance aircraft to the appropriate command posts. It should be noted that the problems of receipt, processing and transmission of intelligence data in short periods of time, and in the necessary volume, are the most complex of all the problems facing aerial reconnaissance.

This is explained by the extraordinary and varied nature of the targets which may be point-like (tochechnyy), of small dimensions, area (ploshchadnyy), aerial, on land (on water), underground (under water), concealed or camouflaged. The characteristics of each type of target exert a great influence on determining the requirements that are levied on the reconnaissance devices: in relation to the capability for long-range detection of targets, the resolving power of the devices, the time for conduct of reconnaissance of a given target, etc.

Aerial reconnaissance can exploit such important characteristics of targets as, for example, the reflection and radiation of electromagnetic waves of various frequency ranges and also the magnetic, ionization and radiation characteristics. Thus, taking into account that the targets of reconnaissance naturally emit electromagnetic waves, radio and radio-technical reconnaissance devices are constructed, and on the basis of exploiting the principle of reflection--aerial photography, television, infrared, radar and other devices are constructed.



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At the present time, aerial photography and radio-technical reconnaissance devices have become the basic reconnaissance equipment of our armed forces. Unfortunately, other types of these devices (television, infrared, radar, magnetometric, radiometric, radiational and meteorological) are not sufficiently developed. Individual models of such devices have not yet been perfected and are of little use in obtaining intelligence data.


The inadequate development of the above-listed types of reconnaissance devices seriously limits the capabilities of aerial reconnaissance. The devices of reconnaissance aircraft do not satisfy the requirements of the armed forces as to volume, quality or timeliness of receipt of intelligence information. The degree of automation of airborne reconnaissance devices is extremely low and special operators are needed to operate them in flight. Night photography is limited because airborne lighting means have not been perfected. It is possible only after lighting the terrain with photobombs, as a result of which the number of aerial photographs is limited by the supply of photobombs on board. There are no electrical lighting devices in the equipment of our units for taking night photographs of targets from various altitudes.

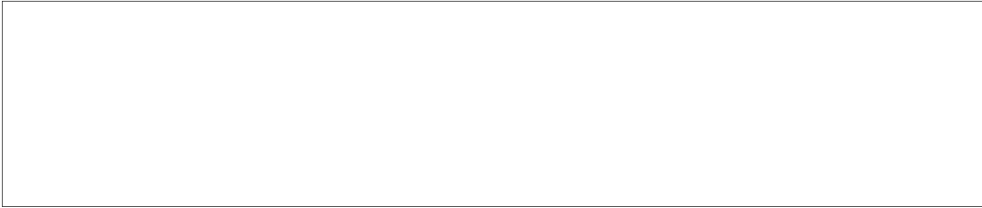
The radio-technical reconnaissance equipment does not ensure complete detection of the enemy's radar networks, particularly of the stations for controlling missile weapons. The handling capacity of the equipment is low. As a result, an experienced operator, in one flight in a TU-16R with an SRS-1 station, is capable of reconnoitering only 8 to 10 ground radar stations. The accuracy of determining the locations of individual radar stations is extremely low: 10 to 20 km.

The processing and interpretation of the results of radio-technical reconnaissance require a rather lengthy period of time.

Intelligence on the enemy's modern radio-technical equipment which operates by rapid bursts or by switch-over of frequencies is practically nonexistent.

The existing means of air navigation do not in fact provide for the necessary accuracy in determining the geographical coordinates of targets, especially under difficult weather conditions and at night, and the navigational problems in long-distance flights over areas without reference points and in northern latitudes are also unresolved.





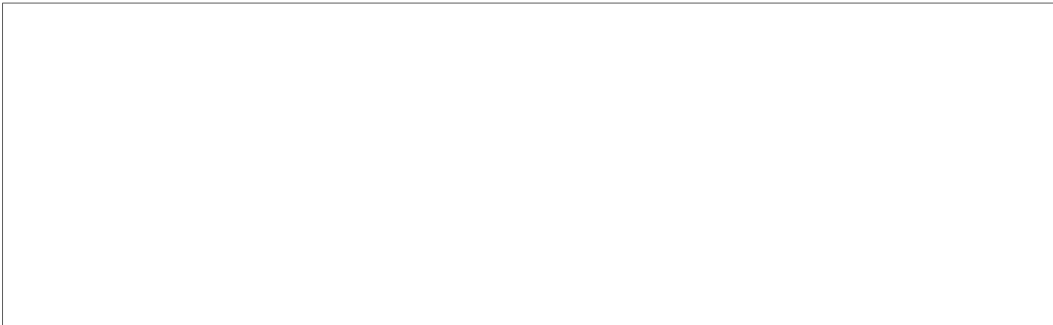
The creation and perfection of navigational means which permit accurate geographical pinpointing of targets and the determination of a current position of the reconnaissance aircraft is an independent problem in itself, as is also mastery of the whole complex of reconnaissance devices.

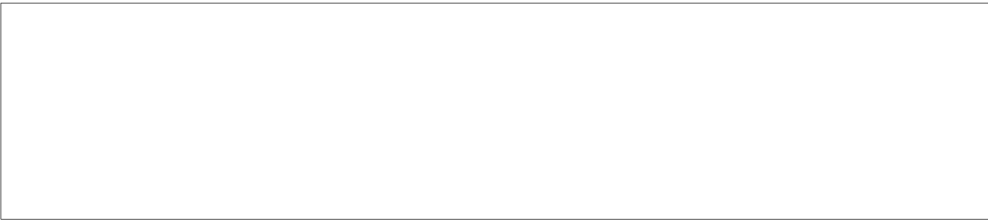
Modern warfare emphasizes the need to shorten, to the maximum extent possible, the intelligence cycle, i.e., from the time of receipt of the initial reconnaissance information to the time of receipt of exhaustive intelligence data by the appropriate staffs. A whole complex of airborne and ground devices is necessary for this.

This problem can be resolved in various ways, for example, by transmitting the initial information directly from the reconnaissance aircraft. Another method is the processing of the initial information aboard the reconnaissance aircraft. A third method envisages having all the reconnaissance information accumulated aboard the aircraft but processing it on the ground after completion of the reconnaissance flight. This method is basically embodied in the existing reconnaissance apparatus since the problems of processing reconnaissance information in flight and its automatic transmission from the reconnaissance aircraft are still unresolved.

The existing ground equipment is not capable of processing and transmitting reconnaissance information in the required volume. For example, the production capacity of the photo-laboratories of reconnaissance units provides for the processing of only 40 to 50 percent of the photographic materials produced by reconnaissance crews during the course of a day. Unfortunately, as yet there has been inadequate development of such highly advanced means of reconnaissance information processing as television, photo-television, aerial photography with processing of photo-documents on board during flight, and also apparatus for the systematic processing of information aboard the reconnaissance airplane with subsequent transmission to the ground.

For a complete resolution of this problem, it is necessary to create ground points for collection and automatic processing of information which is received from strategic, operational and tactical aerial reconnaissance. For transmission of the reconnaissance information to the interested headquarters, it is necessary to introduce television, facsimile and other high-speed means.



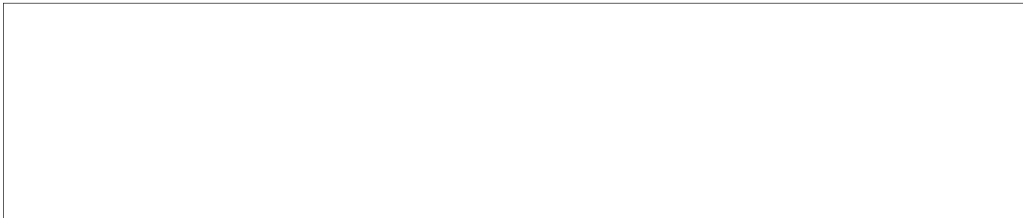


An examination of the basic elements that enter into the complex of aerial reconnaissance indicates that each of them presents a complicated scientific-technical problem.

In order to ensure the necessary coordination in the development of aerial reconnaissance means and in the activities of the various organizations conducting work in this direction, it is advisable to concentrate in a single center the processing, development and requests pertaining to all means of aerial as well as satellite reconnaissance. In our opinion, the air forces will most successfully cope with this problem with appropriate guidance from the General Staff. Together with this measure, in order to eliminate more rapidly the existing discrepancy between the capabilities of aerial reconnaissance means and the requirements of modern weapons of destruction, it is advisable to broaden greatly the scope of scientific-research, experimental and experimental-design work in the field of the creation of the latest technical means of aerial reconnaissance. In particular, it is necessary to designate the leading institutes (especially for the development of reconnaissance devices) and to broaden the production base of the industry engaged in the creation of series models of aerial reconnaissance means by widely initiating the production of devices in small series. In this connection, the development and creation of new aerial reconnaissance means should, in our opinion, be considered one of the primary tasks in the field of increasing the combat readiness of all types of armed forces.

In order to ensure timely intelligence data for all types of armed forces, we must solve a number of problems that are connected with determining the numerical composition of aerial reconnaissance forces for peacetime and wartime conditions, the organizational structure of these forces and control over them, and also the development of the most favorable system for the flow of intelligence information from the lowest level to all interested echelons.

In considering the necessity for maintaining a high degree of combat readiness of aerial reconnaissance, we believe that in peacetime it is very important to have strategic, operational, and tactical means in quantities which will permit the timely detection of the preparations of an aggressor for nuclear/missile attack and will provide all types of armed forces with intelligence data in the initial period of a war. The readiness of the aerial reconnaissance forces must correspond to the combat readiness of our strike forces and above all of our missile troops.



In view of the fact that in the majority of cases aerial reconnaissance will be carried on under conditions of strong opposition from enemy PVO weapons and will be accompanied by significant losses, it is necessary to envisage the creation of special reserves for the period of the war, including those of the Supreme High Command, which are capable of ensuring reinforcement of reconnaissance forces on the most important axes of operations of our troops. During the course of operations, because of the sharply increased troop maneuverability, aerial reconnaissance must be marked by very frequent observation of (targets), which means conducting a large number of flights by manned and pilotless means.

Research, based on materials from training exercises and maneuvers of our troops, indicates that in the most typical front offensive operation in a developed theater of combat operations against a group of enemy armies consisting of 25 to 30 divisions, it will be necessary to conduct 650 to 700 reconnaissance flights per calendar day. In determining the overall number of aerial reconnaissance forces and means required by a front, it is necessary to keep in mind the fact that the average potential of manned reconnaissance aircraft consists of: 3 flights per calendar day for tactical reconnaissance, 2 flights for operational reconnaissance, and 0.5 flights for strategic reconnaissance.

The new tasks facing aerial reconnaissance also necessitate a change in the form of the structure of the entire intelligence system. In our opinion, the basis of the organizational structure of the intelligence system must be the idea of ensuring centralized direction and use of all forces and means. To accomplish this, it is necessary, along with the GRU, which does not embrace all types of intelligence, to have within the Ministry of Defense a single directing intelligence organ upon which should be levied:

- the working out and improvement of the system of equipping intelligence elements;
- the working out of a single organizational-organic structure of intelligence units and organs;
- coordination of the activities of the intelligence organs of the various types of armed forces and the organization of coordinated operations among them;
- centralized direction of all types of intelligence.

The absence at the present time of such an intelligence organ does not provide an opportunity for the most effective use of our available forces and means of intelligence and is a serious obstacle to the creation of a single intelligence system within our armed forces.


The direction of strategic, operational and tactical aerial reconnaissance with the aim of receiving reconnaissance data for all of the interested echelons should, in our opinion, also be concentrated in appropriate intelligence centers. For this, the forces and means of strategic aerial reconnaissance of the armed forces, including satellite reconnaissance, should be concentrated in a special center of the air force, which would be responsible for providing intelligence data both to the Supreme High Command and to all types of armed forces. The forces and means of operational and tactical aerial reconnaissance should be concentrated in the intelligence centers of air armies (air forces (voyenno vozdushnyye sily--VVS) of fleets or groups of troops) which would be responsible for furnishing intelligence data to the troops of the district (front or fleet).

We consider the introduction of aerial reconnaissance units and subunits into the (TO&E) of combined-arms and tank armies premature for the time being, since a large number of service units and subunits would be required for airfield support. As a result, this would decrease the maneuverability of the combined-arms formations, would result in a dispersal of the already limited forces of aerial reconnaissance, would hinder combat support of the operations of aerial reconnaissance forces, and in peacetime would also significantly weaken the organization of combat training and the direction of reconnaissance units and subunits. As pilotless means for reconnaissance of a field of combat are introduced, means which do not require complicated maintenance, it will be possible to introduce them into the TO&E of combined-arms formations. At the present time, however, combined-arms and tank armies must receive reconnaissance data from the headquarters of the front, which, depending on the combat situation which is taking shape, will carry out operations by the forces and means of aerial reconnaissance on behalf of all troops and in accordance with the goals of the front operation being conducted.

It should be noted that the intelligence organs which exist in the main headquarters of the VVS, the headquarters of naval (voyenno-morskoy flot--VMF) aviation, and in air armies (VVS of districts and fronts) by virtue of their small numbers and organizational

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imperfection, will not be able to perform the tasks which we propose to levy on the intelligence centers of strategic and operational-tactical reconnaissance. Also, the separate reconnaissance squadrons created in the military districts (groups of troops) instead of aviation regiments, are not capable of fulfilling combat tasks to the required extent, and the extremely limited forces and means of aerial radio-technical reconnaissance are widely dispersed: 2 or 3 aircraft available in the special purpose (osoboye naznacheniyee--osnaz) units of districts (groups of troops) and in the reconnaissance units of air armies.

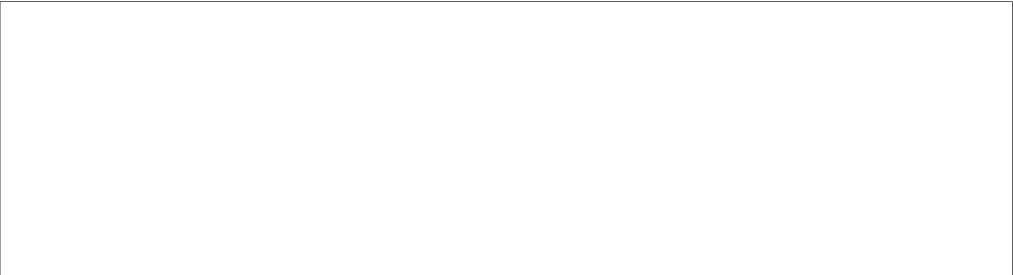
It is perfectly clear that the existing dual subordination of units and subunits of tactical aerial reconnaissance (to the district and to the air army) and the dispersal of reconnaissance means, weakens direction of them and does not permit sufficiently efficient and purposeful organization of cooperation between operational and tactical aerial reconnaissance.

Therefore, it seems to us advisable to create aviation reconnaissance regiments in some military districts (groups of troops) primarily on the main axes, instead of having separate small intelligence subunits in each military district.


The question of having cadres of reconnaissance specialists for intelligence organs and units and subunits of aerial reconnaissance is also very important at the present time.

In connection with the increased demands of modern conditions, specialists of the intelligence organs of all echelons must have broad general and special training. However, this category of officer personnel has not been trained in military educational institutions in the course of recent years. As a result, a significant part of the intelligence organs and staffs of air regiments are still manned with officers who do not have the necessary theoretical knowledge and work experience.

The acute shortage of reconnaissance specialists can be eliminated only by establishing special training on a sufficient scale in the military educational institutions of the country. In addition, in the interests of maintaining permanent cadres of intelligence personnel, it would also be advisable to resolve the question of the material-legal incentives of the personnel of intelligence organs and units.'



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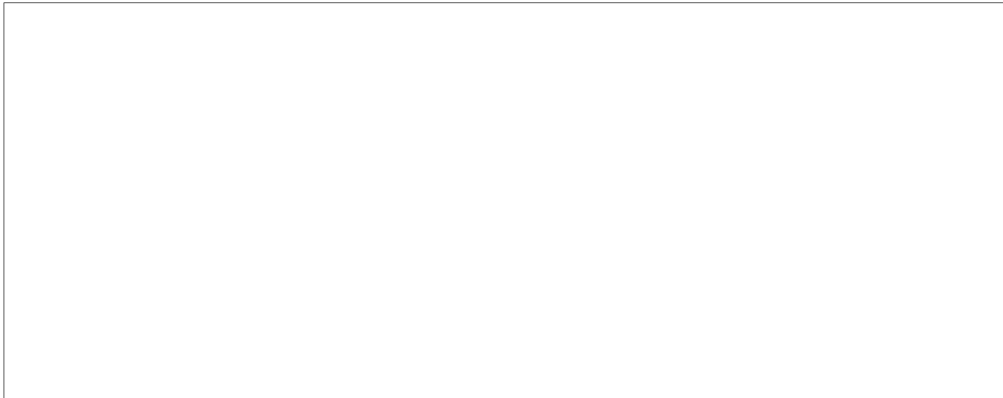
Also of no small importance is the problem of improving the TO&E of reconnaissance units. In aviation reconnaissance regiments, for example, the position of photogrammetric interpreter is usually filled by privates and privates first class who are serving their normal period of compulsory military service. Taking into account that under modern conditions decisions for the use of weapons of mass destruction will be made on the basis of the interpreted materials of aerial photo-reconnaissance, we consider that it is advisable to assign to these positions officer-specialists and soldiers who are serving voluntarily beyond the required period and who possess high qualifications.

In conclusion, a few words about the preparation of intelligence organs and the training of intelligence personnel.

At the present time, the performance of reconnaissance tasks is not being achieved to the required extent because of the extremely limited training facilities, the lack of trained command posts for controlling reconnaissance aviation, the lack of proper opposition by PVO forces and weapons during training exercises, and also because significant limitations in the mode of operation of reconnaissance aircraft in flight cause serious defects in the training of units and intelligence organs.

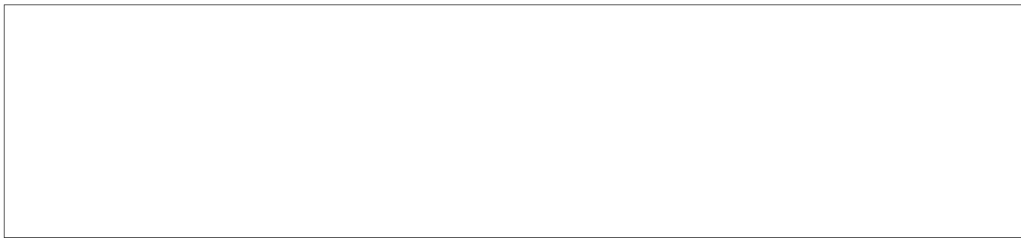
In order to improve the combat training of intelligence organs and units, it is necessary above all to create an appropriate training facility which will permit the training of units and intelligence organs in the conduct of reconnaissance of weapons of mass destruction and determination of the coordinates of targets with the maximum possible accuracy. In our view, it is advisable to create within the armed forces specialized inter-district firing ranges with control and support means which provide targets which are mobile at firing positions both on the firing ranges and in areas outside the ranges.

In order that reconnaissance units perform their tasks during training exercises under conditions of strong enemy PVO, we feel that it is necessary during the training to create realistic countermeasures by fighter aircraft, by units of anti-aircraft missile troops (zenitnyye raketnyye voyska--ZRV), and by radio jamming.



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And finally, in order to work out, during the course of the training of units, the whole complex of tasks in the collection, processing and analysis of reconnaissance data, and also for the transmission of these in the shortest period of time to the interested headquarters, it is advisable to employ the maximum possible number of reconnaissance units and subunits and the intelligence organs of all echelons in the troop training exercises and maneuvers.

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Speedy resolution of the entire complex of problems facing aerial reconnaissance will ensure the elimination of the gap which has formed between its capabilities and the requirements of the troops. This will increase the effectiveness of the use of the new weapons of destruction and also the combat readiness and combat efficiency of all types of armed forces to a significant degree.

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