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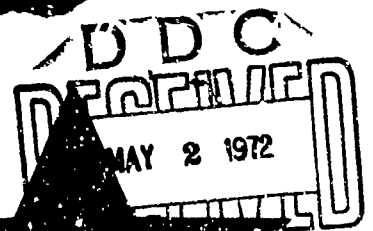
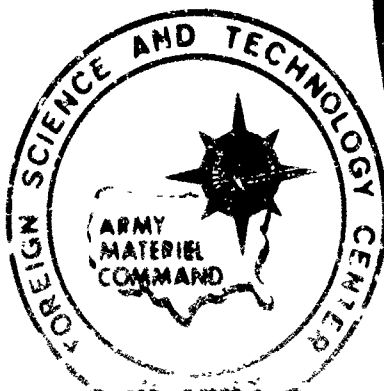
ВЕСТНИК ПРОТИВОВОЗДУШНОЙ ОБОРОНЫ

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The following definitions apply for the transliterated organizational entities included in the text:

- chast'** [voinskaya chast'] - Administrative, line, and supply unit (yedinitsa) of the [branches] of troops, which has a number and banner, e.g., a regiment, separate battalion (batal'on, division) and troop organizations equal to them.
- ob''yedineniye** [operativnoye ob''yedineniye] - Large-scale unification of various soyedineniye of the branches of troops, which is nonpermanent in composition and is intended to conduct operations in a war.
- podrazdeleniye** Troop unit of permanent organization and homogeneous composition in each branch of troops, which unit forms a larger podrazdeleniye or a chast'.
- soyedineniye** [soyedineniye voyskovoye] -- Combination (soyedineniye) of several chast' of one or various branches of troops into a permanent organization (division, brigade, or corps), headed by a command and a staff and including chast' and podrazdeleniye of auxiliary troops and services necessary for combat operations.

Source: Russian-English Dictionary of Operational, Tactical and General Military Terms, 1938

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TOWARD NEW SUCCESSES IN COMBAT IMPROVEMENT

1971 is coming to an end. It will go into the history of our homeland as the year of the 24th CPSU Congress. Personnel of our country's PVO [Antiaircraft Defense] Forces, just as all fighting men of the Soviet Armed Forces, profoundly conscious of their responsibility for ensuring the defense capability of the Soviet state, have labored in a state of great patriotic enthusiasm under the slogan, "The Year of the 24th CPSU Congress -- a Year of Outstanding Training and Service." All specialists of the PVO Forces, in missiles, aviation, radar and communications, have struggled every day to reduce the time required to bring chast and podrazdeleniye to a fighting state, improve maintenance and operation of the machinery entrusted to them, and increase its fighting efficiency. True to the behests of Lenin, the defenders of our air frontiers have constantly devoted attention to improving their fighting skill and strengthening military discipline and order.

A majority of chast and podrazdeleniye completed the training year with high indicators and completely fulfilled their increased socialist obligations. There was a rise in the number of soldiers rated outstanding in combat and political training, high grade specialists, masters of a military qualification, soldiers who have mastered related specializations, winners of the medal for the All-Union Sport Complex, and rated athletes. The number of outstanding podrazdeleniye and chast rose, and their combat readiness was raised to a qualitatively new base.

Chas. commanders and their staff, podrazdeleniye commanders, and all generals and officers gained considerable experience in preparing for and conducting tactical exercises and combat firing and improved their skill in organizing and guiding modern combat with an air enemy and controlling subordinates' actions under complex conditions.

There was increased militance by political agencies, party and Komsomol organizations, and podrazdeleniye. The practicality, concreteness, and effectiveness of party political and political education work during combat watch, performing field fire, flights, exercises, drills, and training periods on combat machinery increased. Evidence of this is provided by the South troop exercises which were conducted this year, as well as by tactical and flight-tactical exercises, field firing, and summary inspections.

According to results for the past year, the anti-aircraft missile battalion commanded by Lieutenant Colonel V. Yasyutin is rightly called outstanding. These missile troops performed all their obligations with honor. They operated skillfully in a difficult situation during the South troop exercise. At the summary inspection, the podrazdeleniye demonstrated outstanding combat training, a high level of organization, and model military order. The Deputy Commander of PVO Forces expressed gratitude to all personnel of the battalion.

Fighting men of the squadron commanded by Major V. Lemeshev, pilot first class, are famous for unstoppable intercepts. This podrazdeleniye has maintained its title of outstanding for several years. Recently, while performing missions in a complex tactical situation, personnel demonstrated a high degree of group flight harmony. All attacks at low altitudes and in the stratosphere were extremely accurate.

Personnel of the radio operations podrazdeleniye commanded by Captain V. Ladoverov consistently demonstrate high vigilance and outstanding coordination, thorough knowledge of the combat machinery entrusted to them, and masterly control of it. At the exercises which were conducted and the summary inspection, the radar troops operated precisely, resolutely, and with tactical intelligence when low-altitude, maneuvering targets appeared unexpectedly. The soldiers detected the "enemy" at a great distance and tracked him solidly under conditions of interference.

There are many more such examples. They are evidence that the PVO fighting men are persistently and fruitfully seeking ways to further improve their skill and raise the combat readiness and capability of all elements of our country's PVO Forces. They remember the party's demand -- not to flatter oneself with what has been achieved, but to view it as a kind of step or jumping off place for conquering new heights. That is why personnel of the PVO Forces of the country see their foremost duty during 1972 as strengthening and multiplying the successes of the past training year.

It is an objective necessity to raise the vigilance and combat readiness of the Soviet Armed Forces by every means, including the PVO Forces. V. I. Lenin called on us to constantly remember that the imperialists are capable of undertaking any adventures and using the most refined means and procedures to try to destroy or, at the very least, weaken, socialism. As historical experience tells us, sudden attacks, treachery, and perfidy have been and remain the favorite tricks of the imperialist plunderers. As long as imperialism exists, the threat of war remains. The events of recent years have given new proof of the bandit-like nature of imperialism.

Therefore the main concern of every PVO fighting man, no matter what post he may occupy, is steadily improving his fighting skill, intensifying vigilance, and using every means to raise combat readiness and maintain it on a level such that any aggressor can be crushed and repulsed at any minute. This was stressed with new force by the 24th CPSU Congress.

It is very important, right from the first days of the new training year, to develop a persistent campaign to accomplish the large, complex missions facing personnel of the PVO Forces on time and in a model fashion, to constantly improve antiaircraft defense, and to prepare for active combat operations to destroy an enemy in a complex and rapidly-changing air situation and to make skillful, intelligent use of all forces and equipment to counter high-speed maneuvering targets operating over the entire range of altitudes and using different types of interference.

Fighting men of antiaircraft missile chast and podrazdeleniye must refine their tactical and fire skill even more stubbornly and persist in learning to accurately hit any targets or groups of enemy aircraft, carrying out maneuvers, applying extensive radio interference, or other means of counteraction. The missile troops should constantly improve their fire and control system and procedures for firing antiaircraft missile complexes.

In order to raise the combat readiness of aviation podrazdeleniye to a new level, it is essential to continue to improve personnel training for active combat operations in a complex air, interference, and meteorological situation. It is the duty of commanders to train the pilot as an air fighter, capable of intelligently carrying on search, and individual or group battle over the entire range of altitudes with due regard for the operating tactics of enemy aircraft and utilizing the advantages of his aircraft's weaponry and the weak points of the enemy's aircraft.

Particularly precise actions are required from pilots and crews when working through intercepting air targets at maximally remote lines and landing at neighboring airfields. This also increases the responsibility of flight and squadron commanders for controlling crews and groups in the air, as well as the responsibility of engineers and technicians for reducing the time required to prepare and introduce fighter planes into combat from different levels of readiness.

The contemporary situation demands that the personnel of radio operations podrazdeleniye put even greater stress on further raising the vigilance of the combat watch and improving the capacity for reliable radar support to the combat operations of antiaircraft missile troops and fighter aircraft. It is understood that these missions will be accomplished faster and better as radar troops become more comprehensive and solid in their knowledge of methods of efficiently employing the tactical and technical capacities of all types of radar stations under different air situation conditions with due regard for visibility zones and terrain. This will also be facilitated if they constantly strive to detect the air enemy at a greater distance and raise combat readiness.

Ideological tempering of personnel and forming a Marxist-Leninist worldview and high moral-political, psychological, and fighting qualities in them is of primary importance. This is dictated by the development of modern weapons, by the fact that the army is saturated with a large quantity of varied and complex machinery, and by the nature of modern war in which, as never before, extremely critical situations can arise which face a person with the necessity of overcoming enormous hardships and enduring harsh trials. It is the duty of commanders, political agencies, and party organizations to continue to improve the content, form, and methods of party political work and subordinate it to nurturing communist ideology, devotion to the homeland, Soviet patriotism, proletarian internationalism, and a constant readiness to defend socialism in PVO fighting men.

A high level of tactical training among personnel and working harmony in podrazdeleniye and chast comprise the basis of combat readiness. As before, it is essential to improve tactical skill in exercises and when working through the missions and drills envisioned by combat training courses for the arms of troops. A dynamic and educational situation which corresponds to the probable nature of enemy actions and requires active operations by podrazdeleniye and combat teams and bold plans and flexible control by commanders should be created at exercises and training

periods. In this respect, Captain V. Bogovan has a great deal that is instructive. When he conducts a drill, the radar operators do not waste a single minute. The officer saturates training periods with unexpected inputs and conducts short exercises calculated for maximum intensity in the actions of team members.

The effectiveness of exercises, training periods, and drills increases if personnel at them work through the full standards for combat operations and measures to protect against enemy weapons of mass destruction and eliminate the consequences of their use, steps are taken to prepare personnel for ground battle, transferring the radar station to other positions is practiced, and so on. Special care should be taken in preparing drills conducted for the purpose of working through the most complex missions in practice. In this, just as before, radar operators must learn to perform missions under complex conditions where the "enemy" uses various types of interference. Senior officers must give commanders greater independence in planning and organizing combat training, particularly tactical training, depending on local conditions and the level of personnel training achieved, in accordance with the missions of the chast or podrazdeleniye.

It is essential to avoid the mistakes of the past year, where sometimes indulgence and simplification in troop training was permitted, there was unnecessary intervention in actions by specialists, substitutions and extra support were provided for them, or they were placed in easier conditions. Unfortunately, even now training leaders sometimes raise new training questions for drill while the conditions of combat work remain as before. And it is no surprise that certain specialists are becoming accustomed to stereotype actions. They have become so tied to the chart previously worked through that as soon as they are placed in different, more difficult conditions, one mistake follows another. That is how it happened, specifically, with Captain Yemel'yanov. When the situation became complicated during a certain drill, he was unable to handle his mission. But then, just a month before this, the officer had received an outstanding evaluation at the training ground.

Fixed attention should be given to the know-how of commanders and leaders who make efficient use of combat machinery resources and limits of fuel, ammunition, and other materiel, employing them primarily to fulfill the most complex missions of preparing troops for battle completely and with high quality. For example, during exercises and when working through missions of combat

training which require air support, it is possible to establish a dynamic and instructive air situation without a large number of planes representing the attacking party by tactically intelligent planning of the attack using the most complex methods and procedures of operation of the probable enemy.

There should also be fuller utilization of constructive know-how from comprehensive training, with this training being directed to supporting troop preparation for operations in a complex air situation. It is very important to strive to see that every flying day in aviation chas is used in the interests of training staffs and podrazdeleniye of all arms of troops. On the other hand, it is necessary to make maximal use of training grounds and simulation or training equipment to work through combat training missions without flying aircraft. It is advisable during training periods to make extensive use of military training films, film strips, and other mechanical teaching devices. Putting several tasks together in one training period also offers substantial advantages and efficiency.

A high level of technical training for personnel is also a very important factor in combat readiness. Weapons and combat machinery become a menacing force only when they are in skillful hands. Every PVO specialist must achieve a level of technical knowledge which ensures precision, speed, and accuracy in preparing weapons and machinery for battle and the ability to use it skillfully, with maximum effectiveness, in various combat situations. This same purpose is served by training periods to master repair and restoration of machinery right at the position and training personnel in combat work while wearing individual protective gear and employing collective means of protection.

In the new year, work to develop rated specialists, master related specializations, achieve mutual replaceability in crews, teams, and squads, reduce the time required to master the weapons and machinery entrusted, and search for more effective methods of applying it should take on even greater scope. It is right for commanders to establish personal assignments for subordinates and time periods for them to receive or raise their rated qualification, work out mutual replaceability, or master related occupations.

Growth in the occupational skill of military cadres is the basis for further raising combat readiness and troop training. It is essential to continue to raise the responsibility of officers for improving their own military training and to look after establishing good conditions for

independent officer study, conducted with the personal participation of their immediate superior, in every podrazdeleniye. If the progress of independent training and fulfillment of individual plans is checked each month by personal talks and evaluating the officer's level of training, it is possible to be certain that successes in such a podrazdeleniye will be stable and lasting.

Based on the demands by the 24th CPSU Congress for improving work with command personnel, it is essential to continue to devote more attention to further improving the combat skill and personal training of commanders at all levels in organizing and leading modern battle in a complex and rapidly-changing air situation.

Every tactical exercise and training period and all drills and short exercises for officer personnel should be subordinated to accomplishment of these most important missions. It is important that, during them, different conditions be created which apply to the most typical possible variations of operations by a probable enemy and which require appropriate application of different methods and procedures for combatting them. In this, the decisions and actions of trainees should always be carefully reviewed, the strong and weak aspects pointed out, and references made to regulation and manual requirements and concrete examples from experience in combat operations. As a result of the discussion, it is essential to work out the most advisable decisions and actions appropriate to the concrete situation established in the given training period (drill or exercise). In this manner, during training periods, drills, short exercises, and exercises, officer personnel should, on the one hand, develop tactical thinking and creativity, skill, and initiative, and, on the other hand, accumulate concrete experience with operations in various probable combat situations.

During the new training year, podrazdeleniye commanders and chast commanders and staffs must intensify the process of working through various methods and procedures for controlling battle and attaining skill in employing means of control. It is also important, in combat training, for podrazdeleniye and chast to practically work through procedures for mutual support by PVO forces and equipment in modern warfare and further improve them in order to ensure complete victory over the enemy under any conditions.

During the past year, substantial useful methodological know-how was accumulated in our chast and podrazdeleniye. It is a prime duty of commanders, political agencies, and staffs to systematically generalize and propagandize this.

For this purpose, wide use should be made of different forms, for example, teaching methods training periods and meetings, assemblies of officers in different categories, and visits to outstanding podrazdeleniye during training periods, and so on. It is very useful to have the persons who created know-how present thorough talks on it. It is especially important to arm young officers, including those called from the reserve, with little pieces of useful, new, and progressive know-how.

High combat readiness is unthinkable without iron military discipline, organization, and order; in the contemporary situation, the demand for this has risen further. The 24th CPSU Congress called special attention to the necessity of raising the level of discipline and responsibility among fighting men. Therefore, the efforts of commanders, political agencies, staffs, and party and Komsomol organizations should again this training year be concentrated on maintaining the strictest military order and regulation relationships, teaching men to perform, and ensuring that personnel are ready to carry out their leader's order precisely, unconditionally, and on time.

Socialist competition plays a large part in ensuring high quality fulfillment of combat and political training missions. It is the duty of commanders and political agencies to establish the direction of competition during the training period, during combat watch, or during the conduct of exercises, flights, or firing, striving to have it encompass all personnel. It is also essential to raise the responsibility of staffs for giving aid to podrazdeleniye in fulfilling socialist obligations and for the required organization of the training process.

The high evaluation given to the military labor of Soviet fighting men by the 24th CPSU Congress inspires all personnel of the country's PVO Forces to even more model service. In 1972, when our country will be broadly celebrating the 50-year anniversary of the establishment of the Union of Soviet Socialist Republics, we are filled with a desire to master the weapons entrusted to us even better, to guard the air frontiers of our homeland sharply and vigilantly, and to be constantly ready to repulse any aggressor.

GREAT TRUST, GREAT RESPONSIBILITY

by Col Gen I. Khalipov, Member, Military Council, and
Chief, Political Directorate of the PVO Forces

The armed defenders of the Soviet people stand vigilant watch over their peaceful, constructive labor. At the 24th CPSU Congress, their service and the combat capability and readiness of the Armed Forces as a whole received a high evaluation. It was, at the same time, a remarkable testimony to our military men and women, who are constantly contributing their knowledge and energy to increasing the defensive might of the Soviet State.

The 24th CPSU Congress devoted a great deal of attention to questions of further improving troop training and education, and it stressed their increased role in the contemporary stage of development of our society. This is conditioned by the growing complexity and expansion of the economic and sociopolitical tasks of communist building and the current scientific-technical revolution. As was indicated in the decisions of the Congress, the tasks facing the party and the country persistently demand that leaders have a perfect mastery of modern methods of control, possess a feeling for the new, see prospects for development, and be able to find the most efficient ways of solving problems which arise and using the knowledge and experience of others.

These high demands by the party refer entirely and completely to our military cadres as well, including the generals and officers of the country's PVO Forces.

Thanks to the attention and concern of the Communist Party and the Soviet Government, the country's PVO Forces now have highly skilled command, political, and engineering-technical cadres who are boundlessly devoted to the ideals

of communism, well-trained in all respects, and capable of leading troops knowledgeably in peace or war. Many of our officers have higher military or specialized education, and half of them are engineers and technicians. Ninety percent of our officers are communists and Komsomol members, and during peacetime thousands of them have been awarded high government prizes for successes in training and educating subordinates and for skillfully mastering combat machinery and weapons.

Commanders, political workers, and other leaders are constantly demonstrating their ability of control troops and train and educate their subordinates during intensive daily combat training, during combat watch, and during the numerous drills, tactical training periods, and exercises. The South troop exercises, which were held last summer, were a major test for commanders, political workers, and personnel in a large number of chast and soyedineniye. All the PVO troops who participated in the exercises showed increased combat skill and, at the same time, they supplemented their knowledge, improved their habits in tactically intelligent operations and skillful application of weapons and machinery, and moved forward in mastering the science of defeating a powerful, well-equipped enemy.

At the present time, the results of the past training year have been summarized. The number of outstanding soldiers and highly rated specialists in the chast has risen. Soldiers, sergeants, and officers have successfully fulfilled their socialist obligations in the competition which was held under the slogan "The Year of the 24th CPSU Congress -- a Year of Outstanding Training and Service."

The combat skill of missile, aviation, radar, and other special types of troops was raised to a new, higher level. But life does not stand still. During the new training year, personnel of our country's PVO Forces must resolve even more complex tasks of combat improvement, further raising the quality of combat watch, searching for new reserves to decrease combat readiness periods, and strengthening discipline and regulation order. Successful accomplishment of these major and responsible missions is directly dependent on the level of training, work capacity, initiative, and organizational skill of leadership personnel. And this, in its turn, requires constant improvement of work with leadership personnel by military councils, political agencies, and party organizations. In recent years, military councils, political agencies, and party organizations have notably improved their activity in this area. Questions related to training and educating leadership personnel are now discussed regularly at meetings of military councils, party committees, and party bureaus, at gatherings of party activists, and at party conferences.

Military councils and political agencies have begun to hear reports by commanders, chiefs, and political workers, and to study and generalize their style of work. A well-structured system of ideological and political training for leadership personnel has taken shape in all elements.

For example, there is a good deal that is useful in the work with leadership personnel of the Military Council, political directorate, political agencies, and party organizations of the Moscow PVO District, Winner of the Order of Lenin. They regularly discuss questions of work with cadres at meetings of the Military Council, in the political directorate, and at party organizations. For example, at a meeting of the Military Council, the question of increasing the role of leadership personnel in the engineering-technical aviation service in solving the problems of accidentless flight work was reviewed. This made it possible to find new reserves for improving the training and education of aviation specialists and technicians, which had favorable results later in fulfillment of the flight training plan.

Training periods with leadership personnel are set up, and concrete training is carried on in the local units. Special concern is shown for training and educating chast commanders. Assemblies and seminars for them are held regularly, by arms of troops, and at them questions of combat readiness, organizing the training process, and political and military education are considered. At one of the recent seminars, the question of the commander's work to organize vigilant performance by personnel on combat watch was discussed. Assemblies and training periods are ordinarily conducted in leading chast, with participation by the best methodologists.

Special attention is devoted to ideological and political tempering. Marxist-Leninist training groups, in which chast commanders and political workers study, have been established in the soyedineniye. Useful and instructive training periods with officers and generals are held at headquarters and the directorates of the district. Scientific-theoretical conferences and theoretical interviews have become a firm tradition. The majority of generals and officers participate actively in propaganda work. Many of them head Marxist-Leninist training groups. Leadership personnel comprise the nucleus of agitprop collectives and groups of speakers. In just the last few months, generals and officers of the district headquarters and directorates have given dozens of lectures and reports on the urgent problems raised by the 24th CPSU Congress.

As we can see, multifaceted work with leadership personnel is carried on in the district, and it is reflected

favorably in the state of affairs in chast and soyedineniye and in the formation of young cadres. During the past training year, the district successfully handled the difficult missions of further raising combat readiness and combat improvement. The new training year too has begun in an organized manner with a great deal of political enthusiasm among the troops.

Thoughtful and purposeful work with leadership personnel is also done in the Baku PVO District. They devote a great deal of attention to training and educating leadership personnel with useful, progressive know-how. For this purpose they set up seminars, special training periods, and trips to leading chast and podrazdeleniye. For example, many officers have visited one of the leading chast which received an outstanding evaluation at the summary inspection. There they have model regulation order, a high degree of organization, and good personnel combat training. And credit for this belongs primarily to the commander, political workers, and other training leader officers. The district newspaper, Na Strazhe, has written extensively about the experience of some of them in training and educating subordinates.

However, when evaluating training and education of cadres from the point of view of the increased party demands, it must be emphasized all the same that this work is not yet on the necessary level and needs further improvement. Above all, officers and generals need Marxist-Leninist training. It is essential to increase their efforts in mastering revolutionary theory and the Leninist ideological and theoretical heritage, and to continue to study the decisions of the 24th CPSU Congress thoroughly and struggle persistently to put them into practice.

The ideological and political tempering of a leader is the crucial condition for his successful activity. The weakness of a particular leader in organizational matters or his work failings are usually related to inadequate ideological and theoretical training. Not too long ago Officer I. Tomashuk was removed from his position. One of the basic reasons for this was the fact that he showed a complete lack of concern for his own ideological and theoretical training, went for months without reading political literature and magazines, and only skimmed the newspapers. The officer gradually lost the qualities of a leader, began to misuse his service position, and permit amoral acts.

In order to be a bearer of party policy and organize fulfillment of its decisions and instructions, it is essential to be a profoundly ideological, progressive man of our day, and it is necessary to persistently replenish one's

theoretical knowledge and take a daily interest in questions of science, including military science, engineering, literature, and art. In addition, one must have a thorough understanding of international politics and the internal life of the country, and skillfully apply the knowledge obtained in practice. This is particularly important when experience demands insistently that leadership in all sectors be strictly scientific.

The question naturally arises whether all our leaders are persistently mastering theory? And how are political agencies and party organizations helping them in this?

Even with all the positive things that have been done in this area, there are untouched possibilities and shortcomings. There are still workers who study revolutionary theory without the necessary persistence or consistency. Some of them do not have personal plans for theoretical training and expanding their perspectives, do not listen to lectures, do not go to the theater, and do not read political, artistic, military science, and specialized literature regularly. When you ask such a leader why he is not studying, he has prepared a stereotype answer, "I don't have any time, I am very loaded down at work."

What can you say? Every leader is short on free time. But he should discover two or three hours out of the 24 to study, or to sit and read. Not only will work not suffer from this, it will, on the contrary, gain.

Party organizations are not always careful in studying the time budgets of leadership personnel, and they do not set up effective checks on their theoretical training and efficient use of free time. In certain places theoretical conferences and interviews are seldom held and even such a training form as writing reference papers is used timidly. The leaders lose a great deal of time in all kinds of meetings and gatherings, which sometimes could be dispensed with at no cost to the work.

A serious shortcoming is the formalistic approach of certain workers to studying revolutionary theory. It happens that sometimes an officer can restate particular theoretical propositions from the works of V. I. Lenin, the CPSU program, or the decisions of the 24th CPSU Congress, but is not able to apply his knowledge in analyzing current phenomena or understanding missions in the area of troop training and education of personnel.

It is precisely the formalistic approach to the study of theory that is sometimes the basic factor which hinders a leader from presenting lectures or reports to personnel or simply having a sincere talk with the troops

and answering questions raised by them. But after all, under contemporary conditions it is no longer enough for a leader to be simply an organizer and knowledgeable about work, he must also be an educator. In the Official Report of the CPSU Central Committee to the 24th CPSU Congress, Comrade L. I. Brezhnev said that even if a leader is given the right to sole command, he still cannot rely only on the force of orders. In order to be on top, it is essential for him to patiently and persistently master the art of teaching, to know the men and their moods and needs very well, and to be in constant communication with them.

A majority of leaders give lectures and reports willingly and regularly, and they go to the barracks or to the training area simply to talk with the soldiers. For example, personnel of the N chast always listen with great interest to talks by Officer N. Proskurin concerning pressing questions of our party's foreign and domestic policy and problems of scientific-technical development and military education.

It is difficult today to imagine a leader who would stand aside from explaining the documents of the 24th CPSU Congress to the fighting men, or who would not participate in mobilizing personnel to put party instructions into practice. Nonetheless, it must be stated that such cases exist. Lieutenant Colonel A. Belikov, for example, avoids speaking to the troops in any way possible. And this is understandable. At the summary inspection it was discovered that he himself does not have a clear idea of many of the problems raised by the 24th CPSU Congress. But after all, Comrade Belikov is the leader of a Marxist-Leninist training group. During the year he did not read a single one of the classics of Marxism-Leninism. Therefore, with such a leader it is not surprising that training periods in the group are on a low ideological level, several officers demonstrated a poor knowledge of theory at the inspection, and two of them had to be given the evaluation "Has not understood."

One may ask where were the political agency and party organization? Why did they fail to correct Comrade Belikov in time or hold him responsible for his personal theoretical training and the success rate of students in the group? It is clear that liberalism and indifference to officer ideological and theoretical training was permitted here. And by the way, such liberalism is also found in certain other party organizations. They seem to be embarrassed to ask a particular leader why he has forgotten the way to the barracks, given a lecture on a low level, or not kept up with the latest things in literature and art.

Party organizations do not always make a thorough study of the subjects of talks by leaders, and they do not give them enough help in constantly raising the ideological content of lectures and reports.

In order for a talk to serve the purpose of educating and organizing the masses of troops, it should touch vital subjects, help the listeners to resolve pressing questions, and arouse their activism and initiative. Talks which are constructed from citations and ready formulas do not mobilize anyone for anything, and do not arouse a desire to share thoughts. For such a speech, the most important things are topicality and the political sharpness of the subject itself. It goes without saying that in order to prepare such a speech, which helps to improve the work, it is necessary to do a good deal of work, talk with the men, know the most correct way to tie the fundamental theoretical questions of the upcoming talk with the life of the collective and leading know-how, and consider the needs and mood of the likely audience. Serious help from comrades and the party organization is necessary to prepare such a talk. And mutual "embarrassment" has no place here. After all, we are speaking about a speech by a leader, and both the reputation of the leader himself and improving the state of affairs in the chast depend considerably on the kind of talk it is.

I would like to take issue with certain comrades who feel that, for them, it is sufficient if they speak at meetings and gatherings from time to time. But this is a one-sided understanding of the question. Of course, it is very important for a leader to use any tribune to communicate with the masses and explain party policy to them. It is necessary for them to be more often in the places where soldiers study, stand combat watch, and rest. This is essential for both the leaders and the subordinates. The work can only gain from this.

The party constantly demands that its cadres persistently develop a Leninist style of work and know the task entrusted to perfection. The following words of V. I. Lenin sound more urgent in our day than ever before: "Every control job requires special qualities ... the person who looks at practical life and has experience knows that in order to control it is necessary to be competent, to have a full and precise knowledge of all production conditions, to know the machinery of this production line in its best contemporary forms, and to have a certain scientific education" (V. I. Lenin, Polnoye Sobraniye Sochineniy [Complete Works], Vol 40, p 215).

Applied to our army conditions, this means that every leader must constantly develop a Leninist style of work and cultivate in himself such precious qualities as a high sense of responsibility to the party and the people for the work entrusted, diligence, high principles, practicality, a feeling for the new, persistence in carrying things which have been begun to a finish, and boldness and practicality in solving complex problems. Subordinates speak with great warmth of those leaders in whom they see models of inexhaustible energy and high standards applied to themselves and those around them, and those who are able to make their words count.

There are quite a few really knowledgeable leaders with initiative among the troops. They are chast commanders, political workers, chiefs of services, and staff officers -- I. Orel, M. Minkin, I. Mirkushin, A. Serdyukov, G. Ushmorov, O. Mordvinov, V. Bogdanov, N. Red'kin, and many others. They all achieved notable successes in raising chast and podrazdeleniye combat readiness. Credit for this also belongs to political agencies and party organizations, which skillfully teach them to find ways to overcome difficulties, discover mistakes and omissions in time, take steps to eliminate them where necessary, and correctly accept criticism. Party organizations are acting correctly when they regularly take an interest in how a particular leader is doing with increasing specialized and technical knowledge, whether he is rated, and in what specialization. Such attention by political agencies and party organizations to the military training of leaders has found its reflection in a growth in the rating level among officers and generals. For example, among chast commanders the rating level is almost 100 percent. Many of them have the first or second class.

However, it would be incorrect to rest on our laurels. In an age of scientific-technical revolution and the revolution in military affairs, the slightest lag in technical, tactical operations, and specialized knowledge is fraught with undesirable consequences. Furthermore, now and then you still meet a leader who does not have a rating or is only third class. It must always be remembered that the men expect practical help, sound recommendations, and sensible advice from a leader, not general instructions and urgings. He should be able to suggest something truly useful to them and resolve a question which has arisen in a skilled manner. But for this, the leader himself must know a great deal.

The party proceeds from the fact that it is not possible to correctly educate cadres without a profound study of their merits and shortcomings, as revealed during

practical activity. It is possible to conduct many different meetings, gatherings, lectures, and reports on subjects concerning the Leninist style of work, but not receive palpable results from this. For example, it cannot be said that Lieutenant Colonel N. Toloknov did not hear lectures and discussions on the commander's work style, but there are few improvements in his activity. What is the reason here? The fact is that Comrade Toloknov has lost the sense of personal responsibility for his own education and has not engaged in self-education, while the party organization of which this communist leader is a member has not demanded sufficiently high standards of him. And without this, conversations about improving the work style will hardly produce an effect.

Today one hears fewer and fewer instances of commanders and chiefs who are rude and insensitive to their subordinates. This is gratifying. Leninist principles, humanity and spiritual warmth, sensitivity, and responsiveness always make a leader look good. Honesty, the ability to look the truth in the face no matter how bitter it may be, is an equally important quality for a leader. Unfortunately, some political agencies and party organizations are failing to adequately cultivate this important trait in leaders. This leads to a situation where some of them take up the path of deception and attempting to pass off that which is desired for that which is actually the case.

Such instances are isolated, but political agencies and party organizations should be on watch for them because this is frequently evidence that criticism is not handled well in the collective. And the commander who directs criticism away from himself, feeling that it may undermine his authority, in the last analysis ceases to be a leader.

We have many good workers. They are valued and respected. They are honored. Others measure themselves against them. All this is correct.

However, seriously studying and popularizing the work style and methods of outstanding leaders is in no way the same as building them up with praise. But such cases also occur. Sometimes the political agencies and party organizations themselves foster this. That is precisely what happened with political worker V. Kovalenko. No sooner had the chast become a leading one than they began to praise him at meetings and gatherings. The result of this was that he stopped looking rationally at the state of affairs in the chast or listening to critical remarks and advice. In a word, the political agency had to remind Comrade Kovalenko to apply higher standards to himself.

Conceit is a dangerous disease. The leader who has been greatly praised is usually most inclined to parading and ballyhoo. He works not so much to actually raise the combat readiness of the chest as "for show." If a failure begins to take shape, he is not worried by how to avoid it, but how best to justify himself to the senior officer. And all this is damaging for the work.

Certain political agencies and party organizations have the shortcoming of not always taking an objective approach to evaluating workers in all things. You may read the personal record of an officer who is being submitted for promotion and be astounded by the extent to which they praise a comrade! The impression is created that there is not a speck of dust on him. And on the other hand, if a person is released from a position, a crushing personal record is written. Why? Does he really have no positive aspects? Hardly. There is no need to prove that in both cases harm is done to cadre education.

The party constantly demands that cadres be educated in a spirit of high responsibility and strictness. This was mentioned once more by the 24th CPSU Congress. The leader who is fulfilling the party's will and protecting the interest of the entire people cannot fail to be demanding and strict with himself and others. Cultivating these qualities in leaders should be a major mission of political agencies and party organizations. It is also necessary to further improve work with cadres and set things up so that every leader is permeated with a sense of great responsibility for the results of the work of the collective subordinate to him, shows creativity and initiative in all his activity, and takes a critical attitude toward that which has been achieved.

It is also essential to further raise the activism of officers and generals in mastering Marxist-Leninist theory. Each of them should thoroughly study the materials and decisions of the 24th CPSU Congress and persistently struggle to put them into practice.

The November Plenum of the CPSU Central Committee and the third session of the USSR Supreme Soviet were a brilliant landmark in the life of our country and the struggle of our people to carry out the grandiose plans of communist building laid out by the 24th CPSU Congress.

The armed defenders of the Soviet land, including personnel of the country's PVO Forces, received the decisions of the Plenum and the laws adopted by the highest agency of USSR state power with deep satisfaction, pride,

and enthusiasm. In the chast and podrazdeleniye, socialist competition has unfolded to greet the 50th anniversary of the formation of the USSR in a worthy manner. The Military Council and political directorate of the country's PVO Forces have approved the initiative of soldiers, sergeants, and officers of the guards antiaircraft missile regiment, three times winner of orders, which is commanded by Colonel V. Kodolov, who were the first to take up the patriotic initiative of the Baltic fighting men and have called on all personnel to steadily increase vigilance and combat readiness, strengthen military discipline, and celebrate the 50th anniversary of the formation of the USSR with new successes in combat and political training. Leadership cadres should do everything to see that PVO fighting men honor their word and fulfill the high obligations taken on completely.

An extremely important task is to teach leadership personnel the Leninist style of work, to master scientific methods of controlling troops, and to spare neither time nor effort to systematically replenish military, specialized, and technical knowledge.

All this work will be more successful to the extent that Military Councils and political agencies are more skilled in studying, generalizing, and discussing questions of troop training and education at their meetings and gatherings, and to the extent that the role and responsibility of primary party organizations for the ideological and political tempering of communist leaders is raised.

Leaders are not born, they are forged and shaped in practical work, in the struggle to build communism. The party attaches exceptional importance to training and educating leadership personnel and is doing everything to see that leaders serve the people honestly and selflessly, accept party policy as their own, skillfully support it and carry it out. The aim of all activity by political agencies and party organizations in educating cadres is to see that the ranks of true, politically mature leaders with a perfect mastery of the Leninist work style, multiply every day.

APPROACH TIME AND COMBAT READINESS

by Maj Gen Arty N. Mil'chenko

The 24th CPSU Congress devoted a great deal of attention to questions of military building and raising the combat readiness of the Soviet Armed Forces. "Everything that has been created by the people," said Comrade L. I. Brezhnev, General Secretary of the CPSU Central Committee, in the Official Report of the Central Committee, "should be reliably defended." In the Resolution adopted, the congress stressed that raising the defensive might of our homeland by every means should remain one of the most important tasks of the party and people.

In carrying out this very important mission, a special part is assigned to the country's PVO Forces. They are designated to repulse any sudden air attack by an aggressor and ensure the continuous operation of our national economy, agencies of state administration, and the combat capability of the Armed Forces during military operations.

In our day, V. I. Lenin's warning that the bourgeoisie are prepared for any savagry and crime to defend decadent capitalist slavery is especially timely. The significance of a high level of vigilance and constant combat readiness for the PVO Forces of the country has grown immeasurably under modern conditions. This is a result of the imperialists' aggressive aspirations and the great changes which have taken place in the development of means of air attack.

In their plans for unleashing a future war, the imperialists place their main hope on the element of surprise in attacking. Unexpected strikes have often led to serious consequences in the past as well. At the present time, the surprise attack, especially with the use of nuclear weapons, can have a greater effect on the course

and outcome of the fight, battle, or operation than ever before.

Having created an enormous arsenal of air attack means, the imperialists are keeping their strategic nuclear forces, ob'yedineniye of tactical aviation, assault aircraft carrier soyedineniye, and other forces in readiness and are constantly drilling on every possible procedure for unleashing surprise warfare using modern weapons. It is sufficient to say that the armed forces of the USA and its allies in the aggressive blocs now have more than 7,000 combat planes. Heavy bombers and supersonic aircraft make up about 80 percent of the United States' strategic air force. The new supersonic aircraft F-111A, F-4, F-104 and others make up more than 50 percent of the tactical and deck-landing aircraft of the USA and its allies. They have a large operating radius and are capable of performing flights, carrying out bombing and launching missiles from low or extremely low altitudes, and are rigged out with equipment for laying down active and passive interference against radar stations.

The imperialist aggressors are working out tactical procedures for overcoming antiaircraft defense. The USA and its allies are studying the experience they have gained during combat operations in Indochina and the Middle East, and modernizing and improving their attack weapons. For example, the USA plans to replace its obsolete strategic bombers with the new B-1A supersonic aircraft with a speed up to 2,550 kilometers an hour and increase the number of supersonic tactical fighter planes and deck-landing assault planes with maximum speeds up to 2,000-2,650 kilometers an hour. New multipurpose tactical fighters are also being created. As reported in the foreign press, the new SRAM-type air-to-ground missile will soon be supplied to strategic aircraft of the USA, and the SCAD missile is being developed. They will have higher tactical and technical specifications: small reflecting surfaces, high speeds and launch range. Continued modernization is underway with the onboard electronic equipment in means of attack, especially equipment for laying down interference.

In order to deliver surprise attacks from the air, the imperialist aggressors make extensive use of low and extremely low altitudes, concealed approaches to targets, special features of the terrain, maneuvering, and various types of interference. In this they avoid stereotyped actions, attempt to vary their tactical procedures, use deceptive actions, diverting groups, and so on.

The main goal which the enemy sets before himself is carrying out the combat mission while spending a

minimum amount of time in the operating zone of active PVO weapons. Based on this, he is improving his means of attack and procedures for applying them in combat, grouping of assault forces, and the directions of operational and combat training.

The considerable increase in the speeds of the imperialists' attack weapons, the change in the tactics of their operations, and the increased combat capabilities for delivering sudden strikes from the air have now made the question of time, as a factor directly influencing the outcome of battle, especially critical. Surprise, fast movement, tension, and activity will characterize the conditions under which PVO podrazdeleniye and chast will have to operate. In such a situation, they will be able to repulse a surprise attack by an air enemy if the PVO weapons, especially those located in the border and coastal band, are brought to readiness for combat operations in a time which is less than the enemy needs to make his assault against the objects being defended.

The battle to win time will be a rule of modern war, if it is unleashed by the imperialists. It will begin at the very start of the armed conflict. It becomes evident that evaluating the enemy's capabilities to make a surprise attack against targets in the country and PVO weapons as well as evaluating PVO capacities for preparing to repulse this attack in time is enormously significant. We can give such an evaluation if we compare the enemy's approach time to the position for carrying out his mission and the time required to bring fire means into readiness for battle and conduct the battle itself.

But what is approach time? There are various interpretations of it. The most widespread definition is that approach time is the flying time of an air enemy from his airfield or base or from the moment that appropriate means of reconnaissance obtain information on him to the assault target. It is not difficult to see that such a definition of approach time gives only a general notion of the location of the air enemy and of the time which it takes him to fly from the airfield or base to the target and deliver the strike.

There is no question that this time must be known and considered when organizing antiaircraft defense. However, it cannot serve as a measure for establishing the time required to bring PVO chast and podrazdeleniye to combat readiness. For this it is necessary to know another time, the time which PVO chast and podrazdeleniye will have from the moment that the air enemy is detected by forward

radio operations podrazdeleniye to the position from which he can carry out his combat mission. This time is also the approach time of the air enemy.

This is the approach time which has special meaning. In essence, it is the time reserved which the enemy "gives" to antiaircraft defense and during which it must discover and recognize him, bring its fire means to combat readiness, and destroy the enemy before he reaches the positions from which he can carry out his combat mission. It is not difficult to see that this time is small. Furthermore, the trends in the development of air attack weapons are such that the enemy's approach time is steadily decreasing and the possible consequences of a surprise attack are becoming more and more dangerous. Therefore, questions of vigilance and constant combat readiness among podrazdeleniye and chast of the PVO Forces take on exceptionally great importance in peacetime or war, greater than ever before. The USSR Minister of Defense and the Commander of PVO Forces emphasized that the time factor is of particular significance in combat readiness. In the wars of the past, as we know, fairly long times were spent bringing troops to a state of readiness. But the time available now, especially in the PVO Forces, is a matter of seconds. This truth must be known and understood by every PVO fighting man and he must constantly be ready to cut off an aggressor's surprise attack and defeat it with rapid, crushing blows. At a reception held in July 1967 in the Kremlin in honor of the graduates of military academies, Comrade L. I. Brezhnev said, "The enormous efforts and physical outlays of the people to equip the army, the consciousness, combat training, and discipline of all servicemen, and the skill of command personnel in controlling troops, as well as much more, are focused, so to speak, in troop combat readiness. In the last analysis, this is the crown of troop combat skill in peacetime and the key to victory in war."

The most important indicator of combat readiness is the actual time during which a podrazdeleniye can bring itself to a combat state and perform its combat mission. This time should be determined based on the approach time of the actual enemy who is most likely going to operate against the given target in the particular sector. Every PVO specialist should have a solid knowledge of the approach time of the concrete enemy he is facing in order to correctly evaluate, from a time point of view, every step, every movement, and every possibility or capability in him or the weapon.

In addition to this, it is necessary to have a clear idea how much time is expended preparing for battle, until the first missile launch or the first intercept

takeoff. In other words, it is absolutely necessary to know the so-called "required time." It goes without saying that the required time to bring a podrazdeleniye or chast into combat readiness to perform a combat mission should be less than the enemy's approach time. Only in this case is it possible to destroy the enemy's attack weapons before they perform their mission. This is the basic content of the time characteristic of combat readiness.

Let us briefly consider how the approach and required times are determined. Let us uncover their content and ways of reducing the required time.

The approach time is determined for every podrazdeleniye or chast in the most important sectors based on the expected altitudes and flight speeds of air attack weapons. Altitudes should be taken at minimal values, while the speeds should be those realistically possible at these altitudes to perform the combat mission.

In order to compute the approach time, it is necessary to know the distance at which forward radio operating podrazdeleniye will detect an air enemy (D) and the line from which the enemy can perform his combat mission and deliver a strike against the object being covered (A). The distance between these lines (S) divided by the velocity of the enemy (V) will give the approach time (T_{app}) to the object being covered.

If the missile podrazdeleniye position or airfield is located in front of the object being defended, the approach time is established to the point where the enemy can carry out his combat mission against this position or airfield which, in such a case, is considered to be a target of the assault.

By the calculated line from which the enemy can carry out his combat mission we mean the line from which aircraft bombing begins or winged missiles begin the transition from horizontal flight to the descent sector before the assault target. With bombing, the line from which the enemy can carry out his combat mission is determined relative to the delivery of aerial bombs (A).

Enemy bombing may be done from horizontal flight, from a dive, or from various types of vertical maneuver. With bombing from horizontal flight, the delivery of aerial bombs is determined according to the formula

$$A = Vt - \Delta,$$

where V -- flight velocity of the aircraft;
 t -- time of bomb fall;
 Δ -- lag of the aerial bomb.

When the enemy is bombing from a dive or from various types of vertical maneuver, the line from which the enemy is able to perform his combat mission will draw closer to the target, and the distance will be less than when bombing from horizontal flight. The distance to the point where winged missiles begin the transition from horizontal flight to descent before the assault target will also be less than the delivery of aerial bombs when bombing from horizontal flight.

In this manner, calculating the probable line at which the enemy can perform his combat mission should be done for the case of bombing from horizontal flight.

Is it possible in determining the approach time to take the far boundary for hits by a missile podrazdeleniye and the intercept line of fighter aircraft in place of the calculated line at which the enemy can perform his combat mission? It is possible in those cases when the far boundary for launching or the intercept line is further from the target than the calculated line where the enemy can perform his combat mission.

In order to determine the required time (T_{req}), it is necessary to know the time needed to warn antiaircraft missile podrazdeleniye and fighter aircraft, bring them to readiness, and perform their combat mission. The sum of these time periods will be the required time, and it can be expressed as

$$T_{req} = t_w + t_r + t_m,$$

where t_w -- warning time, determined from the moment the target is detected until information about it arrives at the command post of the antiaircraft missile podrazdeleniye or chast, and the fighter aviation command post, the time it takes for radar information to pass from forward radio operating podrazdeleniye;

t_r -- time spent bringing the podrazdeleniye into readiness for battle;

t_m -- time required to carry out the combat mission.

The components of the required time for each arm of troops is calculated with due regard for the combat

capabilities of the weaponry, the level of personnel training, and other factors. Based on the enemy approach time and the required time, the commander analyzes the possibility of introducing forces and weapons into battle to perform the combat mission depending on the degree of their readiness, and he also establishes measures to raise the combat readiness of the podrazdeleniye or chast. Only a comparison of these two values can give a correct answer to whether the podrazdeleniye or chast combat readiness period is appropriate to the approach time of the concrete enemy with which they are faced, and this must be done in order to ensure the necessary period of time. An essential condition for performance of the combat mission, from the point of view of time, is the expression

$$T_{app} \geq T_{req}$$

The difference between the approach and required time we will conditionally name the reserve time:

$$T_{app} - T_{req} = T_{res}$$

The existence of reserve time is an essential condition for repulsing a surprise enemy attack. The reserve time cannot be negative.

From the determination of the approach time it is seen that it depends on the flight speeds of air attack weapons and on the capacities of reconnaissance equipment to detect them, that is, on the distances at which targets are detected by radar stations. Therefore, the earlier and more distant a target is when detected, the greater will be the approach time and, correspondingly, the greater opportunity PVO weapons will have to prepare and carry out combat operations. Therefore, the demand -- to detect the air enemy at maximal distances -- takes on primary importance for radio operations podrazdeleniye.

The required time depends on the tactical and technical capacities of available weapons, but primarily on personnel training, the working harmony of the podrazdeleniye, and the level of organization and vigilance among specialists of antiaircraft missile podrazdeleniye and fighter aviation. The smaller the required time to bring active PVO weapons into readiness is, the better conditions for performing the combat mission will be, the higher the podrazdeleniye or chast combat readiness will be, and the greater chances for success in battle will be. Therefore decreasing the required time is an important mission of personnel in podrazdeleniye of our country's PVO Forces.

In general, it can be reduced by efficiency in passing radar information about the enemy from its sources (radio operations podrazdeleniye) to the direct consumers (antiaircraft missile podrazdeleniye and fighter aviation), and also by decreasing the time required to bring active weapons into readiness for battle or attack.

A reduction in the time required to pass radar information is achieved by efficient location of the command post and control point of radio operations podrazdeleniye, antiaircraft missile troops, and fighter aviation. Increasing the efficiency of radar information is also facilitated by reducing the discreteness of information issued on targets. This is done, on the one hand, by increasing the number of channels over which warning data is transmitted from the command post of the radio operations chast and, on the other hand, by improving the practical skills and tactical perspective of the specialists who are assigned to gather, analyze, and transmit radar information.

There are a number of ways to reduce the required time by decreasing the time needed to bring PVO weapons into readiness. These are, specifically, efficient and thoughtful deployment of specialists and auxiliary equipment, mastering related specializations, and mutual replaceability in crews, teams, and squads. Work is being successfully done in podrazdeleniye to introduce mechanization and automation in gathering, processing, and issuing commands, reports, and orders. All this makes it possible, in the last analysis, to save seconds and minutes while bringing podrazdeleniye to combat readiness and during actual combat work.

All PVO fighting men must clearly understand the concrete time periods needed to reach combat readiness and the reasons for them, and do everything necessary to reduce the required time. The level of podrazdeleniye training should be such that it ensures personnel a minimal amount of time to assume combat position, prepare machinery, and carry out the combat mission while, at the same time, guaranteeing a high degree of vitality and continuous combat capability.

The efforts of personnel should be directed to maintaining fighting equipment at a level which ensures that combat missions will be carried out in less than the approach time. This refers not only to fighter means, but also to reconnaissance, communications, and control equipment. The fighting men of these podrazdeleniye are called on to accomplish their functional missions in a time which ensures timely preparation of active defensive weapons

for battle, encountering the enemy, and destroying him on the assigned lines.

For radio operations podrazdeleniye, this means constant readiness to detect targets on the assigned lines and to warn troops with objective information about the nature of the enemy and his intentions. For communications equipment it means to transmit this information continuously, with minimal time expenditure, to the appropriate chiefs, podrazdeleniye, and control agencies. The combat control agencies must provide rapid, comprehensive analysis of incoming information, practical development of recommendations for the commander to adopt a plan, extremely rapid dissemination of orders to performers, and strict control over performance of the orders issued. For missile troops and aviators, rapid preparation for battle and carrying out the combat mission on the assigned lines is of crucial significance.

The work of commanders, political agencies, staffs, and all officers in searching for efficient methods of maintaining combat machinery and weapons and using them skillfully in combat, as well as the persistent struggle of all personnel to ensure model mechanical maintenance for the weapons entrusted and high quality performance of periodic and preventive jobs should be subordinated to accomplishing the tasks of preparing for battle and carrying out the mission.

As the level of personnel training increases, specialists' actions will be more confident, they will spend less time preparing for battle and directly carrying out combat operations, and they will act with more awareness and initiative in a complex situation. This is achieved through a solid knowledge of the weapons and methods of using them in combat, ability to foresee the development of events, and a high degree of working harmony in crews and podrazdeleniye.

All these and other questions should be carefully and fully worked through at various exercises, drills, and methodological, demonstration, and regular training periods conducted under complex tactical and interference conditions. After all, in actual battle, operations under interference and enemy fire will be the rule, not the exception, and it is necessary to constantly prepare for this. We must proceed from the idea that there will not be stereotyped enemy actions, and therefore we must constantly develop qualities such as initiative, boldness, strong will, self control, and determination to carry out the commander's order no matter what in all personnel.

It is of great importance to intensify the training process and improve officers' methodological skill, which makes it possible (and the experience of leading podrazdeleniye confirms this) to rapidly achieve a level of training for all specialists without exception and a degree of working harmony in combat teams which makes it possible to prepare for battle in less time than the approach time and to successfully carry out combat operations in the most complex situation.

Modern battle with an air enemy makes increased demands on the moral-political and psychological training of troops, which is a unified process. That is why drills, exercises, and training periods should be structured in such a way that they demand that personnel show great skill and endure substantial (sometimes extreme) physical and nervous strain. In addition, the element of surprise should always be present. The mission of training and education is to constantly maintain personnel in a fighting mood and readiness to take immediate, intelligent, and energetic actions in any kind of situation. In other words, every soldier, sergeant, and officer should know his combat mission and his duties on alert and in battle and work through the order of their fulfillment to the point of automatism. On this basis, it is essential to search for time reserves to reduce the established norms and to secure outstanding and timely performance of the mission facing the specialist, crew, team, or squad, and the podrazdeleniye or chast as a whole.

In order to achieve victory over an enemy, it is necessary to know him well. Constant, thorough study of the air enemy, his strong and weak points, changes taking place in his organization and technical equipment, is an extremely important requirement for all personnel, especially officers. A knowledge of the concrete enemy in each sector and facing each target being defended, including his composition, groupings, nature of weapons, tactical procedures, and directions of operational and combat training are extremely necessary to juxtapose to the combat capacities of friendly troops in order to select the necessary weapons and establish expedient grouping, organization of control, and realistic time periods for combat readiness. Without this, it is not possible to really solve the problem of reducing the required time.

Questions of the struggle for strict and precise observation of regulation order and the rules for performing unit administrative work and combat watch should always be at the center of attention for commanders, staffs, and political agencies. This will make it possible for personnel to operate precisely, resourcefully, and with initiative.

It is their duty to constantly study procedures for preparing weapons and combat machinery for battle, methods of training personnel, and the work style of the officers. This will make it possible to disclose time reserves and seek for capacities which will ensure the efficient and economical utilization of available time to bring troops into combat readiness to achieve victory in battle.

Special attention should be called to raising the responsibility of all military men in official positions for model fulfillment of the duties assigned to them. In addition, attention should be called to intensifying activism and creativity in carrying out all measures directed toward ensuring constant combat readiness among PVO troops and to putting the decisions of the 24th CPSU Congress on strengthening the defensive might of our homeland into practice in a model fashion.

WATCHING THE CAPITAL'S SKIES

by Col-Gen Avn A. Koldunov, Commander, Moscow PVO District,
Winner of Order of Lenin, twice Hero of the Soviet Union

In the heroic history of the Soviet people, the most difficult trial which has fallen to their lot was the Great Patriotic War against the German fascist aggressors, while one of its brightest pages is the historical victory of our troops near Moscow. Thirty years have passed since that time. The years have not eclipsed the majesty of the battle which took place in the fall and winter of 1941-1942 over an extensive territory with unprecedented intensity. The great feat of our people stands before us today in an even more brilliant light.

The victory near Moscow was remarkable evidence of the great military skill of Soviet soldiers and the indisputable moral superiority of our army over the army of the fascist aggressors. This glorious victory was the victory of our social and state order and our communist ideology over the social and state order of Hitler's Germany and over the fascist ideology. It was secured by the unbending will and leadership of our Communist Party which united the Soviet people and mobilized all the resources of the country to rout the enemy.

The party, people, and army did everything possible to defend Moscow. The victory at Moscow was of world historical importance. It was precisely there that the Nazi army, at the zenith of its fighting strength, suffered its first serious defeat. The beginning of the fundamental turning point in the course of World War Two and the Great Patriotic War was seen at the walls of the capital. The victory near Moscow was the first step on the road to the Soviet Union's final victory over Nazi Germany. It demonstrated that the Soviet Union and its army were the only

force capable of defeating the German fascist monster. As a result of this victory, the reputation of the USSR and its influence in the solution of international problems rose sharply. The anti-Hitler coalition was strengthened. The anti-fascist struggle in countries occupied by Germany intensified, and the resistance movement to the Nazi regime began to expand everywhere.

The victory won near Moscow went into history as the greatest feat of the people of the world's first socialist state and their Armed Forces. Moscow truly deserved the high and honorable title of hero city. The fame of the warriors who fought at Moscow will not fade through the ages.

The outcome of the battle near Moscow had major military and political consequences. History knows no other example where such an unfavorable beginning to the development of military events has been so sharply changed and where, after a long line of serious military failures, such an outstanding victory was achieved.

The victory near Moscow was neither a miracle nor an accident, as many political figures and military experts in the capitalist countries have claimed and still claim. It was based on the invincible unity of the Soviet people and the vitality of the Soviet social and state system. In the battle near Moscow, the best traits of the Soviet people, their unconquerable faith in the triumph of Lenin's ideas and the ideals of communism, their unbending courage and valor, and their massive heroism were manifested.

Along with fighting men of the Soviet army and partisans, the working people of Moscow and Moscow Oblast demonstrated exceptional steadfastness in battle and selflessness in labor during the struggle with the fascist aggressors. Tens of thousands of Moscow citizens poured into the ranks of the home guard. During those menacing days, blue collar workers, kolkhoz members, intelligentsia, women, and young people, all the working people of the capital and oblast, guided by party organizations, worked day and night at full intensity to forge the victory. They had one desire and one wish -- to destroy the enemy.

The immortal feat of the defenders of Moscow, who staunchly defended the capital, will always serve as an example of boundless devotion to the socialist fatherland.

Personnel of the Moscow PVO Zone, chast and podrazdeleniye of fighter aviation, antiaircraft artillery, and podrazdeleniye of air observation warning and communications, antiaircraft searchlight, barrage balloon, and

communications troops, made a significant contribution to the victory won by Soviet army at Moscow.

The pages of history are filled with heroic feats by the sons and daughters of our homeland who courageously and skillfully defended our capital against attack from the air during the harsh days of the Great Patriotic War.

In the fascists' strategic plans, as we know, capturing Moscow was assigned a special place. The Nazi clique understood that Moscow was enormously important for the life and defense of the Soviet state. "The city should be surrounded in such a way that no a single Russian soldier, not a single resident whether man, woman, or child, is able to abandon it," it stated in Hitler's barbaric order. "Where Moscow stands today, an enormous sea should appear which will forever conceal the capital of the Russian people from the civilized world." But these monstrous plans of the raving Fuhrer were not fated to come true. Thanks to the concern of the Communist Party and the Soviet Government, by the start of the war a powerful air defense of the capital had been established which far exceeded, in its strength and level of organization, the defense of the capitals of the other combatant states. For example, at the start of the air attack by fascist aviation on England, the defensive London had 336 planes, 328 medium- and large-caliber guns, and 124 small-caliber guns, while as of 22 July 1941, the defensive of Moscow had 796 medium-caliber antiaircraft cannons and 248 small-caliber ones, plus 336 antiaircraft machine guns and 602 aircraft.

From the start of attacks by enemy aviation on Moscow, PVO fighting men fought staunchly and courageously with the enemy. During repulsion of the first attack, undertaken by the enemy on 22 July 1941, 22 Nazi aircraft were destroyed. The fascist vultures were forced to drop their deadly cargo over the forests and fields on the approaches to the capital and hurriedly retreat to the west.

For more than four months, from 22 July until the end of November 1941, the German fascist command attempted to carry out planned air attacks on Moscow, alternating mass air force attacks with small group operations. However, every time the enemy encountered an insurmountable barrier of fighter aircraft and antiaircraft artillery in his path.

In repulsing the attacks of the fascist air force, our PVO fighting men demonstrated unprecedented heroism. The fighter pilots who defended Moscow had 24 rams to their credit. They were performed by S. Goshko, B. Vasil'yev, M. Rodionov, P. Yermeyev, V. Kiselev, and others.

On the night of 5-6 August, 1941, the pilot V. Talalikhin performed the first night ramming in history. Then on 11 August, the communist pilot Aleksey Katrich rammed a bomber at high altitude. This was the first high-altitude ram in aviation history. Emerging victorious from these unequal battles, our pilots returned safely to their airfields.

Skillfully interacting with fighter aircraft, the antiaircraft artillerymen successfully repulsed enemy attacks. For example, the battery commanded by Senior Lieutenant I. Klets was located in one of the urgent sectors. With their third salvo, the artillerymen shot down a fascist Junkers-88 bomber. A little time later, their accurate fire destroyed another enemy aircraft. The Nazis tried to force the battery into silence. They subjected its fire positions to bombing. But the fascists were unable to knock out either the guns and instruments or personnel, because the fighting men had carefully rigged out their positions in advance.

In the battles, artillery men of the batteries commanded by lieutenants A. Kas'yanov, A. Turukalo, N. Tereshchenko, S. Osalyuk and others showed models of courage and bravery.

Antiaircraft troops also showed unprecedented heroism in the struggle with the ground enemy -- tanks and enemy infantry. During the most dangerous time for Moscow, when the enemy was approaching the walls of our capital, 228 antiaircraft artillery guns were taken from their fire positions and thrown into the battle against German tanks and motorized divisions which had broken through. For example, fighting men of the 13th Battery of the 864th Antiaircraft Artillery Regiment heroically repulsed enemy tank attacks in the Solnechnogorsk-Istrina sector. During this fighting, the soldiers of the crew commanded by Senior Sergeant Gayk Shadunts especially distinguished themselves. On 1 and 3 December 1941 near the village of Kiovo, this crew, mutually supporting with the crew commanded by deputy political instructor Viktor Gromyshev, knocked out five enemy tanks. For this deed, Senior Sergeant Shadunts was awarded the Order of the Red Banner.

Operating in a common formation with the defenders of Moscow, fighting men of the PVO Forces of the capital successfully fulfilled the mission given them. The enemy's best air sovedineniye, which had previously participated in bombing the cities of Poland, France, Belgium, and England, were rendered lifeless on the approaches to Moscow. In all, the PVO Forces of the capital destroyed 1,305 German fascist aircraft (of them, 567 planes were destroyed by

pilots while covering our ground forces and as a result of assault strikes against enemy airfields).

While actively helping the ground forces to restrain the enemy's onslaught, PVO troops destroyed 450 tanks, about 5,000 motor vehicles, suppressed more than 250 artillery batteries, and scattered and destroyed up to 50,000 fascist infantrymen.

Through their heroic and selfless actions, the PVO troops of the capital played a large part in the fact that their native Moscow hardly suffered from enemy attacks at all.

The homeland valued the heroism and courage of personnel of the PVO Forces of the capital highly. Dozens of the best of the best were awarded the title Hero of the Soviet Union, and hundreds of fighters and commanders were given orders and medals of the USSR. Many thousands of valiant defenders of the capital proudly wear the decoration "For the Defense of Moscow."

In a speech at a recent meeting of ideological workers of the Armed Forces, Marshal of the Soviet Union A. Grechko, USSR Minister of Defense, said, "The Soviet people and its army have a heroic history, permeated with the glory of victories over the enemies of the Soviet state. Our soldiers and young officers who have not experienced war have some things to learn and someone to take as an example in defending our socialist fatherland."

Three decades have passed since that time when the German fascist troops were routed near Moscow. Some participants of that battle are still in the military ranks, while others are laboring in the civilian area. Intelligent, searching, diligent young people are replacing the veterans. The sons of those who defended our country against the German fascist enslavers swear before the great feat of their fathers to devote their life and military service to multiplying the glorious fighting traditions of the Moscow PVO District, winner of the Order of Lenin. This finds its expression in the concrete deeds of missile troops, aviators, radar operators, communications specialists, and troops of other specializations.

In connection with the 50th anniversary of the USSR Armed Forces, our district was given a high award of the homeland, the Order of Lenin, for high indicators in training and service. This honorary award inspires personnel to new achievements in military labor. More than 50 percent of the fighting men of the district are outstanding

in training, 96 percent are rated specialists, and 90 percent of the servicemen have sport ratings. During the past training year, all chast of the district fulfilled their field training firing with "outstanding" and "good" evaluations.

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Combat Training Underway
(Photo study -- V. Sukhodol'skiy)

Over a space of many years, for example, the title of outstanding unit has been won by the guardsmen of the Putilov-Kirov Antiaircraft Missile Regiment, winner of the Order of Lenin, which was formed on the personal order of V. I. Lenin. The Putilov-Kirov soldiers multiply their successes in military labor from year to year. They were the initiators of socialist competition to greet the 24th CPSU Congress in a worthy manner and were the first among the defenders of Moscow's skies to support the patriotic initiative under the slogan "The Year of the 24th CPSU Congress -- A Year of Outstanding Training and Service."

Personnel of the chast commanded by Lieutenant Colonel A. Starcheusov achieved high indicators in training and service. Last year this chast won the challenge Red Banner of the Moscow City Committee of the CPSU and the Moscow Soviet. Fighting men of this collective achieved significant successes in combat improvement during the past training year. Today too, the soldiers, sergeants, and officers are struggling to achieve even greater successes in military skill.

The aviators of the district also stand vigilantly on watch over the skies of the capital. Among them are

quite a few whose fathers fought against the fascist aggressors. For example, personnel of the fighter air regiment where Officer Gogolev is chief of the political department labor in an organized manner with a great deal of political enthusiasm. The aviators persistently struggle to fulfill the flight training plans on time and with high quality, to thoroughly study and efficiently use their first-class military machinery, and to carry out missions without air accidents.

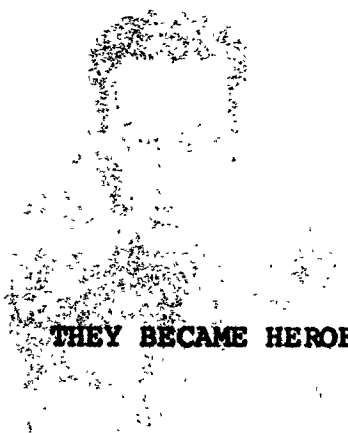
Personnel of our district have major, complex tasks to accomplish during the new training year. The primary mission remains as before, high combat readiness, vigilant performance of duty watch, and the ability to conduct successful combat operations to destroy any aggressor under complex conditions. All troop training and educational work should be carried on with maximal consideration of everything new that is advanced by military theory and practice, so that the entire process of combat training and personnel service corresponds to the actual demands of contemporary war. Carrying out this mission assumes that a determined struggle will be conducted with indulgence and simplification. It is essential to strive to see that every hour and day, every training period, tactical exercise, flight, and field fire makes a substantial contribution to improving soldiers' combat skill and raising combat readiness. Our commanders, political workers, and party and Komsomol organizations see their foremost duty in reinforcing the successes achieved during the past training year, enriching themselves with accumulated know-how, raising all fighting men to the level of the leading ones and mobilizing them for vigilant performance of combat watch, intensive combat training, and outstanding assimilation of complex combat training tasks and standards.

Under modern service conditions, maintaining combat readiness requires a high degree of consciousness, military smartness, precision of action, and organization in personnel. That is why we should continue to labor persistently to tighten military discipline. In this connection, developing and setting up socialist competition among the fighting men will also take on special importance. We should strive to expand competition's sphere of influence on all aspects of military training and troop life. In this, the main content of competition should continue to be the struggle to further raise vigilance and combat readiness, increase the number of soldiers with outstanding evaluations and rated specialists, develop a masterly control over the machinery and weapons, constantly maintain them in readiness for battle, and strengthen military discipline.

Many patriotic initiatives have become widespread among troops of the capital district, including destroying air targets on the first attack with the first missile, reducing periods required to achieve combat readiness, mastering related specializations, and so on. The struggle among chast for the right to be awarded the challenge Red Banner of the Moscow City Committee of the CPSU and the Moscow Soviet as well as for the Military Council of the District, has become very widespread. In this struggle, the fighting men are showing great patriotism, diligence and zeal, and a readiness to perform the most complex task under any conditions.

A great deal of work is being done in the chast and podrazdeleniye of the district to propagandize the glorious military traditions of the defenders of the capital. This serves the interests of further raising personnel training and combat readiness. A living memory of the past war, the victory over fascism, and the deeds of PVO fighting men of the capital is, for us, not simply a tribute to the past. In the heroic feats of the defenders of the homeland, young soldiers see everything that is best and inherent in the very nature of the Soviet man -- a son's love for the homeland, a burning hate for the enemies, and readiness to defend the fatherland courageously and skillfully at any minute without sparing efforts, energy, and, if required, life itself.

In the Official Report of the CPSU Central Committee to the party congress, the Soviet Armed Forces were given a high evaluation. The fighting men of our district are selflessly laboring to justify this evaluation. At any time of the day or night, the guards of the Moscow skies stand watchfully at their combat posts. These skies will always be unapproachable for our enemies.



THEY BECAME HEROES IN MOSCOW SKIES

The harsh autumn of 1941. A deadly danger hung over the capital of our homeland Moscow. Hordes of fascists, taking no account of their enormous losses, raced like devils toward the city. The Nazi Command was attempting to carry out the Fuhrer's order, to flatten Moscow to the ground. Several times a day enemy bombers tried to break through to the city. They intended to drop about 12,000 high explosive and 110,000 incendiary bombs on Moscow. But the fascists' plans were not fated to come off. Anti-aircraft defense troops covered the skies of Moscow as if they had them under lock and key.

During the course of the heroic defense of Moscow, the fighter pilots covered themselves with immortal glory. The flying defenders of the Moscow skies demonstrated unprecedented valor, courage, and bravery in the desperate fighting near Moscow. They threatened the Nazis ruthlessly in the air and on the ground.

For heroism and great skill demonstrated and the ability to beat the enemy, hundreds of fighter pilots of Moscow antiaircraft defense were awarded orders and medals of the Soviet Union, while the flying heroes G. Grigor'yev, I. Golubin, I. Zabolotnyy, I. Kalabushkin, and many others were given the highest title of military valor, Hero of the Soviet Union. In this issue of our magazine, we tell about the combat deeds of certain of them.

Falson-Like Assault

During the Great Patriotic War, the combat deeds of the pilots of Moscow antiaircraft defense were reported in the press summaries of the Soviet Information Bureau many times. "According to refined figures for 29 October,

47 German planes were shot down near Moscow, not 39 as previously reported," it said in the summary for 30 October.

In repulsing this attack, Lieutenant G. Grigor'yev, a pilot, distinguished himself. He was in the patrol zone together with a support aircraft. Having spotted the enemy, Grigor'yev flew like a falcon to meet him. An air battle broke out. Skillfully maneuvering, this defender of the Moscow skies attempted to draw close to the fascist airplane in order to deliver a certain strike.

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Captain G. Grigor'yev, 1943
(Drawing -- V. Vorob'yov)

And when only some 80-100 meters remained to the Junkers-88, the Soviet patriot opened up with all the fire power of his Red Star aircraft. He withdrew upward with a steep zoom and then again raced at the fascist. The accurate fire unleashed by the Soviet pilot decided the fate of the Ju-88. It burst into flames and, leaving behind a trail of black smoke, sank toward the earth.

Many times the 20-year-old Komsomol member Grigor'yev rose up into the fiery sky of the front near Moscow and entered battle with the numerically superior enemy. That is how it also was during a day in November. He received the mission of making an assault against a fascist river crossing with his flight.

During the assault on the fascist troops, nine Messerschmitt-109's attacked the Soviet falcons. The enemy had a three-fold superiority. But this did not frighten the defenders of the Moscow skies. Spotting two Messerschmitts to his left, Grigor'yev made a turn and in a matter of seconds was behind one of them. Pulling even with one Messerschmitt, Grigor'yev immediately attacked the other.

His subordinates acted following his example. Covering one another, the Soviet falcons destroyed two Messerschmitts. The others, unable to survive the attacking spirit of the defenders of the Moscow skies, took to their heels.

For five victories won in the sky above the capital, the pilot Grigor'yev was awarded the highest government award, the Order of Lenin.

Grigor'yev, who had become a communist, improved his skill from takeoff to takeoff. The number of victories on his combat record also grew. By September 1942 he had 11! For this, the 22-year-old Gerasim Afanas'yevich Grigor'yev was awarded the title Hero of the Soviet Union. The Gold Star and one more Order of Lenin also sparkled on his chest.

After the war, the pilot Grigor'yev remained in the ranks of the troops defending Moscow's skies. After successfully completing the Air Force Red Banner academy, officer Grigor'yev devoted all his knowledge and efforts to strengthening the antiaircraft defense of Moscow. Many of those who received their pass to independent flights from his hands are now, like their teacher during the war, vigilantly serving in the defense of the heart of our homeland, Moscow.

Flying Hero

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The first year of the war was ending. The Moscow City Committee of the CPSU and the Moscow Soviet instituted a challenge Red Banner for chast of the Moscow antiaircraft defense. At the beginning of August 1942, it was awarded to the 562nd Fighter Air Regiment, which had achieved the best indicators in combat and training work.

Captain I. Kalabushkin Hero of the Soviet Union, was given the honor of carrying this banner in front of a formation of his brothers-in-arms. This courageous son of the homeland was awarded this exalted title because he bravely fought the enemy in the skies near Moscow, sparing no effort and risking life itself, to maintain the safety of the capital's skies as the apple of his eye.



Captain I. Kalabushkin
(1942 photograph)

He became a defender of the capital's skies at the end of July 1941, when he already had several fascist planes destroyed on his record. He was the one who destroyed two enemy planes over Brest on the first day of the war.

He stunned all the defenders of Moscow with his courage and ability to shoot down the Nazi pirates when they observed how this flying hero fought 22 Heinkel-111's in the region of the airfield on 31 July 1941. Taking off, Komsomol member Kalabushkin guided his fighter right into the center of the group of fascist bombers.

The boldness of the Soviet falcon shocked the enemy. They were thrown into confusion.

Getting a Heinkel which turned up in front of him in his sights, Kalabushkin pushed the button and a hail of fire poured over the swastika-bearing aircraft. It burst into flames like a torch and hurtled toward the ground.

Having dealt with one, the Soviet falcon attacked another Heinkel-111. However, the enemy's superiority made itself known and the Nazis were able to set the Red Star fighter on fire. But Komsomol member Kalabushkin continued the battle. He kept the words of his favorite author, N. Ostrovskiy, in his mind, "Remember that in addition to the personal element, we have something that is much greater. There is a struggle for the honor of our homeland." Komsomol member Kalabushkin abandoned his flaming machine only after he felt burns on his face.

Pilot Kalabushkin also fought bravely and heroically with the fascists while repulsing subsequent attacks on Moscow. During the autumn, he had to fight the enemy in the air and on the ground. Any assignment from the command is an order of the homeland, and the homeland, he felt, is above anything. Therefore, no matter what situation took shape in battle, he inspired and fired up his subordinates with his personal bravery, courage, and skill. Following their commander's example, they tore victory away from the enemy. That is how it was also on 14 November 1941, when he and his flight fought a large group of Messerschmitt-109f's in the area of Trostyanskoye Lake-Zvenigorod. As a result of the battle, the Soviet Falcons destroyed two Messerschmitts and returned to their airfield without losses.

Then in the evening of that same day, the flight commanded by Communist Kalabushkin destroyed three more enemy planes.

In the skies of Moscow, the pilot Kalabushkin destroyed eight Nazi planes personally and six more in group fighting. For this, an Order of the Presidium of the USSR Supreme Soviet dated 4 March 1942 awarded the title Hero of the Soviet Union to Ivan Nikolayevich Kalabushkin.

Major General Aviation, Reserves, Kalabushkin now lives in Leningrad. Meeting with young people, he often tells about pilots of the older generation and how they fought with fascism for the honor and independence of our homeland.

Lines from a Front Fighter's Letter

On 12 December, having been replaced on combat watch, Lieutenant Kovalyov wrote a letter to his wife

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"Hello, Tonya!
A kiss for Edik and Svetlana.
I have not received a letter from you for a long time. I know that the children miss me, I feel it with all my soul. I hate the enemy for separating me from you and the children. I am making him pay in full for everything...

"I love you all, I love our homeland, and I love peace and a laboring people. I say that fascism will end! While my hands can hold a steering column and my eyes can see, I will fight the Nazis viciously.



Lieutenant V. Kovalyov
(1941 photograph)

Your V. Ye. Kovalyov "

At the moment when he wrote this letter, Lieutenant Kovalyov had destroyed eight enemy planes in the Moscow skies -- two personally and six in group battle. In addition, he had a great deal of enemy machinery and manpower destroyed on his record as a result of carrying out assaults.

On 14 December, he and other pilots of the 11th Fighter Air Regiment received an assignment to make an assault against German fascist troops in the Yadrmeno-Rummentsevo-Teryayeva Sloboda-Yaropolets region.

Having descended, the Soviet falcons used contour flying to destroy the machinery and manpower of the fleeing fascists. The Nazis were furious. Their antiaircraft

artillery opened barrages of fire. During the next approach to the target, an enemy antiaircraft shell hit the plane piloted by Lieutenant Kovalyov. Flames broke out and encompassed the motor. The pilot could not put out the fire by skidding. Like lightening the words of the military oath flashed through his head, "I vow ... to my last breath to be devoted to my People, my Soviet Homeland, and the Soviet Government."

Carrying out this oath, the communist Kovalyov decided not to let go of the steering column, to give his life at a price like Gastello. He looked toward Moscow, whose skies he had preserved for three years, and his hands gripped the steering column even more tightly.

Venedikt Yefimovich Kovalyov, an alumnus of the Leninist Party, dipped his wings several times as if to say to his fighting friends, "Goodbye, Comrades! Complete the victory without me." He turned the burning aircraft and, opening fire with his guns, guided it at the fire position of the enemy battery.

That is how this defender of the Moscow skies gave his life for the freedom and independence of our homeland. In March 1942, Lieutenant Kovalyov was awarded the title Hero of the Soviet Union (posthumously) and a certificate from the Presidium of the USSR Supreme Soviet was awarded to Antonina Dmitriyevna in April. This reminder of their husband and father's military glory is still kept today in the Kovalyov family. It reminds the front hero's son, Engineer-Captain Eduard Kovalyov, of his sacred duty to the homeland.

"I Will Justify the Title of Communist"

On 12 October 1941, the combat friends of Junior Lieutenant Zabolotnyy congratulated him on his latest victory won in the skies of Moscow. On this day, the fighting record of the fighter pilot showed two fascist bombers destroyed. The next day the Komsomol member Zabolotnyy turned over an application to the secretary of the party organization. In it he wrote, "In an hour of danger for our homeland, I want to be in the ranks of the party of Lenin as I fight with the hated fascism for our



Lieutenant I. Zabolotnyy, 1941.
(Drawing by V. Vorob'yov)

Red capital and for the Soviet Union. I will justify the title of communist." This defender of the Moscow skies kept his word.

One time he noticed four fascist bombers. The decision to attack came quickly. The fighter with the red star approached and unexpectedly attacked the enemy. The accurate rounds fired by Zabolotnyy from short range settled the fate of one Junkers. The other three, stunned by the actions of the Soviet falcon, quickly disappeared.

"When you have seen the enemy -- destroy him!" It was under this slogan that the pilot Zabolotnyy guarded the Moscow skies. On 28 November 1941 while returning from a combat mission to his air field, the communist Zabolotnyy noticed a Dornier-215, which emerged from the clouds for a minute and then disappeared again. It was obvious he had seen the Soviet falcon.

"Oh no, you won't get away!" the Soviet patriot thought to himself and turned his aircraft in order to attack the enemy bomber from the cloud side. Zabolotnyy's tactical maneuver turned out to be correct. He forced the Dornier-215 to turn away from the clouds.

Then, having gotten above the Nazi pirate, the communist Zabolotnyy attacked him from a dive and destroyed the enemy with accurate fire.

While defending the skies of Moscow, the communist Zabolotnyy always believed that the Soviet people would win and the enemy would be routed. His letters written to his wife Mariya Animovna in the fall of 1941 are full of optimism and faith in victory. In one of them he wrote, "A difficult lot has fallen to our young generation, to fight against fascism, the most vicious enemy of mankind. But I am confident that we will defend our beautiful homeland and the capital of our great state. The Red Army will destroy the enemy.

Yesterday I made four combat flights. One apiece for you and me and two for the happiness of Alik and his peers. If the command had permitted, I would have made even more flights. Hate for the Nazis is raging in my heart. When I see an enemy plane with a cross, I forget about danger. I have one wish, to destroy the enemy every minute, every second.

Masha! Take care of Alik so that he is healthy, and I and my combat friends will fight for his happiness, for the happiness of all children, and for the happiness of the Soviet people. We will destroy the enemy!"

Ivan Nikolayevich Zabolotnyy, a glorious son of our party, did not live until the bright day of victory over the enemy. On 4 January 1942 he failed to return from a combat assignment. He died as a hero while performing it.

For heroism and courage demonstrated in battles with the enemy in the skies around Moscow and for destroying nine fascist aircraft, an Order of the Presidium of the USSR Supreme Soviet dated 4 March 1942 named Ivan Nikolayevich Zabolotnyy a Hero of the Soviet Union.

A Master of Swift Attacks

"When flying over Moscow and the Kremlin," wrote pilot I. Golubin during the defense of the capital, "I always feel an influx of new forces. It seems that some kind of invisible energy comes to you from down there, it accumulates in you, and you become a hero, ready to smash any barrier and emerge victorious from any battle."

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Pilot I. Golubin, 1941.

The pilot Golubin participated in many air battles. One day in October, he and his combat friends took off to cover our ground forces who were holding back an enemy advance toward Naro-Fominsk. On the approach to the cover region, I. Golubin spotted two Messerschmitt-109 fighters emerging from the clouds. They were trying to pass by unnoticed and strike our troops who were holding the defensive line.

Junior Lieutenant Golubin decided to intercept the enemy. From a distance of 100-120 meters he fired a long burst at the enemy. His fire was accurate and destructive.

Coming out of the attack, the Komsomol member Golubin saw another flight of fascist fighters in front of him. The Soviet patriot boldly and determinedly entered into battle with them. Desperate fighting began. He had to defend and attack, and pick out advantageous positions to conduct accurate aimed fire.

Skillfully piloting his aircraft, Golubin appeared first on the right and then on the left, lacing the enemy with trails of fire. He hit one more Messerschmitt from short range.

The pilot Golubin returned to the airfield with two victories. But before the maintenance crew had even prepared the aircraft which had returned from performing the assignment and before the excitement from the battles had calmed down, a report came that a large group of Nazi bombers was moving toward Moscow.

In repulsing this attack, the pilot Golubin won two more victories.

At the airfield Ivan was congratulated by his friends on the successive victories. He became the first pilot in the skies around Moscow to destroy four enemy aircraft in one day.

In the evening, when they were summing up the combat day in the squadron, Ivan Golubin said, "In order to achieve victory, skill is necessary. It is necessary to have an outstanding knowledge of the enemy and his tricks, to be able to evaluate his forces rapidly and soberly, and figure out his treacherous ruses in time. But that is not everything. It is necessary to have outstanding control of the weapons of your own aircraft. The pilot who does not have perfect control of his plane's weapons becomes a target for the air enemy."

In any situation, the pilot Golubin endeavored to carry out the command's order. On 15 December he and Junior Lieutenant Shishkovskiy took off to strafe enemy troops who were approaching the front line.

Above the front line, the Soviet falcons came under fire by enemy antiaircraft artillery. The plane piloted by Junior Lieutenant Shishkovskiy was damaged by this fire.

"Go back to the airfield," Golubin signaled to his support plane and himself continued the flight.

In the target region there were clouds at 100 meters. This made it more difficult to carry out the strafing attack. Breaking through the clouds over the target, Lieutenant Golubin opened fire. Trucks burst into flames on the road from his accurate rounds.

Carried away by the strafing, the pilot Golubin did not notice the Nazi Messerschmitts which appeared behind him.

A sheaf of bullets flew by from the side. Looking around, Golubin spotted 13 ME-109's. An extremely difficult situation had arisen -- low altitude, pincers, and numerical superiority of the enemy.

The forces were unequal. The motor of the Soviet plane began smoking from enemy fire and stopped working. It was impossible to drop the landing carriage. Pilot Golubin looked down -- below him spread territory occupied by the fascists. In the vicinity there were no visible fire points or enemy columns. Spotting an open area, Golubin landed his MIG. Leaping out of the burning plane and overcoming the pain in his legs, Golubin ran into the forest. In the evening he made it to the village of Vertolino. The local residents hid him for three days, and then helped him cross the front line.

A short time later, Golubin was again in the ranks of the defenders of the Moscow skies and flying assignments. His combat record was replenished with new victories. By 1 January 1942, he had already destroyed 10 enemy aircraft, as well as a great deal of enemy manpower and machinery by strafing assaults.

The homeland valued the deeds of the fearless air warrior Ivan Filippovich Golubin highly. An Order of the Presidium of the USSR Supreme Soviet dated 4 March 1942 gave him the title Hero of the Soviet Union.

On 1 November 1942, Captain Golubin was no more; he perished during the performance of a combat assignment.

AN IMPORTANT MEANS FOR EDUCATING TROOPS

by Maj Gen Ye. Dvoryanskiy

The 24th CPSU Congress devoted a great deal of attention to questions of further raising the defensive might of our homeland. In the documents from the congress, Lenin's teaching on defending the socialist fatherland received further development. In it special attention was devoted to questions of communist education for Soviet people and moral-political and psychological training for our armed defenders.

Way back at the start of our century, V. I. Lenin emphasized the enormous and ever-growing role of high morale among the armed masses as the crucial factor in achieving the aims of war. Several times since then history has confirmed the profound truth of this very important proposition from Lenin's harmonious teachings on war and the army. History has shown that no degree of equipment and machinery in armed forces can compensate for a lack of fighting enthusiasm among the troops or for their lack of steadfastness when attacked by a powerful enemy. For the conditions of modern war, Lenin's proposition has not only remained true, it has taken on special significance.

Communist education is above all scientific education, that is, education which meets the requirements of Marxist methodology, pedagogical and psychological principles and laws, and the objective demands of life, and uses scientifically sound and practically tested methods, forms, and means. One of these means is educating troops in the revolutionary, labor, and combat traditions of the party, the Soviet people, and its Armed Forces.

And we would like to dwell on certain questions of educating troops in combat traditions.

Combat traditions are the rules, customs, and norms of behavior for Soviet fighting men in combat and peacetime which have taken shape historically and become firmly rooted, and are passed from generation to generation. We began with the fact that traditions have a class nature and can be either progressive or reactionary. In the armies of the imperialist states, they persistently affirm the traditions of racial hatred and hostility to other peoples and the traditions of rape and plunder.

The forward-looking nature of the Soviet Armed Forces' combat traditions is determined by the progressive Soviet social system, whose ideological basis is the all-conquering teaching of Marxism-Leninism.

The fighting history of our great people and its Armed Forces is rich in traditions. A prime task of commanders, political workers, and party organizations is to employ them to a maximal degree to educate patriot-soldiers and internationalist-soldiers.

Propaganda for the heroic traditions of the party and the people lies at the basis of work to educate in combat traditions. It has become a custom in our chaste to present the soldiers with lectures and reports, discussions, and topical evenings devoted to the heroic history of the Communist Party and the Soviet people, to study the revolutionary activity and life of Vladimir Il'ich Lenin and his comrades, to organize meetings with party veterans and participants of the Civil and Great Patriotic Wars, and to visit museums and other treasure houses of past glory.

Excursions to places of revolutionary and combat glory and meetings with war veterans in the places where PVO soldiers are now serving have a great influence on the formation of high morale and fighting qualities in our soldiers. During these meetings, young soldiers become even more deeply aware of their responsibility to the older generations and of the inseparable link between combat traditions and military labor during days of peacetime training. For example, this is confirmed by the experience of the podrazdeleniye where Captain N. Yudin serves. The personnel of this unit were recently visited by Comrades Ivankin, Kochetkov, and others, retired officers and veterans of the last war. Together with the soldiers, they drove to memorable and beloved places, visited workers at a local enterprise, residents

of the rayon, and students. The veterans told the young people about the glorious combat traditions of their fathers and older brothers in a simple, understandable way, and called on the PVO soldiers to vigilantly guard the air frontiers of our fatherland.

All this varied work has an enormous influence on the development and formation in every soldier of the qualities of an invincible fighter for communism, and it emphasizes the indivisibility of combat traditions and the heroic history of the Communist Party, its ideas, policy, and experience.

The missions of the PVO Forces during peacetime are, as we know: raising combat readiness by every means (today this is not a temporary or exceptional state, it is the constant, customary, and necessary condition of our troops); further reducing the time required to bring chast and podrazdeleniye to combat readiness; vigilant and precise performance of combat watch; and achieving a high level of military skill among personnel which makes it possible for them to detect and destroy air targets under any conditions. It is to precisely these missions that educating PVO troops in combat traditions should be subordinated.

The most important fighting traditions of the Soviet Armed Forces are: devotion to the cause of communism, and to the socialist homeland; loyalty to one's military duty, selflessness, and mass heroism in battle; irreconcilable hostility to the enemies of communism and readiness to defend the cause of peace and freedom for peoples; love for one's military chast and podrazdeleniye and military specialization, and loyalty to the fighting Colors; constant struggle to achieve high combat readiness, strong military discipline, comradeship among the troops, collectivism, and love for the commander and protecting him in battle; respect for the peoples of other countries and brotherhood-in-arms with the armies of the socialist states.

These traditions have become so firmly rooted in our life that a majority of them are reinforced, in one form or another, in the military oath, military regulations, and the moral code of the builder of communism. Stressing the unchanging significance of troop education in these traditions, we would like here to separate out those traditions, such as vigilant performance of combat watch and a sense of high responsibility for constant combat readiness, without which combat service by PVO soldiers is essentially unthinkable.

For a long time now these traditions have been a law of life and a firm rule for all fighting men in the leading podrazdeleniye. For example, let us take an antiaircraft missile battalion. In it the soldiers struggle to make every day a day of outstanding combat training and service. The remarkable initiative of the missile troops has gotten wings and been taken up by the radar operators of the podrazdeleniye in which the young communist PFC Levin serves, the military collective of the mechanical maintenance chast, one of the specialists in which is Master Sergeant Extended Service Nenashev, a communist, and by the personnel of other podrazdeleniye. The great significance of this movement is understandable per se; after all, the struggle to achieve an outstanding evaluation every day is the most efficient way to raise combat readiness further and to bring one's chast and podrazdeleniye into the ranks of the outstanding. It is also noteworthy from the point of view of troop education and moral-psychological tempering. Outstanding daily combat training and service is simply unthinkable without constantly improving soldiers on both the moral and psychological levels. After all, achievement of the goal here depends on a person's high level of consciousness, his qualities of will, and many other moral and psychological traits.

There is no need to go into detail about all the forms and methods of education in combat traditions. A large majority of them are widely known. In addition to those already mentioned above, such forms and methods for educating personnel in revolutionary and combat traditions as political training periods, discussions of books, movies, and radio and television broadcasts, and excursions and trips to memorable places, as well as others, have for the most part been thoroughly tested in practice and become universal.

While reflecting on the forms and methods of educating in combat traditions, I would like to stress their utilization in educational practice. The fact is that the statement that the above-mentioned forms are stable and generally accepted by no means indicates that this stability is absolute. Our Armed Forces, including the country's PVO Forces, experience the effect of all changes taking place within the country. And these changes naturally find expression in the forms and methods of educational work with personnel, including educating them in combat traditions. And it is not just the technique that changes. Along with the development of our state, there is change in its social structure and the moral and

psychological qualities of Soviet people. This was reflected at the 24th CPSU Congress in the report by General Secretary of the CPSU Central Committee, Comrade L. I. Brezhnev, and in speeches by many delegates. For example, take the social structure. During the past five-year plan, the ranks of the working class in our country expanded significantly. Workers now comprise more than 55 percent of the employed population of the country. This is of enormous significance for ideological work in the army as well, because while before the Great Patriotic War and in the first years after it our army was primarily composed of peasants, today many soldiers come from the working class.

But what is the modern Soviet worker like? He is a highly educated, politically intelligent, and highly skilled person. And representatives of our socialist rural areas are a match for him; at the end of 1970, more than half of the rural population had also completed secondary or higher education.

What does this have to do with education in combat tradition; in our opinion, there is a direct relationship. Whereas before, due to the low literacy level of some of our soldiers, we were forced to engage primarily in the informational aspect, now it is apparent that we should increase the proportion of active forms of education in combat traditions.

I will refer to the following example. In a certain podrazdeleniye where Senior Lieutenant Vorontsov is Komsomol worker, for a long time education in combat traditions meant only lectures, discussions, and topical evenings. But then the Komsomol activists learned that, in the area where their company was located, a certain soldier at an air observation and warning post, who had demonstrated heroism and steadfastness, died and his name was unknown. A Komsomol meeting was held where it was decided to begin a search for the hero's name. What enthusiasm this decision called forth! How many excited conversations there were about the deed, heroism, and loyalty to one's military duty! Soldiers and sergeants of the company seemed to feel in their hearts the majesty of our homeland's combat history and the courage and heroism of its defenders. And this was reflected in discipline and order in the podrazdeleniye. The soldiers began to apply higher standards to themselves and to one another. In everything they attempt to imitate the heroic front soldiers, including the PVO fighting men who died at his combat post.

Active forms of propagandizing our traditions may also include various types of discussions, debates, readers'

conferences, and live interviews with veterans -- those who carry the combat traditions, as well as many other forms. The important thing is just to seek out this active beginning and use it purposefully.

In this respect I would like to call attention to the work of our halls of military glory and museums. Today there is perhaps no chast which does not have a hall or museum of military glory. Every year they are replenished with new materials and their activity in educating troops becomes richer and more meaningful. It is there that young soldiers begin their acquaintance with the combat traditions of their podrazdeleniye, chast, the PVO Forces, and the Armed Forces as a whole. Our Komsomol organizations make skillful use of rooms and museums of military glory to carry out these steps. For example, the marvelously equipped hall of military glory in the N chast is widely known. The materials which have been gathered there and lovingly displayed give a graphic idea of the remarkable combat history of the chast and its traditions and of how the work of fathers and grandfathers is now being continued by the heirs of their glory, our current PVO soldiers.

However, the content and work forms of halls and museums of military glory can be richer. Since they are now so strong, we have a right to give them new, more difficult missions, above all to demand that they work actively in ways such as setting up travelling exhibits, putting their materials to use in the work of agitation brigades, and so on. For this purpose, it is necessary to really organize their work. It should be planned regularly, not from time to time, and a broad range of activists should be drawn to regular participation in it. It is necessary to direct more attention to accuracy and expediency in gathering and storing materials. Halls and museums of military glory are now in a position to take on the entire job of establishing continuous communication with chast veterans, preparing the history of chast and podrazdeleniye, and -- what is especially important for education in combat traditions -- keeping a kind of chronicle of the fighting men's glorious deeds. Very little attention is being given to this question now.

I would like to say a few words about the museums which are found in the Baku PVO District and in a number of soyedineniye. For example, a history museum has been working since the fall of 1967 in one of the soyedineniye. In this relatively short time it has become popular among the soldiers. People come to it on excursions, they hold meetings between veterans of the Great Patriotic War and soldiers, sergeants, and officers, and propagandists and agitators prepare for speeches in it. In a word, such

museums as this one have reached, in the scale of their activity, the level of major cultural centers. And it is clear that the scope of their work will grow steadily. For this reason, it is evidently time to think about securing physical facilities for such museums and establishing better conditions for the activity of their associates. If this is done, museum work will become considerably more effective and, no doubt, will pay for itself by intensifying troop education in combat traditions.

Experience shows that educating troops in combat traditions is inseparable from the active struggle against negative phenomena and harmful "traditions," such as a neglectful and sometimes insulting attitude among older servicemen toward young soldiers. There are also cases where friendship and mutual help take on distorted and ugly forms. This shows itself in cases of mutual "deals" and covering up misbehavior by comrades. All these and other perversions, even if they are isolated incidents among our fighting men, have a bad effect on the state of military discipline and on the collective as a whole. They must be condemned in the most determined fashion, and everything must be done to avoid their appearance among servicemen.

The 24th CPSU Congress, which made increased demands of everyone who carries on educational work, posed new and more difficult tasks of communist education, including education in combat traditions. For commanders, political workers, and party and Komsomol activists, a knowledge of the law and requirements of social psychology, and especially of applied areas such as the psychology of propaganda, will help greatly. After all, propaganda for combat traditions is a focal point in education in combat traditions. Conscious and purposeful utilization of the conclusions and recommendations of propaganda psychology would, without any doubt, make it possible for us to sharply increase the effectiveness of education in combat traditions as well as in all troop education. Unfortunately, these requirements are not always fulfilled or are used in a purely intuitive way, without any system, which sometimes significantly decreases the effectiveness of propaganda.

The great Lenin, who worked out and substantiated the theory of defending the socialist fatherland and the orderly teaching on war and the army, wrote "In every battle, there is a moment when the bravest soldiers, after great tension, feel a desire to run. This panic arises from a lack of confidence in one's courage. A simple incident, any kind of pretext, is enough to return this confidence to them. It is a great skill to create such pretexts." (V. I. Lenin, Polnoye Sobraniye Sochineniy [Complete Works], Vol 29, p 357). The tension in modern

warfare is a hundredfold greater than it was when these lines were written. Therefore, our skill in creating the necessary moral and psychological situation to ensure victory in battle must also grow. This skill must be learned. It must be learned persistently, purposefully, and every day, and it must include educating troops in combat traditions.

IN THE INTERESTS OF VIGILANT PERFORMANCE OF COMBAT WATCH

by Maj Gen S. Bukhteyev and Lt Col K. Luchnikov

Vigilant performance of combat watch demands a high level of specialized training and firm practical skills from all officers who make up the duty shifts of command posts. The training for this element of control is represented by a large number of measures which ensure attainment of theoretical knowledge and practical skills in the performance of functional duties while standing combat watch.

Theoretical training is tied to the practical missions being accomplished and is carried on for the purpose of expanding the officer's perspective and deepening their general military and specialized knowledge. The subjects of theoretical training are established in accordance with the requirements of controlling documents and the training program for generals and officers of the PVO Forces. These subjects are worked through by the independent study method, within the system of officer training, at assemblies of officers, and during officer-staff and tactical exercises. The basic method of training officers is independent study, and its organizing principle is the personal plan approved by the immediate commander or chief.

In the process of theoretical training study is primarily devoted to: controlling documents which regulate the organization and performance of combat watch, as well as flight safety; the organization, weaponry, and procedures for combat application of enemy means of attack and their combat capabilities; tactical and technical data on the machinery of arms of troops and methods for its combat application; combat and material-technical support for combat operations by PVO troops; conducting combat operations where the enemy uses weapons of mass destruction; setting up communication, the system for employing primary and alternative communications channels, and the rules for concealed troop control; and the fundamentals of using

automated systems of control and means of automation at the command post.

As a result of theoretical training, officers attain the necessary knowledge and individual skills in performing their functional duties.

Practical training periods are done by the methods of headquarters drills, group exercises, and short exercises. Their number and direction is determined by the chief of staff with due regard for the problem facing the officers as well as the level of training and work harmony in the command post detachment. As experience shows, it is advisable to conduct training periods every day, sequentially alternating headquarters drills, group exercises, and short exercises. Drills conducted by higher headquarters are also included in the plan.

The practical necessity of holding regular group exercises and check drills has been proven. In addition to them, it is advisable to employ staff drills and short exercises. Their subjects should be established concretely in accordance with the yearly program. Furthermore, the deputy chief of staff determines, at his own discretion, the subjects and times for short exercises to eliminate gaps in the officers' knowledge in practical skills.

The periods for conducting all these forms of training are determined by the missions of combat readiness, the level of training of the specialists, and the particular features of performing combat watch. But under any circumstances, training periods should be structured in such a way that in a certain period of time all officers are encompassed, they are helped to improve their knowledge in practical skills, and the experience of the best specialists is provided to them.

After working out the plan for conducting headquarters drills, group exercises, and short exercises, it is desirable to compile a schedule in which all the measures being envisioned are arranged by time. This will make it possible to ensure an even load and goal-directedness in training command post personnel.

The schedule indicates the times of headquarters drills, tactical exercises, and other measures being carried out according to the plan of higher headquarters. It is also desirable to make a list of the questions which are to be studied and worked through with command post specialists during the training periods.

When planning group exercises, provision is made not only for their order and subject, but also for the persons

responsible for preparing and organizing these training periods. The schedule reflects the times and subjects of headquarters check drills and headquarters drills. The times and subjects of short exercises should be carefully planned.

The schedule is completed with short exercises whose subjects are determined by the deputy chief of staff.

The existence of a carefully thought-out schedule for conducting headquarters drills, group exercises, and short exercises makes it possible for training leaders to prepare themselves well and secure the essential training facilities in advance.

The materials for headquarters drills, group exercises, and short exercises are worked out by the deputy chief of staff and approved by the chief. Training periods are ordinarily held under the leadership of the deputy chief of staff in a training classroom or right at the command post in the officers' work stations.

Headquarters check drills are worked out by competent specialists and held under the leadership of the chief of staff or other officer with good specialized training.

Headquarters drills are conducted according to special exercises for the purpose of improving officers' practical skills in performing their regular duties in controlling on-duty podrazdeleniye while rebuffing the first strikes by enemy aircraft, and the development of working harmony in a duty shift as a whole is also worked on. During headquarters drills, the following questions may be worked through: evaluation of the situation; transmitting missions to performers and checking their performance; sending and receiving orders, reports, and information by radio and other means of communication when using concealed control; and other questions related to control and combat activity by on-duty forces.

A study of the targets is entered on the intention map. It also depicts the calculated intercept lines, the detection zones of radio operation equipment, and other calculated data. The air enemy's operations tactics are considered by variations of combat operations.

As experience demonstrates, it is advisable to structure the drill by stages. At first the officers' theoretical knowledge is checked and there is more intensive study of particular theoretical questions. In the second stage primary attention is devoted to practically working through the functional duties as part of a duty shift.

Group exercises are also held according to the corresponding exercises. During the group exercise the functional duties of duty personnel and their working method in different situations are studied. The entire learning process in a group exercise is built on the basis of a gradual move from the simple to the complex. The purpose of group exercises is to reinforce knowledge received in lectures, seminars, and during independent study, to deepen and expand knowledge on particular theoretical questions, to cultivate the skills of duty personnel in organizing combat operations and controlling them, and in analyzing, evaluating, and generalizing the results of combat operations, and to check their knowledge and ability to apply it in practice.

Precise, confident actions and mutual understanding always distinguish the shift headed by Officer Ye. Veretennikov. During a headquarters drill, the training leader created a complex and dynamic situation. Thanks to the skills obtained in previous training periods the officers were able to discover the enemy's intentions and determine the optimal variation of action in a limited time. Their recommendations and decisions were supported by sound calculations.

The duty shift of Officer K. Sukhov also carried out its functional duties under complex conditions created for the purposes of the drill. A majority of the officers operated intelligently and energetically on the inputs. However, certain comrades were slow in reacting to changes in the air situation, and in isolated cases they made belated decisions. This put the guidance control officer and the interceptor pilots in a difficult situation. During the review, the drill leader gave a thorough analysis of both the mistakes and the reasons for them, and made concrete recommendations to prepare for the next training period.

As the trainees' theoretical knowledge grows more profound, the nature of group exercises becomes more complicated and greater attention is devoted to developing practical skills. Proceeding from this, the educational goal of group exercises changes in the direction of reducing theoretical work.

When working out the plan of a group exercise, one should begin with the fact that the basic theoretical problems of the subject, which has been planned before and is known to all the officers, have already been studied and will only be deepened and refined at a group exercise. As experience demonstrates, such exercises are an effective

form of learning, especially when preparing command post detachments to resolve particular questions and in developing their skills in performing their functional duties. This form of officer tactical training should be carried on systematically because it not only makes it possible to thoroughly check and deepen knowledge, it also permits exchange of know-how and developing unified opinions on a number of questions which are of practical importance for further raising combat readiness.

Like group exercises, short exercises are conducted according to specially developed exercises. Short exercises include elements of both the headquarters drill and the group exercise. Therefore the method of conducting them is, so to speak, mixed.

The plan of a short exercise ordinarily includes one or two training questions. Their content is not passed on to the trainees in advance. During short exercises, officers practice the ability to independently and rapidly evaluate a situation which has taken shape, adopt sound, optimal battle plans, draw them up, and improve knowledge and skills in particular questions of organizing and conducting combat operations.

Command post officers should know the variations for operations by on-call weapons and the system for strengthening them in full detail by heart. This is conditioned by the tactical and technical capacities of the aircraft of the probable enemy and their bases in the given sector. The great speeds, maneuvering by altitude and course, and the possibility of flights by enemy aircraft from different directions can rapidly change the air situation. Under these conditions, intelligent and flexible actions by officers of the control element and their ability to select the most suitable variation for operations in the given situation in a limited amount of time is of crucial importance.

Overall, training for duty shifts is subordinated to accomplishment of the primary mission -- ensuring constant and high combat readiness.

TECHNIQUE FOR SELECTING OPERATORS

by Engr Lt Col P. Shlayen, Candidate of Technical Sciences,
Engr Lt Col P. Perfilov, Engr Lt Col A. Karasev, Candidate
of Technical Sciences, and Engr Maj N. Kosolapov

Efficient utilization of machinery and weapons in battle is only possible where the combat teams who service this equipment have a high level of training. This is why the problem of occupational selection has taken on special significance at the present time.

The rapid progress of military machinery in recent decades, which is linked to the extensive introduction of automated systems of control, has fostered the appearance of the widespread occupation -- operator. Great demands are made of the specialist in this occupation (speed and precision in performing operations, ability to make correct decisions under the complex conditions of fast-moving battle, and so on).

Experience demonstrates that persons who possess the necessary individual qualities make fewer mistakes and omissions in operating the machinery than fighting men who do not have these qualities. For this reason we feel it is advisable to be guided by a number of scientific and methodological propositions which should be considered in developing a system for selecting operators. Below we give a model sequence for conducting the selection and certain recommendations for setting it up among the troops considering only the psychological and physiological traits of the candidates. But in order to determine the suitability of a particular candidate for the position of operator, it is essential to have, in addition to an evaluation of his psychological and physiological traits, data on the possible efficiency of his work under certain conditions.

Research shows that change in the monitored parameter Q , which characterizes the work efficiency of an

operator from learning time t , can be assessed according to the expression:

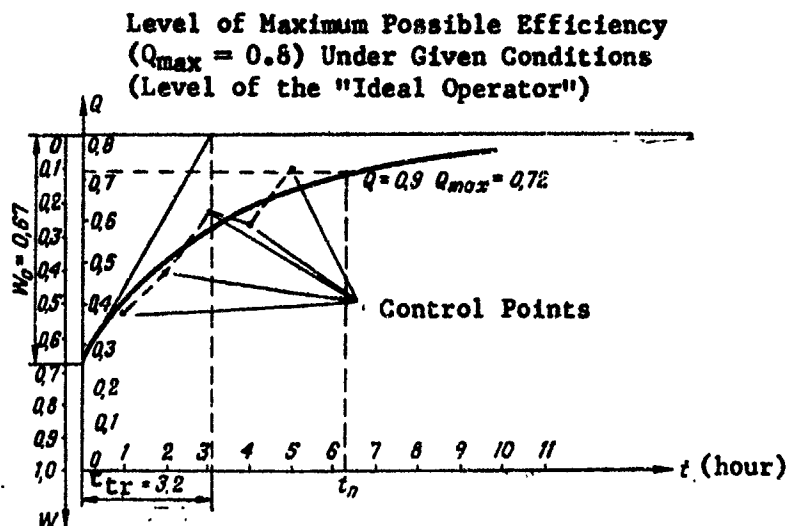
$$Q = Q_{\max}(1 - W_0 e^{-\frac{t}{t_{tr}}}), \quad (1)$$

where $Q_{\max}$ -- maximal value of the monitored parameter of the "ideal" operator under the concrete condition;

W_0 -- initial level of operator training;

t_{tr} -- coefficient which characterizes the operator's capacity for training (see Chart One below).

Chart One



Supposing in expression (1) that

$$W_0 = \frac{Q_{lim} - Q_{ev}}{Q_{lim}},$$

where Q_{lim} -- limit value of monitored parameter (for an increasing parameter $Q_{lim} = Q_{\max}$, and for a diminishing parameter $Q_{lim} = Q_{min}$);

Q_{ev} -- initial value of the monitored parameter -- we receive a dependency for evaluating both a diminishing and a growing parameter, as follows:

$$Q = Q_{lim}(Q_{lim} - Q_{ev})e^{-\frac{t}{t_{tr}}}. \quad (2)$$

It follows from expression (1) that the work efficiency of the operator of a concrete system is primarily determined by his individual qualities, which are characterized by the initial level of training for work in the given specialization and the coefficient of trainability. Therefore, in order to

evaluate and predict the possible work efficiency of an individual, it is necessary to know the quantitative values of these parameters for him.

Because the process of establishing them requires that the work of the person being tested be observed for a certain time, the problem arises of determining in advance the persons who, by their psychological and physiological indicators, correspond to the requirements made of specialists in the given occupation. For this reason, the selection of operators is done in two stages. In the first stage, the preliminary stage, the candidates' level of psychological and physiological qualities is evaluated using fill-in or equipment tests (controlled problems). In the second stage, the final stage, candidates are selected who are capable of most efficiently performing the expected work.

For every concrete specialization, sets of tests are established which contain the necessary number of problems to ensure detection and evaluation of the psychological and physiological qualities required for successful work in the given specialization. In accordance with this, requirements are worked out for the psychological and physiological qualities (for vision and hearing analyzers, perception, orientation, attention, memory, thinking, psychomotor activity, emotional qualities, and so on).

During their development or selection, the following requirements are made of the tests: the possibility of evaluating the psychological and physiological qualities necessary for the given activity in persons undergoing selection; the possibility of investigating an adequately large group of people with minimal outlays of time and capital; simplicity and convenience in decoding and analyzing data received, and others. It is essential to have at least two or three tests to evaluate every psychological and physiological function.

Practice shows that not all tests make it possible to predict the differences among people with sufficient accuracy. In order to select from the total number those tests which ensure the most information on determining "suitable" and "unsuitable" candidates, an evaluation of their informativeness is made. One of the ways to evaluate tests' informativeness is analyzing the results of selected tests taken by specialists known to be "good" (group A) and "bad" (group B). The criterion for assigning a particular operator to the category of "good" or "bad" is the efficiency of his work achieved during the space of a certain time and evaluated according to formula (1).

The greater the difference between the indicators received in groups A and B on the same tests, the higher the level of their informativeness. According to the results of this evaluation, uninformative or low-information tests are rejected, and the most informative are used to develop quantitative selection criteria.

The next stage in working out a selection system is establishing quantitative criteria for determining the suitability or unsuitability of candidates for work in the given specialization in accordance with a theoretically sound algorithm for classifying them.

One of these algorithms is based on use of the theory of image recognition. Its essence is as follows. Let the quality of performance of test i be characterized by the indicator q_i . In a general case, there may be several indicators for one test, for example, time and exactness. As a result of selection, each candidate is evaluated by the totality of these indicators:

$$q_1, q_2, \dots, q_n, \quad (3)$$

where n -- the number of tests.

The candidate is considered to have passed selection when a certain summary indicator $L(q_1, q_2, \dots, q_n)$, determined by the above-mentioned quantity (3), is equal to or exceeds a previously assigned threshold value (L_0).

During the selection process, depending on the quality of performance on test i , each candidate receives a certain number of points:

$$L(q_i) = \ln \frac{f_A(q_i)}{f_B(q_i)}, \quad (4)$$

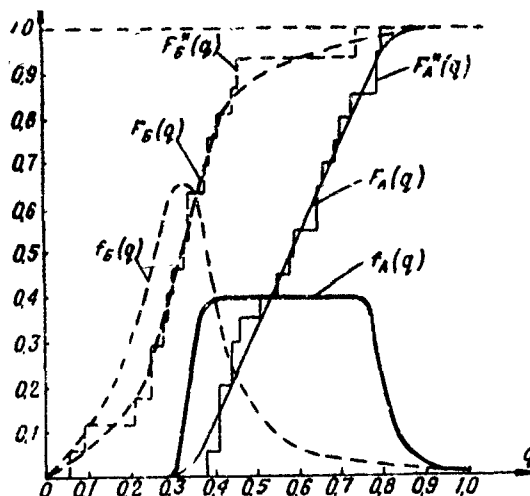
where $f_A(q_i)$ and $f_B(q_i)$ -- distribution density of the i indicator of the test in each group.

The points received for performance of all the tests are added together, and the candidate passes the selection if this sum exceeds the previously assigned value L_0 . Substantiating the limit values for each specialization and compiling tables of points or calculation formulas for determining the values of $L(q_i)$ according to the results of test fulfillment, which would replace the tables, are among the tasks of the selection system developers.

The method for determining $L(q_i)$ is as follows. According to experimental data received on the basis of a study of specialists assigned in advance to groups A and B,

integral laws of distribution for the indicator q_i in groups A -- $F_A^*(q_i)$ and B -- $F_B^*(q_i)$ (see Chart Two below).

Chart Two. Density of Distribution of Values from the "Coordinates" Test in Groups A and B



These approximated integral laws are differentiated, as a result of which we receive a distribution of probabilities for the test indicator in groups A and B -- $f_A(q_i)$ and $f_B(q_i)$. Knowing these characteristics, it is possible to determine the logarithm of their relationship, which is called the point (or diagnostic coefficient).

As an example, Chart Two shows the order for obtaining these distributions, while Chart Three (see below) the graphic form $L(q_i)$ for the "coordinates" test (see Chart Four, next page)

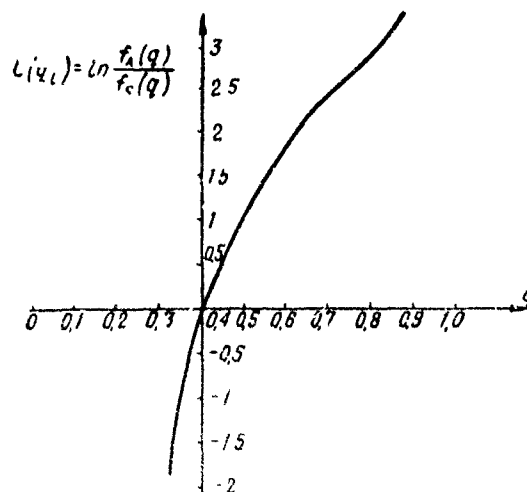
Knowing the dependency $L(q_i)$, it is possible to determine the value of the summary point

$$L = \sum_{i=1}^n L(q_i) \text{ for each}$$

candidate of group A and B and to construct the distribution of $F_A^*(L)$ and $F_B^*(L)$.

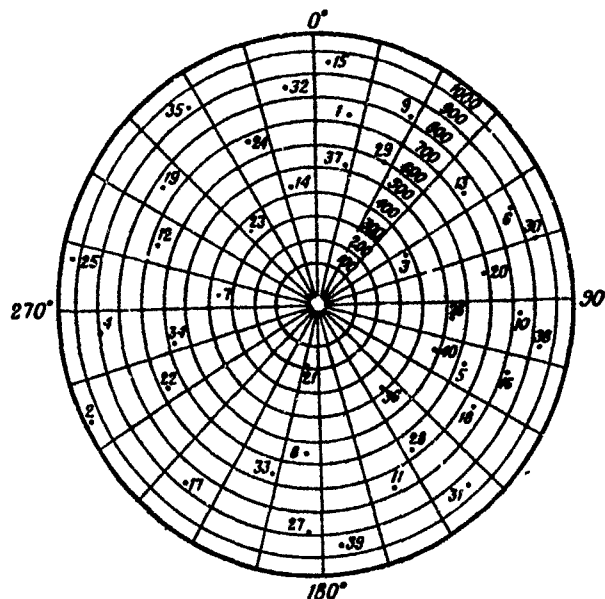
After they are approximated and differentiated, the distributions of summary point $f_A(L)$ and $f_B(L)$ for groups A and B can be

Chart Three. Chart of the Diagnostic Coefficients of the "Coordinates" test.



received. Using these distributions and the previously established values of first and second order error, it is possible to select the limit value L_0 . In those cases where L_0 is not determined or when the problem of the selection is not to weed out candidates, but rather to obtain data for more efficiently assigning them to work, it is advisable to carry out a so-called ranking. Ranking candidates is done in accordance with the amount of points they receive, beginning with candidates who collect the largest sum.

Chart Four. Coordinates.



A distinguishing feature of the second stage of selection is evaluating the dynamic of knowledge and skill development in candidates when working directly on combat machinery in situations typical of actual battle. The second stage of selection is essentially the initial stage of operator training.

In this stage, the individual indicators t_{tr} and W_0 (see Chart One) are determined for a limited number of drills at work stations, and an evaluation of the assumed time required to train each operator (t_{as}) is made. These time outlays are determined according to the formula

$$t_{as} = t_{tr} (2.3 + \ln W_0), \quad (5)$$

where t_{as} -- time required to train an operator to a point which ensures work effectiveness not lower than 90 percent of maximum possible.

In general, this dependency will have the form

$$t_{as} = t_{tr} \cdot \ln \left(\frac{Q_{ev} - Q_{lim}}{Q_{req} - Q_{lim}} \right),$$

where Q_{req} -- required value of monitored parameter
($Q = Q_{\text{req}}$).

According to the results of the second stage of selection, all candidates are ranked. Those whose training requires the least time are assigned to the given operator position first of all.

The sequence of occupational selection in the armed forces goes as follows. All young replacements who, by their psychological and physiological indicators and level of education, are capable of working as operators are investigated for the purpose of selection for these positions. In order to carry on the first stage of selection, a special place (or classroom) is selected which is as isolated as possible from external noises. The desks are arranged in it in such a way that the candidates being investigated can be situated independently of one another and the instructor can go up to any one of them. The desks should be well and evenly lit. The study is done with a group of not more than 20-25 (preferably during the morning hours).

During the investigation, no outside personnel should be in the room, especially those who, by their position, might influence the behavior of those being tested. Also there should be no objects, instruments, or sources of sound and light signals in the room which would distract the persons being tested from their work.

One of the main tasks of the instructors who conduct the occupational selection is establishing a positive attitude toward the work in those being tested. Educational and mass political work at the recruit reception station is very important here. Explaining the meaning and significance of the testing and the military essence and importance of operator activity with the concrete weapons system, and using heroic examples from the history of the Soviet Armed Forces and the chast helps to raise interest among young recruits in the occupation of operator and to cultivate a desire in the soldiers to master this difficult specialization.

To a great extent, the candidate's attitude toward the investigation depends on the personal qualities of the instructor. Such things as confident behavior, a balanced and well-wishing attitude toward those being tested, and an ability to create a business-like situation help to establish and maintain a positive attitude toward the work in those being tested.

The problem and purposes of selection are explained to everyone going through selection, and then they are instructed on the first test. The explanation is done using

a picture which shows a test similar to the control test. Advance acquaintance with the control tests is categorically prohibited. In order to obtain more reliable data on the results of selection, the recommended instruction technique should be strictly followed. Then the content and form of its presentation for each test will be constant for all groups.

After explaining the manner of working with the tests, the instructor explains the form and rules for filling out the answer blanks (see Table One, next page).

Testing of the candidates begins only after they have fully assimilated the rules for working with the tests. The length of continuous testing should not exceed 50-60 minutes, after which it is necessary to call a 10 minute break.

After the first stage of selection, all materials from the investigation go to a group for processing and analysis of the results. In order to evaluate the quality of performance on a particular test, a "blank key" is used to determine the test score, and the number of points is computed on this basis.

The points corresponding to performance results for all tests are added together, after which the candidates are ranked beginning with the soldier who has collected the largest sum.

The total points or results of the ranking, as well as additional information obtained by observing the behavior of the young soldiers during the test period make up the initial data for admission to the second stage of selection. For example, if during work on the tests a certain individual was very agitated, felt constrained, became distracted, and so on, this candidate requires further careful study and, if possible, should be replaced by another. The final decision on admitting a candidate can only be made after a personal conversation with him. During such a conversation, it is desirable to evaluate the general inclination and capabilities of the candidate, his desires, and so on.

The second stage of selection is combined with training periods conducted according to the combat training plan for young recruits. A team is formed from soldiers who have been admitted to this stage and it is put under an instructor who conducts the second stage of selection. The chief of the recruit reception center jointly with the instructor compiles a schedule of training periods for the candidates with due regard for specific matters and the time required to carry out the second stage of selection.

Table One.

Answer Sheet

No _____ Name _____ Chast _____ Date _____

Education _____ Occupation Before Service _____
(Lathe Operator, Student,
and so on)

(1) Тест 1	1-	2-	3-	4-	5-	6-	7-	8-	9-	10-	11-	12-	13-	q ₁ = БАЛЛ = (3)			
	14-	15-	16-	17-	18-	19-	20-	21-	22-	23-	24-	25-					
(1) Тест 2														q ₂ = БАЛЛ = (3)			
Тест 3 (1)	ДАННОСТЬ	УГОЛ	ДАННОСТЬ	УГОЛ	ДАННОСТЬ	УГОЛ	(1) Тест 4							q ₃ = БАЛЛ = (3)			
	1-		15-		29-												
	2-		16-		30-												
	3-		17-		31-												
	4-		18-		32-												
	5-		19-		33-												
	6-		20-		34-												
	7-		21-		35-												
	8-		22-		36-												
	9-		23-		37-												
	10-		24-		38-												
	11-		25-		39-												
	12-		26-		40-												
	13-		27-														
	14-		28-														
Тест 5 (1)	1-	2-	3-	4-	5-	6-	7-	8-	9-	10-	11-	12-	13-	14-	15-	16-	q ₅ = БАЛЛ = (3)
	17-	18-	19-	20-	21-	22-	23-	24-	25-	26-	27-	28-	29-	30-	31-	32-	
Тест 6 (1)																	q ₆ = БАЛЛ = (3)
Тест 7 (1)																	q ₇ = БАЛЛ = (3)
Тест 8 (1)																	q ₈ = БАЛЛ = (3)
(6) Сумма баллов																	

Key: (1) Test; (3) Points; (4) Distance; (5) Angle;
(6) Total Points.

The data received during the test process in the form of control points is recorded on a graph (see Chart One) where training time is laid out on the horizontal axis, and the values of the parameter being monitored during the process of drills are on the vertical axis. The points on the chart are smoothed out by a curve which is close to the exponent. The graph method (direct reading according to the graph) is used to establish the values of t_0 and W_0 for each candidate. These are used to determine the assumed time outlay (t_{as}) for training him. After this, a final ranking is made. The results of the selection are recorded in a special table (see Table Two below).

Table Two. Table of Selection Results

Subjected to study on tests _____

Date selection conducted (month, year) _____

№ по пор.	Фамилия, инициалы	Образование	Занятие до военной с.лужбы	(а) Первый этап отбора		(б) Второй этап отбора				Замечания инструкторов
				балл после 1-го этапа	ранг после 1-го этапа	t_{06}	W_0 (Q_0)	t_n	ранг после 2-го этапа	
1	2	3	4	5	6	7	8	9	10	11

Key: (1) Order Number; (2) Last Name and Initials;
 (3) Education; (4) Occupation Before Military Service;
 (5) Points After First Stage; (6) Rank After First Stage;
 (7) t_{tr} ; (8) $W_0(q_0)$; (9) t_{as} ; (10) Rank After Second Stage;
 (11) Instructor's Remarks; (a) First Stage of Selection;
 (b) Second Stage of Selection.

Special attention should be directed to seeing that selection results do not lead to a false interpretation of the qualifications of persons who receive low evaluations. It should be remembered that poor results demonstrated by candidates during selection for one group of specializations do not exclude (and sometimes even presume) their successfully going through selection for other specializations.

Practice has demonstrated that in those cases where selection is done in strict accordance with these requirements, elimination for unsuitability during the training year has been reduced 2-3-fold, and the time required to train operators has also been substantially decreased. This

is confirmed, in particular, by the experience accumulated by officers V. Shramko, I. Litetskiy, A. Mezentsev, and V. Mankevich.

However, unfortunately, there are still cases where the requirements for setting up and conducting operator selection among the troops are violated. For example, in some chast the selection of soldiers for combat teams is done without considering the psychological and physiological characteristics of the candidates. Correct accounting for and storage of tests has not been established everywhere. There have been cases where sets were not stored at chast headquarters, but distributed to podrazdeleniye in advance for study, which naturally decreases the objectivity of results obtained due to advance familiarity with test solutions.

In some places there have been serious violations of the requirements for the first stage of selection. For example in the N chast, the first stage of selection was not done at the recruit reception center, but rather in the podrazdeleniye after recruits had been distributed. As might be expected, there was little benefit from selection at this point because it is difficult to pick out the required number of specialists in the various areas when working on the scale of a podrazdeleniye.

In a number of cases, the psychological and physiological examination of young recruits was not done according to the full program as required by instructions. With no basis at all, the time allocated for resolving certain tests was arbitrarily changed, the number of them was reduced, and sometimes, in order to save time, testees were given assignments to only partially solve certain tests.

One other major shortcoming has been revealed, a desire to accelerate the selection process by eliminating the second stage. However, this stage is extremely necessary. Even though it does require greater organizational efforts than the first, the advantages obtained easily pay back outlays on it. It must also be kept in mind that the second stage of selection makes it possible to cultivate initial skills in future operators, which is very important for their subsequent work.

Experience in conducting occupational selection among the troops according to this technique provides evidence that, despite its complexity, it helps to achieve high combat readiness in radio operating podrazdeleniye.

IN A BRIGADE OF COMMUNIST LABOR

by Maj L. Rakovskiy

At the First State Bearing Plant, which has twice won orders, they waited for them impatiently. And then, there they were, coming through the shops of the enterprise. Smart and well-proportioned. Blue collar, engineering, and clerical workers greeted these leading soldiers from the Moscow PVO District, winner of the Order of Lenin, as their most beloved guests.

The many thousands of workers in the collective of this Moscow plant, winner of the orders of Lenin and the October Revolution, achieved considerable successes during the year of the 24th CPSU Congress. This is shown by the figures. During the year, the enterprise will produce a large quantity of different types of bearings. All this output goes to thousands of enterprises in our country and to more than 50 countries of the world.

The defenders of the Moscow skies arrived in the brigade of communist labor named for Major General Aviation Andriyan Grigor'yevich Nikolayev, the pilot-cosmonaut who was brought up in the order-winning Moscow district and has twice been named Hero of the Soviet Union. The soldiers went there to report to the bearing workers on fulfillment of all socialist obligations undertaken and on the progress of the competition under the slogan, "The Year of the 24th CPSU Congress -- a Year of Outstanding Training and Service."

One sector of the brigade is called the cradle of new machinery. These are modern automatic lathes with which the powerful flow lines are equipped. There the fighting men were met by Aleksey Vasil'yevich Viktorov, leader of a brigade of mechanics. He has worked at the "Sharik" Plant for more than three decades. Because of his profound knowledge and thorough development, they call him the worker-engineer in the collective.

Aleksey Vasil'yevich Viktorov is a Hero of Socialist labor and member of the CPSU Central Committee. He is known far beyond the plant as a talented inventor and efficiency worker who has made more than 40 proposals which have been introduced into production. He is chairman of the inventors' council of the capital.

Aleksey Vasil'yevich introduced the soldiers to members of his brigade. The soldiers, sergeants, and officers shook hands firmly with Valentin Gerasimov and Oleg Feoktistov, communist workers and privates in the reserve, Sergeant (Res) Anatoliy Fedorovich, Junior Sergeant (Res) Aleksandr Zhuravlev, PFC (Res) Vyacheslav Petrov, and Vladimir Miterev, a predraft-age member of the All-Union Voluntary Society for Assistance to the Army, Navy, and Air Force. The last four are Komsomol members. All the brigade workers are shock workers of communist labor. Every month they fulfill their quota by 180 percent.

Senior Lieutenant Aleksandr Nazarov told the bearing workers how the outstanding platoon which he commands emerged victorious in the competition. This military collective has a large number of outstanding soldiers and rated specialists. The communist officer himself affirmed his title of first class specialist, fulfilled the norms of the Military Sport Set, and delivered one efficiency proposal.

Sergeant Aleksandr Yegorov, Pvs Vladimir Tseluyko, Nikolay Soroka, and others reported to the workers that, during the year of the 24th CPSU Congress, they became first class specialists, outstanding in combat and political training, active efficiency workers, and rated athletes.

"We always remember," said Sergeant Yegorov, "the great trust shown us by our native party and the Soviet people, who have given us the keys to the Moscow skies. We will perform our military duties with special urgency, and serve the homeland as Lenin instructed."

In his turn, Aleksey Vasil'yevich Viktorov told the fighting men of the frontiers achieved by his collective in competition. The bearing workers have resolved to fulfill the Ninth Five-Year Plan for output of new models of machinery ahead of schedule, in 3.5 years. This means that each month the brigade must manufacture 10,000 rubles worth of output, not 7,000.

"A number of points in the brigade obligations have already been fulfilled," said Comrade Viktorov. "The automatic line for lubricating and packing bearings is operating in the assembly shop, and a semiautomatic machine

for assembling bearings is ready. Adjustment of assemblies on the automatic machine is being finished, and assembly of experimental models of equipment is being done successfully. I myself," Aleksey Vasil'yevich noted, "am obligated to turn in at least three efficiency proposals a year for mechanizing production processes and replacing manual labor, to produce a benefit of at least 5,000 rubles a year."

When parting with the collective, the soldiers assured the workers and Comrade Aleksey Vasil'yevich Viktorov, member of the CPSU Central Committee and the brigade leader, that they will continue in the future to serve in model fashion, strengthen discipline, raise combat readiness, and vigilantly protect the creative labor of Soviet people.

SMOOTHING OUT A TEAM

by Col V. Vatsenko

Experience in organizing combat training in the crews of antiaircraft missile podrazdeleniye shows that certain training leaders (as a rule the young officers) still sometimes fail to conduct drills with subordinates in a methodologically correct manner. The greatest number of mistakes are made, specifically, while conducting drills to develop teamwork. How can they be avoided?

Before answering this question, let us recall that several stages precede the development of teamwork, specifically selection of candidates by psychological and physiological data and separate training for those soldiers selected by the individual training period method for the purpose of developing in them the habits of correct actions during combat work. When all the soldiers are trained and able to carry out standard indicators with at least a "satisfactory" evaluation, the most important stage of training begins -- the development of teamwork.

To a great extent, success in every drill is determined by how well the training leader, combat machinery, simulation equipment, and means of objective control are prepared for it and how carefully trained and instructed the persons enlisted to monitor team actions are.

The subject of a training period is selected in accordance with the combat training plan and depending on the level of training of the soldiers. For example, in developing teamwork in the command post detachment of a battalion, it is recommended to hold drills on accuracy of lining up sights with an immobile target, accuracy of manual approach with automatic tracking, manual tracking, work on targets under simple conditions, and work on low-flying, maneuvering targets and targets flying under cover of inter-

ference. All this is reflected in the training leader's outline. The completeness and care with which this outline is developed is an important indication of the officer's level of preparation.

The attempt to increase by every means the number of questions being worked through most often leads to directly opposite results. The quality of drills in such a case is sharply decreased. Furthermore, it becomes considerably more difficult to monitor the actions of the specialists being trained.

Experience shows that, for example when drilling radar operators in automatic tracking of deflected signals, it is possible to state the goal of developing skills in accurate manual approach tracking and drilling crew members to react quickly to a disruption of automatic tracking. In preparing for a drill on tracking maneuvering targets, it is possible to single out the following training problems -- drill operators in detecting the start of maneuver, and monitor the correctness with which the distance operator tracks the maneuvering target.

Up to one hour is ordinarily allocated for a drill. In cases where training periods pursue the goal of developing endurance, the time spent in crew training should be progressively increased.

It is fully understandable that success will come to a training leader only when he has a flawless knowledge of the functional duties of each trainee. Therefore, when preparing for a drill, the officer must study the duties of all crew members and, of course, himself work through all these operations in practice in order to develop solid, stable habits.

On the basis of experience accumulated by the best methodologists, it is possible to recommend the following order for personal preparation by the training period leader: first grasp the order of actions by each trainee, memorize them, and after this go through all procedures personally. This order offers the drill leader an opportunity to monitor any specialist and where necessary to demonstrate a particular work procedure for the trainees on the machinery, which is especially necessary during the review.

In conducting drills to develop teamwork, it is very important for the officer to have not only technical and specialized training, but also broad tactical perspective. That is why solid knowledge of the rules of fire and regulations on combat work plus a study of the experience of anti-aircraft missile troops in combat operations and air tactics

of the probable enemy have the most favorable effect on the course of training overall. Practice shows that success is achieved by the one who carefully studies combat experience, the development of attack weapons and tactics of the probable enemy, who has mastered the entire arsenal of methodological means, and who trains subordinates with this in mind.

Another necessary condition for conducting high quality drills to develop teamwork is that the officer have a solid knowledge of the tactical and technical capacities of training equipment and be able to adjust and intelligently use it during combat work.

In this connection, I will relate the experience of Lieutenant A. Pep, an interception controller, in preparing for such drills. He devotes special attention to setting and adjusting the T/O simulator. This makes it possible for him to provide operators with solid training in work under conditions of intensive interference with targets flying at top speed and maneuvering with altitude and course, in other words, for the most complex types of firing.

A knowledge of antiaircraft missile troop experience in combat operations, a profound understanding of the air tactics of the probable enemy, and skillful reproduction of the air situation using simulation equipment makes it possible for the officer to use training period time more efficiently and achieve maximum benefit in cultivating the necessary practical skills in his subordinates. Lieutenant A. Pep knows the individual qualities of each operator very well. In particular, he keeps a daily record of the quality of work by radar operators for all types of targets in different tactical conditions. This makes it possible for him to practically analyze the training level of the operators, note individual shortcomings in good time, and plan further drill correctly.

In order to react to mistakes made by operators during drills in time and choose the most expedient methodological procedures for working with trainees, the training leader must make maximum use of objective control data: photographs of the display unit, tape recordings, and readings from monitor-and-measuring equipment. This is how it is done, for example, by Lieutenant A. Pep. Objective control data helps him to carry on instructive training period reviews. And here is one more detail from his experience. On the training ground, Lieutenant A. Pep carefully observes the work of other crews and borrows efficient training procedures and methods in order to use the know-how of the best specialists in training operators. The painstaking daily work of the officer was paid back a hundred fold during firings at the range; the manual tracking operators received outstanding

evaluations and the battalion successfully performed the missions placed before it.

The working experience of Lieutenant A. Pep shows graphically that he is entirely correct in feeling that skillful, well thought-out use of objective control equipment is, along with conducting the actual drill to develop teamwork, one of the most important stages of training.

"Even if the drill is short in time, let it be intensive and saturated with tactical elements. During the review it is essential to point out in detail what has been achieved, what mistakes there were in operator work, and how to eliminate them," says Lieutenant A. Pep.

Other officers of the podrazdeleniye also follow this rule.

Experience shows that inability to correctly monitor and analyze drill results is the most typical weakness among a certain number of young officers. Therefore, it is justified when the training leader, in preparing for the drill, devotes special care to thinking through steps to monitor crew actions. The quality of the drill will benefit in proportion to the intensiveness and objectivity of monitoring, documenting, and recording work results. Using tape recorders, photographing display unit screens and scales, recording readings on monitor-and-measuring equipment, and maximal utilization of monitoring equipment help to practically and reliably record drill results, discover shortcomings, and eliminate them knowledgeably without delay.

A training period loses its sense if no check is set up on the correctness of actions and time of performance for particular operations. For example, during a drill of the command post detachment of a battalion on switching to combat readiness, it is essential to think through where each monitor should be located, what questions he should check, and to what he should direct special attention.

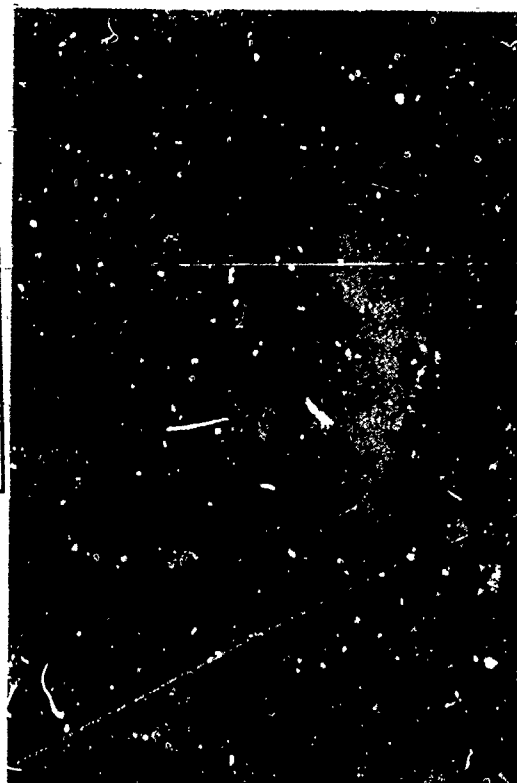
If the training goal is to check the time taken by the entire detachment to switch to combat readiness at night, it is obviously necessary to record data on the alert signal passing from the command post to the barracks, arousing personnel, their arrival at combat positions, turning on the equipment, and checking its functioning. During the first drills, the training goals might be, for example, checking the order of turning on equipment, adjusting it, and checking station functioning. It is the duty of the drill leader to think through in advance where each monitor will be and what time segments must be measured.

The persons being enlisted to monitor team actions receive instruction before the drill and conduct a detailed study of all special features in conducting it and monitoring by stages. We know, for example, how important it is to teach operators to correctly adjust display units within the established time. A check should also be made on how the operators set the brightness of the grid lines and sights in using different scales, and how they regulate the level of amplification and orientation of the strobes. Therefore, the monitor must not only time the operations, but in addition follow the correctness of specialists' actions.

While instructing the monitors, the training leader should satisfy himself that the monitors are able to confidently use training or simulation equipment for the given drill and have a firm knowledge of what organs of control to use and when to carry out particular operations (increase speed, begin maneuver, change magnitude of signal, and so on).

During drills to develop teamwork, especially at first, many interception control officers assign a sergeant or well-trained old-time soldier to perform their duties and they themselves take on the functions of trainee and monitor. This methodological procedure, which is generally correct, does not always justify itself. Experience shows that such a practice is permissible only in the beginning of young radar operator training. Later the interception control officer must be at his working station and accustom the operators to his voice and strive for precise, dexterous performance of all commands. And, naturally, this raises

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Engineer-Major Anatoliy Boychevskiy is an experienced missile soldier. He has carried out field missile launches at the firing range many times, and he and his subordinates have always received an outstanding evaluation. Officer Boychevskiy is a master of military skills.

(Photo by V. Sukhodol'skiy)

the requirements as to the personal training of the interception control officer himself, because it is not that easy to simultaneously work oneself and follow the actions of the operators. This is even more true because these elements must be painstakingly worked through and refined to a jeweler's precision. After all, during battle it is precisely the interception controller who organizes, directs, and monitors operator work. Therefore, his work within the crew is the primary form of combat training.

And now, let us make several remarks on certain methodological features of conducting drills to develop teamwork. We know that they all begin with an alert, then crew members and monitors occupy their positions, the equipment is turned on, and a check is made of its functioning.

Then the crew drill itself begins, and during it training questions are worked through according to the training plan. The specialists who are supporting the drill, using the appropriate simulation equipment, provide inputs and change the situation in accordance with the assigned training goals. For example, in working through crew actions in firing against maneuvering targets, they include division of the target or a start to maneuvering with altitude (or course). The drill leader uses a stopwatch to measure the time from the start of the target maneuver until the moment that the operator detects these evolutions. The moment when stable target tracking is begun is also noted. Thanks to this, statistical data will accumulate from drill to drill on how rapidly the operator detects the start of maneuver and how much the minimum time is for him to transfer to stable tracking.

At the same time it is possible to work through how rapidly the operator catches a break in automatic tracking and switches to manual. For this purpose, the error signal is grounded at the start of the maneuver. In this case again, the time must be recorded.

But how can harmonious actions by crew members be achieved when "enemy" planes use the tactical procedure of "dividing targets"? In this case, two target markers are joined on the simulator in advance (the signal from the target to be separated is sharply reduced) and, on command or at a standard signal of the training leader, division of targets is switched on. On the display unit, this creates the picture of a real maneuver. The drill leader must carry out a time study and carefully monitor operator actions at this moment. This will help to determine the level of training achieved by each member of the crew and the discover weaknesses.

It is necessary to check whether operators notice the moment that the targets separated and how rapidly they reacted to the division of target. For this purpose, the monitor should particularly follow operator actions and check his ability to continue tracking a maneuvering target with a change in target velocity.

It is very important for the operator of the appropriate coordinate to not only operate correctly himself, but to be able to monitor the other operators' tracking of a maneuvering target. And this is precisely an element of teamwork in the operation of an entire crew.

We have dwelt on certain questions of preparing for and conducting drills to develop teamwork in a crew. Experience shows that holding drills according to the recommended chart is very useful in teaching crews and makes it possible for the young officer to rapidly master the technique of developing teamwork and prepare his crew to perform their combat mission in a minimum time.

DEVELOP STAUNCH, SKILLFUL, AND TEMPERED SOLDIERS

by Col Gen Avn V. Lavrinenkov, Twice Hero of the Soviet Union

The article by Major Ye. Khal'chitskiy, commander of an antiaircraft missile battalion, entitled "Combat Will Demand," aroused great reader interest. It was published in the first issue of our journal for 1971 and the editors received many responses to the questions raised by the author. Some of this material has been published in the journal. In these articles, the officers share their experience in training and educating personnel, make concrete suggestions, and raise a number of questions related to developing high moral-political, fighting, and psychological qualities in PVO troops.

The editors thank all the readers who have taken part in the discussion of this important problem, and await in 1972 new materials on developing the will, determination, persistence, self-control, endurance, and other moral and fighting qualities of personnel.

The editors requested Colonel General Aviation V. Lavrinenkov, twice Hero of the Soviet Union, to sum up certain results of the discussion on Major Ye. Khal'chitskiy's article "Combat Will Demand."

The name of V. Lavrinenkov, the remarkable Soviet pilot who has twice been named Hero of the Soviet Union, is widely known in our country. During the years of the Great Patriotic War, he made hundreds of combat flights, manifested courage and heroism in air battles, and presented a model of bravery, steadfastness, and devotion to

the homeland in the most difficult situations. In the postwar years, General V. Lavrinenkov has accumulated a great deal of know-how in training and educating subordinates.

The editors also express their gratitude to Lieutenant Colonel V. Kovalev, candidate of psychological sciences and senior teacher at the Military Order of Lenin Red Banner Order of Suvorov Academy imeni M. V. Frunze, for consultation and help given in preparing this article for the press.

It is no accident that the article "Combat Will Demand" by Major Ye. Khal'chitskiy aroused great interest among PVO officers of our country. The questions of moral-political and psychological training which it raises are very current. The level of combat readiness and the ability of the chaste and podrazdeleniye of our country's PVO Forces to conduct combat operations under extremely complex conditions with a technically well-equipped, experienced, and treacherous enemy depend on solving these problems.

The next war, if it is unleashed by the imperialists, will in its political essence be the crucial class collision of two opposing social and political systems. This will predetermine the extraordinary heat of the struggle, its uncompromising nature, and determination to achieve the goal. The new methods of armed struggle demand maximum strain on moral and physical forces from personnel, as well as outstanding mastery of combat machinery and weapons and skillful selection and application of tactical procedures and methods of conducting combat operations to achieve victory. The situations which are constantly arising and sharply changing during the progress of a battle will have a great effect on the psyche of personnel. Along with the exhilarating feeling of the will to attack, contempt for the enemy, and a profound understanding of one's military duty, in a complex situation there may be, especially at crucial moments, manifestations of lack of confidence, confusion, temporary shock, and, finally, fear.

M. V. Frunze, speaking of the fact that the use of a new weapon which inflicts physical losses also inflicts enormous psychological damage, stressed that the extent of this psychological damage cannot be calculated and, in some cases, it may exceed the physical damage caused by these weapons of destruction manyfold. This remark by the outstanding Soviet military leader was applicable to the military clashes of the past and it is applicable to the

conditions of nuclear war, which is fraught with extremely critical situations and is characterized by tension and fast movement of combat events.

Soviet military science is guided by Lenin's teaching that the morale of the army and the people is one of the fundamental factors in the overall military potential of a country, and that the readiness of personnel to carry on active and determined combat operations should be universal. Its components are not merely military-technical and physical training, but also, necessarily, moral-political and psychological training. Numerous examples from the Great Patriotic War and the postwar years convince us of this. Under current conditions, developing high morale and fighting qualities in personnel is the most important problem of moral-political, combat, and psychological training.

"As modern weaponry develops and armies are increasingly saturated with a large amount of varied and complex machinery," points out Marshal of the Soviet Union and Minister of Defense A. A. Grechko, "the role of moral-political and psychological training for troops increases and increases, and the requirements made of it rise. This is dictated by the nature of modern war.

"In order to gain victory over a powerful enemy, it is necessary for every Soviet fighting man to represent a mighty fusion of moral-political tempering, military skill, physical endurance, courage, and heroism."* The necessity of constantly developing and improving these qualities is especially evident for troops of the PVO Forces of our country, whose primary mission is to repulse any sudden air attack by an aggressor and ensure continuous operation of the national economy, agencies of state control, and the combat capability of the Armed Forces during military operations. The PVO Forces also perform a combat mission during peacetime; they maintain a combat watch to protect the air frontiers of our homeland and are in constant combat readiness.

High morale and fighting qualities are the result of influence by the total system of moral-political, combat, and psychological training and troop education. However, in some places the emphasis is incorrectly placed on psychological training. Whether intentional or not, certain participants in the discussion of the article "Combat Will Demand" also were attempting to some degree to separate

* A. A. Grechko, Na Strazhe Mira i Stroitel'stva Kommunizma [On Guard over Peace and the Building of Communism], Military Publishing House, 1971, p 68.

and single out psychological training. It is not possible to speak of psychological training as independent. It is inseparably linked with moral-political training and forms one unified process with it.

The basis for developing the qualities necessary in modern combat in soldiers and officers is moral-political training, which arms the fighting men with progressive ideology and a profound understanding of party and government policy and the state interests of our homeland. Conviction in the rightness of our cause establishes a conscious, active attitude toward fulfillment of one's military duty in our soldiers. For this reason, I would like to emphasize the pressing need for all commanders and political agencies to determinedly strive for further improving ideological work among the troops, the core of which is developing a communist worldview among the masses of workers and educating them in the ideas of Marxism-Leninism. This was emphasized by the 24th CPSU Congress.

The forms for this work are well known. Especially valuable experience in ideological educational work was accumulated during preparation for and celebration of the 50th anniversary of Great October and the Soviet Armed Forces, the 25th anniversary of our victory in the Great Patriotic War, the 100th anniversary of the birth of V. I. Lenin, and preparation for the 24th CPSU Congress. The task now is to reinforce and develop this substantial and useful experience, unfold even broader propaganda and study of the materials from the 24th CPSU Congress, and ensure an organic link between them and troop life. No short-run campaign is needed here, but rather a well thought-out system covering all personnel.

The efforts of commanders and political agencies should continue in the future to be directed toward seeing that, during the process of training and education, there are better results in performing the missions of developing in personnel the qualities necessary for achieving victory in modern warfare: courage, bravery, emotional stability, internal readiness for self-sacrifice, steadfastness, self-control, resourcefulness, and so on. Lofty social and psychological qualities, such as feelings of comradeship, collectivism, and proletarian internationalism, should also be cultivated intensively.

It is good that a majority of officers devoted primary attention, in their responses, to the best and most effective ways of accomplishing the missions of psychological training during training periods, exercises, and daily life and training with soldiers and officers of our country's PVO Forces.

The value of the writings by the officers Ye. Khal'chitskiy, I. Kutepov, A. Krotov, V. Sukhodolov, A. Baranov, and others is that they summarize accumulated experience in developing, in fighting men, the high morale and fighting qualities necessary for successful combat operations in modern warfare. This process goes on constantly, during the daily training and life of the servicemen.

From the very beginning of service in the army, the accustomed behavior developed by a person is subjected to fundamental changes. Combat and political training and the entire arrangement of army life, together with the commander's high standards and pedagogical tact as well as his concern for his subordinates, temper the young soldier, make him more resistant to external irritations, discipline him, develop his ability to overcome the hardships of military service, and help him develop will and persistence in achieving military skill.

For example, take a young missile soldier, a member of a launch team. At his first training period or drill, he overcomes certain difficulties, such as timidity in the face of the complex machinery and his new specialization. With the help of the commander and his senior comrades, he masters his functional duties and manages within the assigned standards. His morale and fighting qualities become even more solid when working through subsequent, more difficult problems such as deploying the machinery, marching to the range, and field firing. Here the soldier learns to perform his duties under complex conditions, to overcome physical fatigue, and to maintain a conscious, responsible attitude toward accomplishment of combat missions. During subsequent trips to the range, this soldier will ordinarily operate more skillfully and resourcefully. And in addition to the occupational experience gained, the psychological tempering received during the first firings will also play a significant part.

In addition, it is important to take account of the individual psychological features of the personality. The commander must always remember this and, when setting up combat watch, guard duty, training periods, and drills, envision not merely a member of the combat team, but rather a personality with its special features, in order to correctly influence subordinates and achieve success in the shortest possible time.

However, certain comrades underestimate this approach to matters, mistakenly supposing that everything can be done quickly, by mass-scale measures. In a certain chaste, a questionnaire was given to a group of servicemen. They were asked to respond to one question -- during which training

events are the missions of psychological training accomplished? Some (primarily young officers) answered that psychological training as such takes place primarily at special lectures, as well as in groups for political training periods and Marxist-Leninist training. A second group stated that psychology is for scientists and political workers. Only the third group of soldiers stated confidently that psychological training is an inseparable part of the overall process of personnel training and education. This very thought is clearly seen in a majority of the responses to Major Ye. Khal'chitskiy's article "Combat Will Demand." The authors of these materials emphasize the importance of concrete, purposeful work to develop psychological qualities during combat and political training.

It is clear that with lectures, seminars, and other purely educational measures the problems of psychological training will not be resolved. Of course it is essential for officers to study psychology as a science. And those hours which are given to it according to the officer training plan must be used with maximum efficiency. It is essential here to draw in psychological scholars, pedagogs, and experienced commanders and political workers. The study of psychology helps an officer to grasp the fine points of the psychology of the human personality and makes it possible to set up the process of education and training with due regard for the data of psychological science and more effectively cultivate the qualities necessary for battle in subordinates.

So, assume the fundamentals of psychology have been studied. How then should they be used in practice? Here too a natural answer suggests itself -- only during the process of daily combat training and education of subordinates. How about political training periods? Yes, there too. Examples from the heroic past and present of the PVO Forces, related to the subject of the training period, will unquestionably have an emotional effect on the listeners. This is also essential to develop deep, stable feelings whose influence will be seen in the soldier's behavior during battle, while performing everyday service, when performing the missions of combat watch, and so on. And here it is not simply a matter of telling of the bravery, resourcefulness, initiative, and daring of the soldier. The main thing is to reveal to personnel the very essence of the hero's feat or act and the motives which inspired his behavior or skillful actions.

At the front, commanders and political workers made skillful use of this form of work with personnel not only to popularize heroes and their deeds, but also to disseminate the tactical discoveries and new methods of combatting the

enemy which were born during the fighting, and also examples of military resourcefulness, in order to develop high morale and fighting qualities in personnel. Today too, it is essential for every officer to have fully mastered these pedagogical methods in order to teach using the positive example.

It should always be remembered that officers are dealing primarily with young people. This requires the ability to affect a person emotionally and intellectually, the ability to consider age and special personality features, and so on. Stereotypes, formalism, and naked appeals will not persuade anyone, and sometimes they may even lead to the opposite results.

Skillful aesthetic educating bears fruit in developing high morale and fighting qualities. The strength of art -- literature, painting, music, and the film -- has been known for a long time. Television is widely used for these purposes today, and effective aesthetic education can even be carried on in remote areas.

Modern warfare makes exceptionally great demands as to discipline, because the significance of speed, precision, and timing in performance of combat missions has increased very greatly. For PVO troops, V. I. Lenin's instruction as to the necessity of military discipline raised to its highest limit is especially relevant. The discipline of combat watch, the discipline of radio communication, and the discipline of air battle and target interception are manifestations of this. All these qualities are being cultivated in PVO soldiers today, during peacetime. On the basis of a high degree of ideological conviction, political awareness, and maintaining strict regulation order in every podrazdeleniye. Individual violations of discipline and misbehavior which sometimes take place are explained primarily by poor organizational and ideological-educational work and by the absence of a truly scientific approach to work with the men.

The commander who is constantly striving for strict, precise fulfillment of regulation requirements thereby strengthens military discipline in the podrazdeleniye and helps to cultivate and reinforce many volitional qualities which are essential for battle in his subordinates. In the responses to the article "Combat Will Demand," certain authors will, unfortunately, put little emphasis on this question.

For example, take carrying out assignments, which is closely linked with the level of discipline. It is based on developing in the servicemen an awareness of the necessity of fulfilling the commander's order no matter what. But in battle, and frequently also during peacetime, this involves

overcoming various types of hardships and dangers. But if the soldier is disciplined and possesses sufficiently developed other volitional qualities such as persistence and determination, which are reinforced by his political awareness and conviction in the justice of our cause, this soldier will operate in a collected manner, always evaluate circumstances correctly, use his military knowledge skillfully, fulfill the order even if it involves danger to his life, and demonstrate true heroism. The actions of PVO soldiers during the Great Patriotic War are proof of this.

During the battle of Stalingrad, the name of Senior Lieutenant Mikhail Baranov rang out across the country. Before this battle, he had already shot down 20 enemy planes.

In one of the battles with superior enemy forces, Baranov cut into a combat formation of Messerschmitts and immediately knocked out one of them. Withdrawing upward and again gaining speed, the pilot attacked and set one more on fire. After this, spotting enemy fighter planes attacking our ground attack aircraft, he again went on the attack and won a third victory. By this time his regular ammunition was already expended. But Baranov raced to the attack, struck the Messerschmitt in the tail with his wing, and, to the amazement of all, again began to gain altitude. There was a new enemy before him. At a high altitude, the planes sped to meet one another at enormous speed. A crash, then an explosion, and fragments of debris. The white of a parachute showed above the clouds. It was Mikhail Baranov who, right after an "ordinary" ramming, had rammed his fifth fascist aircraft in one battle head-on.

What a fusion of consciousness of his duty to the homeland, combat skill, courage, and strength of will!

There are many examples of courage and discipline in our day too.

However, it is clear that, with every person coming into the army, discipline, like other qualities and like physical and psychological tempering overall, is not adequately developed to fully carry out military duties. We can even take pilots, whose very occupation assumes the existence of high morale and fighting qualities. Nonetheless, many of them have moments when they run into a kind of psychological barrier. Is this a hopeless situation? No!

The following incident occurred. A squadron was mastering high-altitude flights in a new aircraft. Major I. Zhukov, podrazdeleniye commander, noticed that one of the pilots had become almost open in his fear of exercises

involving high-altitude flight, although previously he had performed all other assignments outstandingly. The squadron commander carefully studied materials from the flight commander and talked with the pilot himself. It turned out that in one of the flights to the practical ceiling, due to a lack of experience piloting the new aircraft, the pilot got into a critical situation. And although the officer corrected the situation, this incident undermined his faith in his powers and in the capabilities of the fighter plane.

The commander talked with the pilot a number of times. He used results from aerodynamics, an analysis of the state of the atmosphere, and charts of the flight and technical specifications of the aircraft to graphically demonstrate to the pilot the causes of his mistake. He proved that the airplane can be controlled well at this altitude. After this test flights were made. The pilot operated confidently. But during independent flight, he again failed to reach the ceiling. The commander understood that, left alone with the new airplane and the stratosphere, the pilot would recall the recent incident and the feeling of dread would arise in him again.

Major Zhukov decided to first work out group flying harmony with his subordinate and, after that, fly together with him in open pair formation to the ceiling. The pilot, sensing and seeing the commander's plane alongside, calmly maintained speed. And soon his former confidence returned to him. He now intercepts targets skillfully at any altitude.

A conclusion suggests itself -- the process of developing morale and fighting qualities is controllable. Furthermore, because it is inseparable from combat and political training which are ordinarily planned in detail and painstakingly organized to achieve greatest efficiency, it is also possible and necessary to plan, organize, control, and guide psychological tempering work. The experienced commander who has a good idea of the importance of psychological tempering and knows the methods of developing it by assigning missions for exercises, flights, firing, drills, and so on, definitely must determine, and then later create, conditions in which personnel will be able to obtain appropriate psychological training. In this, consideration is given to the level of not only specialized training, but also the degree of psychological tempering achieved in previous training periods. Here too, just as in combat training, it would appear that a certain methodological order based on the principle "from the simple to the complex" should be followed. This has been proven; it is shown with many persuasive examples in the articles by comrades A. Kondrat'yev, A. Shaposhnikov, A. Kostyuk, and other participants in the discussion.

This approach is important for at least two considerations. On the one hand, gradually increasing strains along with complicating the missions of combat training eliminates possible breakdowns in the psyche and ensures, for example in aviation, flight safety, while among antiaircraft missile troops it ensures confidence in an accurate launch. On the other hand, constantly, but consistently increasing the number of factors operating on the psyche and raising their complexity develops more stable psychological features.

For example, the following incident took place. The pilots were working on flights with interception at full range. At first the target routes passed over terrain that was relatively convenient for orientation, with an extensive network of ground radio operating equipment and reserve airfields. The pilots fulfilled their flight assignments calmly and with high quality. But then they began flights in another direction, over sparsely settled terrain with few orientation markers and a large sector of the flight over the ocean's surface. There were no disruptions in the technique of flight training here. The majority of pilots continued to fly with the same confidence. But a few became timid in the face of this flight. This was a manifestation of the so-called "psychological stress" -- a functional state of the human psyche which, in this case, is caused not so much by the complexity of the upcoming flight as by waiting for it.

Any human trial begins at the moment when the person learns what he is to do. In the episode being described, the negative influence on the psyche was exerted by such factors as the possibility of losing orientation, the reduced possibilities for a forced landing in comparison with previous flights, and the unfamiliarity of the terrain under the upcoming flight. These feelings manifest themselves primarily in pilots with inadequate experience, but not the youngest, who characteristically underestimate the degree of danger. These pilots had only to fly a lesser distance in this direction and they all began to successfully perform the whole assignment.

This example shows once again the indivisible relationship between combat and psychological training. They are links in a single chain of developing the qualities necessary for battle. Just as weakening any link leads to a reduction in the strength of the whole chain, so shortcomings permitted in work to develop any of the qualities needed by servicemen results in disequilibrium in his training.

As has already been emphasized, party political work plays a crucial part in developing the high moral-political and psychological qualities needed in war. Its basic mission

is to secure influence on every person, help soldiers, sergeants, and officers size up their regular missions more deeply, disseminate progressive experience, and mobilize personnel for active, model combat work. Many commanders, political agencies, and party and Komsomol organizations have learned to structure this work very well at large exercises. The interests of the work require that party political work be carried on just as intensively, aggressively, concretely, continuously, and resourcefully whether it is during combat watch or periodic repair jobs, flights, firing, guard duty, or any training period or drill. Participants in the discussion devoted less attention to this question than it truly deserves.

In addition, there is no doubt that those comrades are correct who, in the responses to the article "Combat Will Demand," emphasize that creating a situation during daily planned training which demands great strain, resourcefulness, initiative, and determination from trainees is an essential requirement in work to develop high morale and fighting qualities in PVO troops. This is necessary because extremely critical situations may arise in modern warfare which require a person to overcome enormous difficulties.

It can be understood that during peacetime training it is not possible to completely create such conditions, but it is possible and necessary to maximally approximate them to the situation of modern combat.

In the country's PVO Forces, which are standing combat watch, carry on detection and tracking of real targets, and perform field training fire and intercepts, conditions are most favorable for training personnel with maximum exertion. As the readers correctly stress, carrying out this mission assumes a determined campaign against indulgences and simplification. The commander who is operating correctly will knowledgeably assign concrete tasks in training battle so that every serviceman is able to maximally raise his combat skill and psychological tempering and, in actual battle, manifest these qualities most fully and achieve the greatest success. Comrades A. Garavskiy, V. Korkin, and other authors rightly note the significance of well thought-out inputs to create a dynamic and complex situation at exercises, drills, and training periods, with due regard for the expected actions and tactical tricks of the probable enemy. The know-how of these podrazdeleniye deserves support and dissemination.

One important means for mobilizing troops to fulfill the missions placed before PVO Forces of the country in a model fashion is socialist competition. In the current

stage, its significance is increasing. It is essential in the future to continue to improve the organization and management of socialist competition and expand its sphere of influence on raising combat readiness, developing ideological conviction and high morale and fighting qualities in personnel, on model performance of combat watch, strengthening discipline, and solidifying military collectives.

The example of leading chast and podrazdeleniye shows persuasively that socialist competition, especially by missions and norms and contests among specialists, serves as a powerful stimulus to manifest persistence, initiative, and goal-directedness. Unfortunately, during the discussion of the article "Combat Will Demand," these matters were poorly dealt with. It would seem that certain podrazdeleniye should draw the appropriate conclusions, make corrections, and strive to see that competition actually becomes an inseparable part of the entire process of combat and political training. In this, the role of commanders and political agencies and the responsibility of headquarters should be raised.

The question of the psychological compatibility of members of a crew, squad, or combat team, which was raised by officers N. Zhukov, V. Sal'nikov, and other readers, deserves attention. But certain writings came out one-sided because, while speaking of the development of morale and fighting qualities, the authors seemed to forget that the military collective represents a multitude of human personalities, among which there are people with a predominance of negative traits. In order to successfully carry on education and influence the men, it is first of all necessary to know them well -- their personalities, inclinations, and capabilities. And this is even more important because the basic method of education is, as we know, the individual method. As is noted by N. Kostyuchenko, A. Baranov, and other responding writers, a great deal depends on the officer's pedagogical skill. It is precisely a knowledge of each person that makes it possible for the commander to structure work in educating and training servicemen differentially. On the basis of a knowledge of the individual qualities of his subordinates, the officer-teacher will have a better notion of the psychology of the military collective as a whole. His skillful employment of the influence of the collective on the individual also plays a major part in the process of daily training and education.

This is especially important for the PVO Forces officer. PVO soldiers are, with full justification, called the first line fighters. They are the first to detect the enemy, and enter battle first. They have collectively operated weapons, but the results of their combat activity depend on the skill, spiritual effort, and discipline of

every specialist and on working harmony in all elements of the military collective. The crew, and sometimes the entire podrazdeleniye, will not fulfill its combat mission if even one radar operator or intercept controller goes too slow or too fast, makes a mistake, or loses control of his actions. And the "mood" of those who work at the control panel, at the display unit screens, in the cockpit of an airplane, in the equipment room of a communications unit, or behind the wheel of a motor vehicle is by no means unimportant; they cannot falter at a difficult moment in the battle.

And this is the place to stress the crucial role of the officer. He cannot be a purely military specialist, no matter what position he occupies. In any case, the officer is a pedagog and teacher, and the first person responsible for the combat readiness of a podrazdeleniye or chast. It is clear that in order to correctly structure the training and education process, officers should be equally well trained in the political and military-technical areas, have solid knowledge of pedagogy and psychology, and be demanding, strong-willed leaders. Engineer-Major A. Semenchenko, a participant in the discussion, correctly noted that subordinates will follow such a commander into fire or water.

In one of his appearances during the Great Patriotic War, M. I. Kalinin pointed out that it would be naive to think that a steadfast attitude can be generated by words alone, no matter how correct and good they may be. He emphasized then that only active combat operations, when fighting men have become trained to engage and defeat the enemy, when men are constantly being tested in danger, can generate steadfastness.

Let us note in passing that elements of risk and complex situations which demand self-control, instantaneous reaction, and a high degree of skill from personnel are not created only in war. Take, just for example, landing airplanes by the emergency method, shifting position on an exercise, detecting and tracking a small-sized, maneuvering, high-speed target at maximum altitude, radio communication with intensive interference, and so on. Every time we analyze such skillful actions, we are persuaded that every such military success is based on will, diligence, pedagogical skill, and the personal example of commanders.

The great significance which attaches to teaching teachers also follows from this. It should be remembered that young commanders are constantly moving in to lead podrazdeleniye and chast. They have excellent knowledge, but not always enough experience. They need concrete aid

and monitoring, but by no means minute guardianship. They need a thorough analysis of their actions, but not a rough "dressing-down." Their training for guiding combat operations under the complex conditions of modern warfare should begin now, by assigning them to participate in drills and exercises at a level above their occupied position, and enlisting them as umpires on exercises and participants in developing drill plans.

Unfortunately, the authors who participated in the discussion devoted little attention to psychological training of the commanders themselves. But then, if we take just combat control, there are many important psychological aspects to it. This is a result of the fact that in combat control, even where headquarters and control points are very saturated with modern equipment, everything is done by people and through people.

On the psychological level, the actions of the commander in battle and of all who participate in combat control should be viewed as a continuous process of learning whose basic elements are receiving information, processing it, and accomplishing the mission. If it is considered that this complex activity takes place under conditions where the enemy uses weapons of mass destruction and radio-electronic combat, it is clear that the productivity of this work depends on the person's control, temperament, personality, capabilities, emotional stability, and his psychological state, which are manifested in military skill, discipline, and a desire to fulfill the combat mission as quickly as possible in model fashion.

In conclusion, let us remark that the discussion on the pages of the magazine Vestnik Protivovozdushnoy Oborony (Antiaircraft Defense Herald) has been of definite use. I feel that the editors would be correct if, during the coming year, they were to offer room for materials which solve concrete questions of developing morale and fighting qualities which ensure successful operations by PVO troops in modern battle.

ON RESULTS OF MISSILE FIRING COMPETITION

In the missile firing competition held by the editors of Vestnik Protivovozdushnoy Oborony (Antiaircraft Defense Herald) in 1971, the best results in solving problems were achieved by officers Yu. B. Mal'kov, A. A. Shokolovskiy, N. S. Chernyshev, V. K. Fedorov, V. M. Osmolovskiy, G. P. Tokunov, A. G. Zazulin, S. P. Isyk, and others.

A majority of these participants in the competition demonstrated the highest knowledge of firing theory and practice. But at the same time, it should be noted that certain missile officers who decided to participate in the competition did not show the necessary persistence. Having performed the first problems of the competition well, they decided not to solve subsequent ones and, naturally, withdrew from further participation in the competition.

The editors of Vestnik Protivovozdushnoy Oborony and the contest jury thank all active participants in the competition and wish them further successes in improving missile firing training and successfully accomplishing the missions facing them during the new training year.

We give below the answers to the last three problems of the competition.

Problem No 16. The aircraft which is laying down active interference will be observed on the radar display unit screen at a distance of 13.8 kilometers.

Problem No 17. The mathematical expectation as to number of targets destroyed during the attack is 8.8 targets.

Problem No 18. The minimum required value for homing range to the rear border of the hit zone is 18 kilometers.

RESPONSIBILITY OF THE FLIGHT SUPERVISOR

by Engr Col V. Malanichev and Col V. Golyas, Military Pilot
First Class

It is difficult to overestimate the significance of the flight supervisor [officer in charge of flights] in the organization and conduct of flight training. Fulfillment of the plan schedule, which also means improving the combat skill of flight and engineering personnel, depends exactly on the level of supervision of aviator work during the flight shift. There is a direct relationship between the quality of flight supervision and ensuring their safety.

Such factors as the participation of a large number of aircraft which are, in addition, outstanding in their characteristics, in the flights, supplying them with various types of air tractor and special equipment serviced by soldiers of many specializations, and the fact that pilots frequently carry out flight training missions in unfavorable weather conditions demand exceptionally precise and highly skilled supervision of flights, which means special skill from the officer who is carrying out these missions.

The flight supervisor, in his work to organize the movement of aircraft on the ground and in the air and directing the actions of air force maintenance and support chas and podrazdeleniya and control points, is the first one to enforce the rules which regulate flight work. He must know the rules for operating the aircraft and safety measures, the flight region, and the level of training of the pilots participating in the flight shift. And he cannot get by without the ability to clearly see and correctly analyze the air and meteorological situation. It is also evident that he should possess the ability to adopt a correct plan and carry it out under the most unexpected conditions.

It goes without saying that the flight supervisor must have not only a high level of occupational training (experience in flying and methodological work, knowledge of air force machinery, flying, aerodynamics, and so on), but also individual qualities such as a tempered will, composure, determination, a strong memory, and physical endurance. Unfortunately, there are cases where commanders forget this when assigning and preparing an officer for flight supervision work. And then it turns out that the flight supervisor -- an outstanding pilot and skillful methodologist who possesses good theoretical training and has lengthy time in service -- becomes lost when a complex situation arises while he is supervising flights independently, and he makes incorrect decisions.

One time an emergency situation was created in the air. The flight supervisor needed a cool evaluation of the situation and calm in delivering commands to the pilot. Officer V. Ryabov, who was at the flight supervisor panel, sent a continuous stream of wordy commands over the air which the pilot could not even have carried out consistently under normal conditions.

A very important quality for the flight supervisor is his ability, at any moment, to use data available at the flight command post on the location of the aircraft to recreate the air situation in space through the force of his imagination and "see" every crew and establish its actions. This is particularly essential and, at the same time, difficult to do with a large number of aircraft in the air. It is essential to constantly employ special drills to develop the operational memory, imagination, and ability to model the air situation in mind of those officers being permitted to supervise flights.

Observations and research that have been conducted demonstrate that officers who are supervising flights experience great psychological and physical tension. For example, when 8-10 airplanes are in the air the pulse increases by 10-30 beats a minute and arterial pressure (maximum) increases by 10-20 millimeters. This indicates that, in addition to special training for flight supervision (independent study of documents, the plan schedule, content of exercises, and drills individually and with the SKP [flight command post] detachment), it is essential to provide the officer with normal rest and maintain a check on his state of health. However, there have been cases when a doctor has removed an officer from flights as a pilot, and the commander has assigned him to supervise the flight shift. Naturally, disease sharply decreases a person's work capability and the quality of supervision, which is detrimental to flight safety.

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Aircraft technician Officer Mikhail Iosifovich Alekseychik is a specialist first class. He mastered aviation machinery that was new to him in an extremely short time and now operates it in a high quality manner. In the picture, Captain Technical Services M. Alekseychik inspecting the front support of an aircraft landing gear.

(Photograph -- K. Subbotko)



The quality of flight supervision depends greatly on preliminary preparation of the supervisor and the entire SKP detachment. It is a correct practice for commanders to personally conduct a compulsory drill for the flight supervisor's detachment using SKP equipment and a special classroom, not relying on the experience of the officer assigned to supervise the flight shift. At such training periods, special attention is devoted to working through the actions of the detachment and supervisor when special cases arise. It is advisable to conduct the drill on the basis of an actual plan schedule with a statement of inputs on supervising the actions of concrete flight crews.

During preliminary preparation, it is compulsory to work through the problems of interaction among the detachments of the SKP, command post, and radio communications post in controlling the aircraft both in the flight region and the airfield region. This makes it possible to avoid cases of incorrectly passing on control, eliminates the possibility of uncontrolled flight, and therefore increases safety.

It is very important that the officer assigned to supervise flights, as well as the entire SKP detachment, vicariously experience, so to speak, the situation of the future flights from the time that the commander states the mission. They must also develop a psychological setting for intensive and responsible work. With the detachment there should be a review of typical preconditions to accidents which have been permitted earlier due to flaws in flight supervision, and they should be shown what mistakes by any serviceman at the SKP can lead to. This fosters a rise in personal responsibility.

During preparation the flight supervisor must make a good and thorough study of the particular features of the upcoming flight shift and the meteorological and air situations. He must have outstanding knowledge of his own airfield and of flight conditions in its area. It is necessary to take account of the relief of the terrain and obstacles in the approach belt. It is necessary to be especially careful in supervising flights at an airfield which lies close to the air routes or corridors of large airports.

One of the main conditions which directly influences flight safety in the airfield region is a good knowledge of the air situation and constant observation of it, analysis, and evaluation. Otherwise incorrect and erroneous actions by the flight supervisor are inevitable and it is possible that airplanes will come dangerously close to the airfield on the circle, during the glide after the fourth bank, and even on the runway after landing.

An accident precondition of this type is easy to avoid if the flight supervisor has a clear idea of the air situation. When allowing entry into the circle it is necessary to indicate both the altitude of entry and the place, while the crew must report the altitude and course of approach to the airfield.

Serious mistakes are frequently made by flight supervisors who are distracted from performance of their duties. Let us suppose that a pilot was flying at night under difficult conditions and became distracted from piloting by instruments for a certain time. When he again switches his glance to the cockpit, he is not able to immediately restore his previous rhythm in distributing attention, especially if flight conditions have considerably changed. A loss of spatial orientation follows. Something similar to this also happens in flight supervision. Therefore, every flight supervisor, no matter how experienced he may be, must always remember that becoming distracted from observation of the situation leads of a sharp decrease in flight safety.

It must be noted here that sometimes there are a large number of outsiders at the SKP. They are not involved with flight supervision, and begin all kinds of conversations which distract the flight supervisor. He himself is obligated to firmly stop this violation and remove everyone from the SKP except the flight detail.

There are cases when crew safety depends on a few seconds. The slightest delay by the flight supervisor in adopting a plan to help the pilot and putting it into action may lead to an uncorrectable situation. The reason that the officer performing flight supervisor duties at the SKP should

always have a clear view of the situation and constantly analyze it is precisely so that any special situation, which ordinarily arises suddenly, will not be unexpected or lead to confusion.

This is even more important because the crew cannot always give the flight supervisor the required information. In such a case, the flight supervisor himself must immediately recreate a picture of what has happened using other data which he has available on the situation.

In order to establish favorable conditions for helping a pilot in special cases, other crews, on instructions from the flight supervisor, temporarily decrease their time on the air to a minimum. Depending on the situation which has taken shape in the air and the pilot's level of training, the flight supervisor briefly recalls the correct decision and orders the pilot to consistently carry out all his commands. In the latter case, the flight supervisor reminds the pilot of correct flight conditions and all the actions which he must perform.

There are, unfortunately, those flight supervisors who permit negligence, carelessness, and overconfidence in supervising flights. Other comrades flaunt their experience and feel that they have mastered everything and know everything. It is very important for the commander to notice such symptoms in time and not let elements of carelessness, negligence, or complacency develop and grow strong.

Accident preconditions frequently arise due to mistakes in the flight supervisor's assessment of the meteorological situation or his incorrect actions when the weather grows sharply worse. This happens because certain officers underestimate the effect of the weather factor on flight safety, do not study special climatic features of their region, do not monitor weather conditions during the process of flights, are not able to analyze the state of weather during reconnaissance before flights, and do not take account of the level of training of pilots participating in the flights. It is particularly important to assess the meteorological situation in areas with unstable weather and during the fall and winter when weather may change sharply even during a brief takeoff period.

Under these conditions, it is essential to carefully analyze synoptic and aerological maps before the start of the flights in order to select the correct reconnaissance route and section. The fact that radio equipment for detecting storm centers, regions of strong cumulus clouds, and snowfall zones are not used adequately or at the correct time in some places cannot be tolerated.

Sometimes when the weather in the airfield region is simple and the forecast calls for no changes, certain flight supervisors are negligent in maintaining air surveillance of the weather. The following case may serve as an example. In the airfield region during the summer, it is cloudless at sunrise. According to the weather reconnaissance man's report, meteorological conditions are also simple throughout the entire region. Flights begin, and suddenly the airfield is covered with low clouds. Where do they come from? It is fog which formed during the night in valleys and above rivers, lakes, and forest clearings and then, after sunrise, lifted up and became a thin strata of clouds. If airplanes are already in the air by this time, a very complex situation may develop. But where there is intelligent weather reconnaissance, such a phenomenon can be detected. It is sufficient to carefully check the places adjacent to the airfield where fog may form.

In order to ensure flight safety in a meteorological sense, however, good weather reconnaissance alone is not enough. It is essential to constantly monitor changes in it and collect information on actual conditions along the flight routes and at alternative airfields. The absence of such data may have dangerous consequences.

One also encounters flight supervisors who, attaching no significance to reports by duty meteorologists that the weather is expected to change for the worse, do not stop flights. There have even been cases where storm warnings were neglected. For example, during night flights in one of the chas, the duty meteorologist pointed out to the flight supervisor that the humidity indicator was approaching the critical point. However, the officer paid no attention to this. Then the duty meteorologist wrote out a storm warning. But even after this the flight supervisor released another plane with the side mission of checking the forecast correctness. The crew did not discover fog, and the plane went off on its assignment. But 20 minutes later, the airfield began to be covered by fog. The plane managed to land safely at literally the last minute.

Sometimes unsound decisions are made with a correct assessment that the weather will sharply change for the worse. This also leads to accident preconditions. Flight supervisors usually attempt to land planes at their own airfields even when landing conditions are plainly inappropriate to the pilot's training level at the same time as weather conditions are stable at an alternative airfield.

One of the reasons that such incorrect decisions are made is that certain commanders (and flight supervisors) erroneously feel that landing at one's own airfield is simpler than at an alternative airfield (at home, as they

say, even the walls will help). This point of view is not only incorrect, it is dangerous. No one will deny that pilots at their own airfield know all the orientation markers according to which they can structure or correct their approach for landing. But this is good for visual flight only. Under conditions of low clouds and low visibility, pilots landing at their own airfield may begin to search for these "familiar" orientation markers instead of piloting the aircraft by instruments and even lose track of flight conditions on the instruments. Therefore, in all cases where landing conditions are not appropriate to pilots' level of training and there is adequate fuel, the flight supervisor should decide to land aircraft at the alternative airfield.

In order to avoid mistakes in evaluating the meteorological situation and to avoid having changes in the weather catch the flight supervisor unaware, it is essential for the commanders of air force chas to devote attention to constantly improving flight supervisors' knowledge in the area of aviation meteorology and methods of conducting initial and final weather reconnaissance.

Precise control of aircraft and, therefore, flight safety depend greatly on the ability of the flight supervisor to carry on correct radio communications with the crews and detachments of the command post and radio operating post. He should always know the channel on which a particular crew is operating, where it is located, and what it is doing.

The basic mission of radio communications is to control crews precisely and take up as little of the air as possible. Before entering radio communication, the flight supervisor should, just as pilots should, listen in order to avoid the simultaneous appearance of several radio stations.

The flight supervisor should also direct attention to seeing that the pilot's index is always named when transmitting permission and prohibition commands. If this rule is violated, the command may be taken and carried out by another pilot.

It is essential to broadcast commands without using the negative particle "ne." The particle "ne" may be "forgotten" or, if the microphone button is pushed late, may not reach the air. The pilot will receive it as permission. It is especially dangerous to transmit such commands to young pilots.

When controlling groups, particular precision in radio communication is needed. If, let us suppose, a pair of airplanes were taxiing on the runway, the flight supervisor would give a command to each crew, for example, "751 -- take off," or 751-752 -- take off as a pair." After they come together and til they break up radio communication is ordinarily carried on only with the lead plane, but after they break up it must be done with each crew.

When controlling an aircraft on the landing course up to the landing itself, especially under complex conditions, the flight supervisor should avoid wordiness and excess commands which distract the pilot from controlling the aircraft by instruments. After the aircraft flies over the close-in homing radio station, the flight supervisor should not enter communication with other crews (except for special cases).

When carrying on radio communications, it is very important for the flight supervisor to take account of voice intonation. A calm, but precise tone in a command instills confidence in the pilot even in the most difficult situations, and forces him to operate in a more collected manner. And on the other hand, if the flight supervisor is nervous himself and transmits this state by the tone of his voice, he has a demoralizing influence on the pilot.

It is not accident that we have dwelt on this apparently insignificant question in the complex range of factors involved in supervising flights. Experience demonstrates that underestimating any element in preparing an officer who is to be entrusted with flight supervision leads to accident preconditions and other undesirable phenomena in flight work.

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Officer Vladislav Solomokhin is rightly considered one of the best technicians in the squadron. The fighter which he services is always in combat-ready condition. The officer passes on his great skill to his subordinates. In the photograph, Senior Technician-Lieutenant V. Solomokhin (on the right) instructs Private S. Shchuk, a mechanic.
(Photograph -- K. Subbotko)

STRUGGLING TO ACHIEVE SKILL

by Lt Col V. Belous

Noteworthy successes in combat improvement and raising the level of combat readiness have been achieved by personnel of the N chast. There the troop training level has been greatly raised, equipment is in model condition, and periods required to bring it to combat readiness have been considerably reduced. And all this has been achieved thanks to the stubborn work of all personnel in mastering the equipment. The party and Komsomol organizations have played a special part in the struggle to achieve technical knowledge.

In this chast it has become a tradition to single out technical training from the entire range of disciplines studied by soldiers, sergeants, and officers. Technical training is constantly monitored by commanders and party and Komsomol organizations. Questions of improving the organization and raising the quality of technical training periods are regularly discussed at party and Komsomol meetings, gatherings and seminars of commanders, political workers, and party and Komsomol activists. The commander, staff, and political department work persistently to see that every hour of planned training is employed with maximum effectiveness. A great deal is done for this purpose to continuously improve the methodological skill of training period leaders and deepen their knowledge. A strict check is maintained on personnel attendance at training periods. Socialist competition is set up in the podrazdeleniye for the best results of each training hour and day. Let us tell in more detail about the actual work done in the chast to improve technical training.

Concerned to raise the technical training level of personnel, the political agency held a meeting on the subject of measures to improve military-technical training

of personnel. Podrazdeleniye deputy commanders in charge of political affairs, staff officers, and the best commanders of podrazdeleniye, launchers, and teams participated actively in the discussion of this topic. They offered a number of useful suggestions. For example, Major V. Shevchenko, podrazdeleniye deputy commander for political affairs, told of practical work to improve technical propaganda. In his podrazdeleniye, regular reviews are held of periodical publications on military-technical subjects. The best-trained officers are assigned to conduct them.

Major A. Bodrov shared his experience in preparing for and conducting technical conferences and evening meetings. Staff officer Major I. Siver dwelt in detail on the work of technical circles. Two operators, PFC P. Budulay and PFC G. Kalinovskiy, both specialists first class, told of their experience in studying functional circuits, and also made concrete suggestions for helping young soldiers in technical training.

The meeting helped communist leaders and party organizations to develop and carry out measures which assisted in improving the organization of technical training periods and activating military-technical propaganda.

The attention of officers and sergeants was primarily directed to the necessity of studying general theoretical questions in electrical and radio engineering with personnel, and also to skillful employment of moving models and diagrams to better clarify the physical processes taking place in the blocks of combat equipment. On the recommendation of the political department and with checking by it, the work plan of the military-technical section of the report group was revised. Its activity was planned by periods of training in such a way as to give each category of specialists those lectures which would expand their technical perspective and help them more thoroughly understand things in their study of concrete circuits and assemblies. In order to raise the quality of lectures, preliminary discussion and review of them has been set up. The most experienced and intelligent specialists have been enlisted for military-technical propaganda. They link every speech or article closely to concrete missions.

Commanders, political workers, and party and Komsomol organizations carry on a persistent struggle to have every communist and Komsomol member set an example for mastery of the equipment. In particular, the primary organizations recently discussed the tasks of communists in improving technical and specialized personnel training in relation to upcoming field firing. The meetings showed a high level of activism among members and candidates for party members.

ship. Concrete decisions were adopted which are intended to further expand and deepen soldiers' technical knowledge and to eliminate defects and elements of simplification and indulgence in combat training.

For example, in the primary party organization where Senior Lieutenant V. Yanchenko is secretary, Officer N. Logvin, podrazdeleniye commander, gave a report entitled "On the Missions of the Party Organization to Improve the Technical Training of Personnel and Conduct Periodic Maintenance Work in a High Quality Manner."

During the discussion of the report, communists criticized the work of the technical circles and pointed out shortcomings in military-technical propaganda and in disseminating progressive know-how. The communists' remarks were taken into account. They have begun to hold training periods in the circles on a regular basis. Their program also encompasses regular tasks of combat training and the requirements made of rated specialists. The well-organized work of the technical circles has proved a great help to soldiers in training and passing examinations for ratings.

Due to the shortened term of service, it becomes particularly urgent for young soldiers to master their functional duties and work procedures on combat equipment rapidly. Considering this, party and Komsomol organizations plan and conduct special programs for young soldiers which are intended to instill in them a love for the equipment on which they will work, and also to develop their desire to thoroughly study it in a short period of time.

In the hall of military glory, meetings are held with veterans, soldiers with outstanding ratings in combat and political training, and masters of military occupations. The combat actions of podrazdeleniye are demonstrated to the newcomers with moving models. Here too they display fragments of target shot down by personnel of the chast in field firing. Visits to leading podrazdeleniye are set up, and there young soldiers observe combat work right on the equipment and listen to talks by old-time soldiers, who tell them their own experience in mastering combat specializations.

The system whereby old-time soldiers give practical help to young ones in studying the equipment has become a firmly accepted practice. This work is also looked after by party and Komsomol organizations. For example, the bureau of the Komsomol organization where Private Yu. Filippov is secretary discussed the question of bureau

work in giving practical help to young replacements in their study of combat equipment and their functional duties. At a decision of the bureau, experienced specialists helped young soldiers understand the most complex technical questions.

The young soldiers will remember for a long time the evening that they met with outstanding soldiers and masters of military affairs, where Sergeant V. Movchan told how he became a highly rated specialist and PFC Budulay related his experience in carrying on periodic maintenance work.

Members of the Komsomol bureau, jointly with sergeants of the podrazdeleniye, explained the organizational principle of socialist competition in the Soviet Army to the young soldiers and helped them to establish their obligations and actively enlist in the struggle to fulfill them. This helped the young soldiers master their duties in combat training in a short time.

In their daily activity, the command, political department, and party and Komsomol organizations of the chast devote constant attention to training soldiers in the leading specializations. Success in performance of combat missions depends primarily on them. The established practice of competing for best specialist and best team has been a great help in this. According to conditions of the competition, soldiers first compete among themselves in the podrazdeleniye (operators, launchers, and teams), and then the winners are included in the battle for the title of best specialist and best team on a chast scale.

Exchange of know-how in studying and operating combat equipment among the best specialists and masters with combat qualifications plays a large part in training troops in the leading specializations. For example, in the podrazdeleniye where Officer N. Logvin is commander, a leading know-how stand is constantly operating. Senior Lieutenant V. Vanchenko, a specialist first class, Private F. Fechenkin, a specialist second class, Sergeant Ye. Girko, who received an outstanding training rating, and many others have spoken to personnel of their work.

Propagandizing leading know-how is not limited merely to speeches by the best specialists and soldiers with outstanding training ratings, while newspapers, operational news sheets, and graphic forms of agitation also tell about them.

In this respect, a practical demonstration of actions by the best specialists and teams is particularly valuable.

For example, here is how a demonstration of combat work by the team led by Sergeant Girko was done. At first the battery commander Captain M. Shtemilyuk reminded the soldiers of the importance of coordinated, precise work by a launcher team during fulfillment of combat standards, and then suggested that the soldiers carefully follow the actions of each member and compare them with their own.

The team demonstrated its skill in performing a number of combat work standards. Battery personnel were given an opportunity to talk with team members and express their comments. In conclusion, Sergeant Girko talked about the organization of combat training and drills.

The party and Komsomol organizations make skillful use of technical evening gatherings, quizzes, and technical "battles" to improve troop technical training. For example, these steps are done in a very interesting and educational manner in the podrazdeleniye commanded by Officer I. Sizonenko. There one of the "battles" was conducted under the slogan "Who Knows the Combat Equipment Best?"

There were 20 questions in the "battle," and a certain number of points were given for each correct answer. After a sharp and interesting struggle, first place was taken by the team of Sergeant V. Demchuk, and the winners in the individual test were PFC N. Sergachov, Private E. Peshko, and PFC A. Yefimenko, who demonstrated a profound knowledge of the layout and operation of the equipment.

Technical conferences are of great importance for propagandizing technical knowledge and instilling in personnel an interest in searching for more effective methods and procedures of using equipment and weapons in combat. In this unit they are usually conducted once every two or three months. A great deal of preparatory work precedes the conferences. Officers and soldiers in the leading specializations familiarize themselves with the conference questions and recommended reading list in advance.

During this time, engineers and technicians give lectures and hold discussions with personnel on possible paths to technical solutions of particular problems. An interesting and meaningful military-technical conference was held, for example, with officers on the topic "Basic Parameters of Combat Equipment which Determine Combat Readiness, Reasons to Look after Tolerance, and Steps to Maintain Tolerances Within Necessary Limits."

A thorough review of the conference questions helped young officers and soldiers in the leading specializations to develop a deeper understanding of the essence of the

processes taking place in the equipment when it is being adjusted and to make practical use of new recommendations on checking the functioning of individual blocks, assemblies, and aggregates. It helped personnel to service the combat equipment more intelligently and to define and eliminate disorders which arise with greater confidence.

Technical information sessions are one of the forms of propagandizing technical knowledge. The best-trained officers are involved in conducting them. They familiarize personnel with the achievements of Soviet science and technology and give reviews of the military journals. The topics of information sessions also provide for acquainting soldiers with the weapons and technical equipment of the armies of the states which make up the aggressive imperialist blocs.

Once a month in all podrazdeleniye, technical bulletins are issued which are a great help in ensuring intelligent operation of the combat equipment. A broad range of activists from among the soldiers, sergeants, and officers participate actively in preparing the bulletins. They prepare materials on the operation of the most complex circuits and tubes, notices about innovations in radio electronic engineering, recommended reading lists for independent study, original problems in electrical and radio engineering, and so on for publication.

While showing constant concern for improving the quality of the training process and military-technical propaganda, party and Komsomol organizations at the same time devote a great deal of attention to working to raise the personal responsibility of communists and Komsomol members for independent military-technical training. The party bureau and bureau of the Komsomol have organized effective checks on fulfillment of independent study plans.

It is typical here that party and Komsomol organizations are not only demanding high standards of communist and Komsomol members, they are also attempting to give them practical help. For example, communist Major A. Ul'yanov, in fulfilling a party assignment, not only discovered that Lieutenants O. Savchenko and I. Makarenko have serious gaps in technical training, he also helped them make up what they had missed in a short time.

In the podrazdeleniye commanded by Officer Sizonenko, checks on independent study by officers and increasing their technical knowledge have been carried on in a somewhat different form. There discussions are held with each officer each quarter on the subjects studied, and their

outlines are inspected. Results of study are regularly discussed at party meetings or gatherings of communists.

At its meetings, the Komsomol bureau hears reports by individual Komsomol members and by aides to the directors of technical circles on their work. The Komsomol organizations devote a great deal of attention to propagandizing leading know-how from the best specialists among the soldiers and sergeants. Socialist competition among Komsomol members goes on under the slogan "Profound Technical Knowledge For Every Komsomol Member!"

A great deal more is also being done in the chast. And all this multifaceted and continuous work by the commander, staff, political department, and party and Komsomol organizations of the podrazdeleniye is precisely what makes it possible to raise technical training for all categories of personnel, put combat readiness on a new, higher level, and successfully carry out the missions facing the chast.

EQUIPMENT OBEYS THOSE WHO ARE SKILLFUL

by Maj Gen Intend Serv L. Leonov

Results of Discussion of the Article "Teaching the Operator to Seek Out and Eliminate Trouble"

In No 5 of this journal for 1971, an article by Engineer-Major A. Golubyov entitled "Teaching Operators to Seek Out and Eliminate Trouble" was published. In it a number of questions were raised concerning the organization of and methods for teaching operators the most efficient procedures in seeking the causes of trouble and eliminating them.

The editors have received a large number of letters and responses to this article. They all show that the author touched on pressing problems which concern many officers who are engaged in the daily work of training and educating operators. As we know, skilled operators in radar station teams are the direct aides to technicians, and in case of necessity are called on to replace them and ensure correct maintenance of the apparatus and equipment. Therefore, developing the operators' practical skills in detecting and eliminating trouble is one of the very important problems.

The ability to define the nature of trouble, rapidly discover the causes of it, and reliably eliminate them is achieved during the process of operating the particular equipment. Those who have an outstanding knowledge of the equipment and analyze its operation and behavior in a thoughtful, profound manner attain the necessary habits. Therefore, it is completely correct of Officer Yu. Shmeker to note that, in teaching operators to seek out and eliminate trouble, it is essential to begin from the actual terms of service of our soldiers and the amount of that time which is allocated by the course of combat training or the curriculum to theoretical

and practical study of this topic. It is also necessary to take account of individual, general, and technical training for operators and their potential capacities. Relying on these initial data, in our opinion it is possible to establish several basic organizational and methodological principles for teaching operators to restore the combat readiness of equipment among the troops regardless of the concrete type of equipment.

Success in training operators overall depends on many conditions, first of all on resolving a very important organizational question -- selecting young soldiers for operator positions. Experience convinces us that during their selection a maximum correspondence should be achieved between the difficulty of the apparatus and the young soldiers' level of general and technical training. That is why it is essential, at the very start of service, to carefully study the individual qualities of each young soldier so that his assignment to a position will be based on a sound system.

The authors of replying articles agree on a number of points advanced by Engineer-Major Golubyov as to the most effective methods of teaching operators. In addition, they contributed a number of useful suggestions and recommendations. But no one doubts that the foundation and stable basis for attaining and reinforcing solid, conscious habits in detecting and eliminating trouble is a mastery of the principles of electrical and radio engineering, an outstanding knowledge of the equipment being serviced with its layout and working principles, and the ability to perform the essential periodic servicing work on it as part of functional duties. This also assumes a good knowledge of control and measuring instrument and rules for employing them. Officers K. Vorontsov and N. Cherednichenko are completely correct to emphasize that operators must be taught the ability to check the incoming and outgoing signals of the equipment being serviced and autonomously monitor the racks and blocks assigned to them. Without a knowledge of control and measuring equipment and habits in using it, no operator will be able to establish the causes of abnormality in the operation of radio electronic equipment.

In their responses, military engineers V. Grishunin, E. Belyy, and others recall the necessity of carefully studying the rules of equipment safety with the soldiers. Mastery of the equipment being serviced should actually begin with a study of these rules. Subsequently, during the operators' entire term of service, their knowledge of these rules should be regularly checked in accordance with times established by the appropriate documents. It is necessary, as Engineer-Lieutenant Colonel V. Grishunin notes, to remind

operators of these rules before work on the equipment and, especially, before seeking out and eliminating trouble, when it is necessary to uncover individual blocks and units of the working equipment to inspect, check, and measure.

Senior Sergeant Extended Service Aleksandr Shaban has achieved outstanding indicators in training. A specialist first class, he performs all periodic servicing work in a high quality manner. In the photograph, Senior Sergeant A. Shaban checks the equipment.

(Photograph -- K. Subbotko)

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The necessary volume of knowledge (including knowledge of functional and basic circuits) is established for operators by the corresponding courses of combat training and curricula, as well as statutes which define the requirements for specialists to attain ratings. At the present time, the technique for progressively assimilating and reinforcing this knowledge has been well-developed and is being successfully applied in practice. It is now necessary to work together on the basis of available experience to clarify one question -- when and how should operators be taught to detect and eliminate trouble, because this question still has not been worked out adequately from a methodological point of view, which is confirmed by the course of the discussion about Engineer-Major Golubyov's article.

The pace of service in podrazdeleniye of our country's PVO Forces, which are standing combat watch, requires that young soldiers enter the ranks after a comparatively short time, able to independently service and work on the equipment. For this reason, the rigid division of the process of training young soldiers into stages, which Officer Golubyov writes about in his article, can hardly be considered acceptable. Engineer-Major Golubyov suggests that training periods one or two hours long be held with operators for each type of trouble being studied. This recommendation is most

appropriate to educational institutions (secondary military schools and schools for junior specialists), which are not involved with standing combat watch. Therefore, the officers V. Anan'yevskiy, K. Vorontsov, and N. Cherednichenko are correct when they state, on the basis of personal experience, that under real troop conditions it is necessary to permit operators to independently service systems before they have fully and thoroughly studied the basic circuits of the blocks and units of the equipment being serviced. The young soldier's "encounter" with trouble can therefore take place immediately, as soon as he, under the guidance of a technician or sergeant, begins to acquaint himself with the working equipment and, in particular, with the signs of its normal functioning. Therefore, already at this time it is necessary to teach the operator so that he will know all the signs of abnormal equipment operation very well. For example, it is necessary to teach soldiers the technique for seeking out such very simple types of trouble as fuses, warning lights, and illuminated indicator boards going out of order from the very first days of their acquaintance with the equipment. This approach makes it possible for young soldiers to gradually accumulate experience in seeking out and eliminating simple types of trouble at first, and then increasingly complex ones. In practice there is not and cannot be a sharply delineated line between the stage of studying the equipment proper and the stage of studying the detection and elimination of trouble. So both the rules of equipment safety and the general methods of establishing the causes of trouble and eliminating them need to be explained to operators from the very start of their study of the equipment being serviced. It is true that all this needs to be done after studying the fundamentals of electrical and radio engineering and the purpose, makeup, and working principles of the equipment with them.

Practice convinces us that the greatest effect is achieved by those officers who make use of operating models of particular series and elements of circuits or blocks when teaching soldiers to search for the causes of trouble, and also demonstrate parts which do not work with external (visible) manifestations of their damage. In addition, it is advisable during the operator training process to continuously familiarize them with the table of characteristic (model) types of trouble and with disorders which are registered in the periodic servicing manuals. Only after the operators have accumulated the appropriate theoretical knowledge and practical experience with it is it possible to make a more detailed study of the external signs of trouble, the most probable causes, and procedures for eliminating failures. During this period, extensive use must be made of functional and basic circuits.

Engineer-Major Golubyov proposes that trouble be artificially introduced to give operators practical training. Specifically "insert paper stoppers between the contacts of relays, in the plugs of antenna and power cables, put matches between the core and armature of relays and contactors, and screw in plugs incompletely so that contact is disrupted in the necessary place or cables are incorrectly plugged into blocks." At the same time, he makes no reservation as to the equipment (combat, training, operating models, or displays) on which this can be done.

In our opinion, such a method of operator training among the troops is unacceptable. Officers Grishunin, Vorontsov, Chuloshnikov, and others are completely correct to note that using it on combat equipment can lead to its going out of order. Therefore, it is not advisable to introduce this method in troop practice in training operators.

As the engineers and technicians who sent responses to the editors noted, in chast and podrazdeleniye it is best to train this category of specialists with "current" troubles arising naturally during the course of equipment operation. As the experience of leading podrazdeleniye demonstrates, this problem needs to be resolved on the basis of the situation, the availability of time, and the complexity of the troubles. If time permits, the operator should be given an opportunity during training periods, under the guidance of a technician or sergeant, to independently investigate the signs and causes of the trouble. At the same time, if the way proposed by the operator of seeking out the trouble is too long or incorrect, the training leader should use control questions to help the trainee arrive at a correct solution. But if the situation has taken shape in such a way that the trouble must be eliminated immediately, it is eliminated by experienced specialists as quickly as possible, and then later an analysis of the causes of it is made with the operator and he is given an opportunity to logically size up the whole picture of the appearance of the breakdown (or trouble) independently and observe what kind of effective measures are taken to eliminate it under the given conditions. It follows from this that it is very important to keep careful track of all troubles and abnormalities which arise in the operation of blocks and units, as well as in the equipment as a whole, in every podrazdeleniye. It is necessary here to record the signs which characterize disruptions of normal equipment functioning, the causes discovered for these abnormalities, the concrete place where they are found, the magnitudes of the parameters which go beyond tolerance, and the most efficient procedure for eliminating the troubles.



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Communist officer Nikolay Belousov is an experienced methodologist. He teaches soldiers skillful servicing of truck and tractor equipment at training periods. In the photograph, Senior Lieutenant N. Belousov conducts training periods on seeking out trouble in an engine.

(Photograph -- K. Subbotko)

In their responses to Comrade Golubyov's article, many officers note that it is necessary to make more efficient use of periodic servicing work to raise operators' skill. One cannot disagree with this, because during the course of this work operators have an opportunity to more thoroughly study the functional and basic circuits of units and blocks. They can also determine the mutual influence and interaction of series and circuits, as well as the influence of maintenance and going beyond the tolerance limits for particular parameters on the work capability of the equipment. Finally, they have an opportunity to thoroughly understand the physical meaning of this.

During the discussion of Engineer-Major Golubyov's article, Engineer-Lieutenant Colonel Yu. Shmeker proposed that test-track circuits be widely used in teaching operators the methods of detecting and eliminating trouble, because this makes it possible to develop stable habits in operators in searching for trouble in blocks with average installation density. This proposal deserves attention, and it would be

advisable to introduce it into troop practice. However, the use of test-track circuits, it seems to us, will produce the best results only when searching for trouble in relay-contact groups and in electromechanical and simple electronic circuits. As for multiseriess electronic circuits, the use of test-track circuits may in certain cases only increase the number of measurements and thus lead to more overall time spent searching for trouble and restoring the equipment.

It is unfortunate that in the responses to the article being discussed, the question of kits of spare parts, tools, and accessories was not raised, although it is closely linked with eliminating trouble. In fact, as we know, the time spent on each such operation increases considerably due to the fact that operators, and sometimes even certain technicians, have a poor knowledge of the location of items in various kits of spare parts, tools, and accessories. Sometimes a great deal of time is spent during the restoration of equipment in searching for the needed part. That is why it is essential to direct attention to this question also in teaching operators to seek out and eliminate trouble.

The broad range of officers in various specializations who participated in the discussion of Engineer-Major Golubyov's article provides persuasive evidence that the question of teaching operators methods of seeking out and eliminating trouble is a very pressing one. It was necessary to do this because the efficiency of the combat employment of modern radio electronic equipment depends significantly on operator training, and this equipment is obedient only to skillful soldiers who know their work down to the fine points.

In conclusion it should be noted that, considering the broad range of radio electronic equipment with which our troops are armed and the special features of operating it in different conditions, it is not possible to issue any general, concrete methodological formulas for seeking out and eliminating trouble. In our opinion, it would be wise to publish a special, broadly-accessible aid on this question to which operators could turn while servicing combat equipment. General, scientifically sound procedures and principles for detecting and eliminating trouble in radio electronic equipment, as well as concrete programs for seeking out the most complex types of trouble depending on their external signs should be presented in such an aid. The rich experience accumulated on this question by leading podrazdeleniye of the PVO Forces of our country should be considered in these programs. And by the way, such an aid is already being worked out by a collective of teachers at the Minsk Higher Engineering Antiaircraft Missile School of Antiaircraft Defense. All the useful recommendation sent by readers of this journal and presented during the discussion which is now finished will be considered in this aid.

NOT OCCUPATIONAL TRAINING ALONE...

In No 6 of this journal for 1971, an article by Engineer-Colonel D. I. Zhitkov entitled "Struggle for Efficient Utilization of Radar Stations" was published. In it the author used concrete examples to demonstrate the factors which determine the efficiency of application of radar stations, and gave recommendations on the question of ensuring trouble-free operation of radar equipment.

This article drew the attention of a broad range of readers. In the responses to Zhitkov's article which have been received by the editors, there is a good deal of useful advice. Two of these responses are published below.

Success is Won by the Harmonious Team

(From Engineer-Colonel M. Utkis, Master of Radio Troops)

In his article, Engineer-Colonel Zhitkov touched on questions which are of great importance for raising the combat readiness of radio operations podrazdeleniye. The author emphasizes that the efficiency of using the RLS [radar station] in combat depends significantly on the level of occupational training of the RLS chief. This is certainly true. After all, he is the one who organizes all steps to increase the efficiency with which the RLS is used in combat. Let us take, for example, Officer V. Popov, who deservedly enjoys the reputation of an experienced and highly skilled RLS chief. The team which he heads always successfully handles any complex mission. But once Officer Popov's

subordinates detected targets at distances less than their usual capabilities. Why? It turned out that the parameters of the receiving and amplification channel had been understated. This happened when Popov was on leave, and the shift head who replaced him was unable to ensure that the parameters of the receiving and amplification channel were maintained at assigned levels. And the fact that he had recently arrived in the team cannot serve as justification. The team failed to fulfill the assignment, and a serious lesson must be drawn from this. It is true that this is a single case, but in all likelihood it demonstrated that the leader's high level of personal training is inadequate by itself. It is essential to strive for a high and even level of training among all team members and for mutual replaceability which guarantees fulfillment of the mission under any conditions.

Just a few years ago, it seemed that the most difficult thing was to teach operators to detect and issue target coordinates at the first blip, by a barely noticeable point or line on the screen. Of course this continues to be important today, but it is already not enough. The everyday intensity of air traffic in our regions is such that the RLS display unit screen now ordinarily shows several dozen targets simultaneously. The mission of the team under contemporary conditions is to issue full, reliable, and timely information with assigned discretion on a complex air situation. In this, interferences should be considered a necessary element of the situation on the screen. Such a problem is beyond the individual specialist, even if he is considered a "sniper" on the screen. There must be harmonious and carefully thought-out work by the entire team, precise delineation of functions, and flawless performance of them by every member. Let us clarify this using the example of organization and distribution of functions in the teams led by officers L. Popov and V. Palkin.

As we know, targets following at middle and high altitudes enter the visibility zone of the RLS at great distances on the periphery of the screen at the same time as the detection range for targets at low altitudes is, naturally, slight and markers appear closer to the center. In view of this, duties in the team are distributed as follows: detection of high-altitude targets is assigned to an operator working at a small-scale display unit, while the urgent task of detecting and following low-altitude targets is assigned to an operator working with the very largest display unit. If the number of targets on each display unit exceeds the norm, the number of operators must be increased, with screen sectors or divisions divided among them.

While the task of these operators is to assign target numbers and issue their surface polar coordinates and affiliation, an equally important task is performed by the height-finder operators who measure the third coordinate -- altitude, as well as the operators of azimuth-distance type indicator units which refine the composition and combat formation of targets and other characteristics. At the same time, we must not forget about interference too. Therefore, the work of each team member is closely linked with the work of his comrades. From this the conclusion follows that under conditions of modern warfare, success in carrying out a mission is not decided by individual operators, but rather by a harmonious, practiced combat collective-team headed by a highly qualified RLS chief who skillfully coordinates the work of all members.

Experience convinces us that even this is not enough. It is impossible not to take account of another important factor too, operator susceptibility to fatigue. Private S. Shchelochkov missed a target. There is no need today to establish the causes of this incident more precisely. One thing is important, that for three or four minutes a target covered about 60 kilometers without hindrance, and yet Shchelochkov was considered a disciplined, diligent soldier. This case served as the occasion for serious reflection. Officers V. Kostenko, V. Grigor'yev, and others had to take a new look at the moral and psychological education of their subordinates and their physical training. After all, during the most intensive period of battle, all teams will be entirely engaged.

Therefore, every member of a team today needs training so that he has sufficient psychological and physical strength to perform intensive work for several hours without a reduction in quality. This has been understood by Engineer-Major S. Dubov, a young podrazdeleniye commander, and Captain V. Silant'yev, his deputy for political affairs. They consider the main thing here to be instilling in all personnel a profound confidence that all team members are able to perform their assignments at the level of the best first class specialists. For this purpose they have set up an exchange of work know-how among the best RLS operators, experienced radio operators, announcers and radar plotters, skilled electricians and diesel specialists, and others. These specialists told the young soldiers about the special qualities of their occupation, the "secrets" of their mastery, and the ways to achieve success. The young soldiers understood that the heights of skill are accessible to them too, and that the only way to these heights is stubborn daily labor. They also understood that their comrades who are their seniors in service and experience will spare no effort to help them, the young ones, confidently take their places.

When Major V. Krinitzin, a political worker, was asked what he sees as the basis of the fact that leading teams successfully handle the flight support mission, he answered, "In the moral-psychological mood, in confidence that the machinery will not let you down and that commanders or supervisors will come to your aid on time in a difficult situation. Under conditions of the complex modern air situation, it is important to instill a sense of responsibility in the operator for the fact that, beyond the radar screen, he is actually engaged in one-to-one 'battle' with an air enemy. Effectiveness in performing the combat mission depends on the quality of his work." That is why RLS chiefs, as well as officers and sergeants, often considering themselves only technical specialists, should raise troop skill to a higher level and become the commanders and teachers of their teams.

An Important Element (from Engineer-Major A. Filimonov, Specialist First Class)

In the article entitled "Struggle for Effective Utilization of Radar Stations," it is very correctly noted that maintaining a station in good mechanical condition is a guarantee of high combat readiness. As we know, this is achieved by carrying out various types of preventive work. The length, periods, scope, and technique for doing this work are established by instructions and manuals on operating radar stations. However, these documents do not always fully reflect the order and time standards for performing checks or the number and qualifications of the service personnel needed to perform periodic servicing work. There is also not a detailed indication of the functional duties of each specialist during regular servicing for any period. A complete set of control and measuring and stand equipment is compiled for performance of each of the checks separately in the installation or system without analysis of functional relationships among them, the possibility of simultaneously organizing the essential number of working positions, minimal period for performance of jobs, and optimal use of production, power, and sanitary engineering equipment.

Practice demonstrates that in order to raise the quality with which preventive jobs are done, it is essential to broadly introduce critical path planning and control. Evidence of this is found in the experience of engineers V. Korsun, A. Krishtak, Yu. Kulakov, and S. Shik. These officers, like many others, are introducing elements of scientific organization of labor on a broad scale in equipment operation. For example, here is how preparations for periodic servicing work on the equipment entrusted to the subordinates of Engineer-Major Kulakov goes.

Here they develop working papers in advance. First of all, a list of all operations which must be done during the periodic servicing is compiled (see Table One below).

Table One

№ по пер.	Наименование операции	Продолжительность операции	Номер операции по ИЗ	Периодичность	Номера непосредственно следующих операций	КНА	Исполнитель	Примечание
1	2	3	4	5	6	7	8	9

Key: (1) Order Number; (2) Operation Description; (3) Length of Operation; (4) Operation Number by Measuring Element; (5) Periodicity; (6) Numbers of Immediately Following Operation; (7) Monitoring and Automation; (8) Performance; (9) Remarks.

On the basis of this, we make an initial critical path schedule of periodic servicing; then a calculation of the numerical characteristics of the given schedule is made and the critical and subcritical paths of the grid model are established. Such a schedule makes it possible to compile a plan-schedule and critical path schedule of periodic servicing for each concrete system.

Engineer-Major Kulakov is especially careful in seeing that work charts, which are the final documents for service personnel participating in periodic servicing, are correctly compiled on the basis of the plan-schedule.

For deterministic systems of critical path planning and control, the average time it takes a group of workers to perform an operation, based on experimental data, is entered in column three. For stochastic systems of critical path planning and control, the length of jobs is determined using probability assessments, which are called optimistic, pessimistic, and realistic, according to the formula

$$\tau = \frac{1}{6}(\tau_1 + \tau_2 + \tau_3),$$

where τ_1, τ_2, τ_3 are, respectively, the optimistic, realistic, and pessimistic assessments of the length of the job. The computed expected length (τ) is included in the critical path model as its true value.

In column five, the letters "N," "M," and "S" are placed for operations which are carried out according to instructions for operation with daily, monthly (five-week), and seasonal (half-year) periodic servicing respectively. Column six establishes the order of operations and, if

necessary, helps to fully restore a duplicate of the critical path schedule. In column eight the performer of the selected operation, for example, an engineer, senior technician, or operator, is entered. A more complex test naturally requires that the performer have higher qualifications or that his actions be checked.

A work card (see Table Two below), which is an extract of the list of operations from the plan-schedule or critical path schedule, is compiled for each performer.

Table Two

№ операции на сети	Текущее время по сети	Наименование операций	№ операции по ИЭ	КИА	Примечание
1	2	3	4	5	6

Key: (1) Number of Operation on Grid; (2) Current Time on Grid; (3) Description of Operations; (4) Number of Operation by Measuring Elements; (5) Monitoring and Automation; (6) Remarks.

The parameters of the signals being measured are sometimes entered in column six. It is advisable to make the work cards out of plastic or cardboard. The use of a critical path schedule made it possible to reduce the time required for periodic servicing by 25-30 percent. At the same time, precise and well thought-out organization of labor, discipline, and a profound sense of responsibility in the workers made it possible to raise work quality also. For this reason, the coefficient of preventive work efficiency rose considerably.

It is also important that critical path schedules made it possible to reduce the time required to switch equipment from the periodic servicing state to a state of combat readiness. An analysis of the readiness coefficient, computed on the basis of experimental data on switching equipment to higher levels of readiness, makes it possible for command and engineering personnel to know the degree of readiness of the equipment at any point during periodic servicing.

Conducting periodic servicing work according to critical path schedules offered several more advantages. The use coefficient of control and measuring equipment increased, expenditure of electric power was decreased by efficient organization of servicing work, and it became possible to ensure more precise organization of preventive work, to carry out timely maneuvers with resources, to discover unused reserves, and to flexibly put them into action.

In a word, widespread introduction of the critical path planning method makes it possible to secure a high level of combat readiness for complex radar equipment and ensure its efficient application.

SPECIAL STAND EQUIPMENT

by Engr-Col D. Savos'kin and Engr-Lt Col A. Kuzin

During the operation and servicing of digital computers, technicians and operators must replace elements which have gone out of order. Experience has shown that merely replacing a card requires a considerable amount of time.

It sometimes happens that, before installation in the equipment, cards are not checked for working condition due to the absence of special stand equipment. This situation frequently leads to a case where the restored digital computer goes out of order again immediately after being turned on. And the external manifestation of the nature of the trouble usually does not coincide with the previous one. In such cases, the actions of technicians servicing the computer are extremely varied. A technician with insufficient experience in operating digital computers will, by the nature of the trouble, draw the conclusion that a new breakdown has appeared and begin to seek it out.

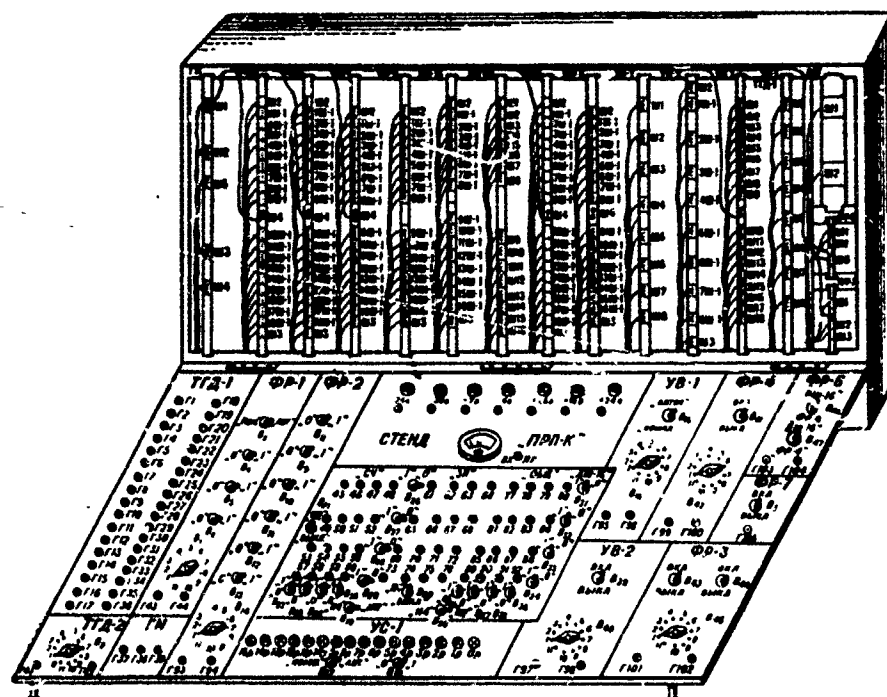
But an experienced technician, regardless of the external manifestation of the nature of the trouble, first checks the functioning of the series of the newly-installed card. In both the first and second cases, it was the card which had just been installed that was out of order. But the time spent searching for the trouble was considerably greater in the first case than in the second. However, despite the different ways of searching for the trouble, the machine downtime is unjustifiably large. It increases even more when, after establishing the failure, the technician replaces the same unit a second time.

It is possible to overcome these difficulties using a special stand developed and now employed in the Moscow PVO District, winner of the Order of Lenin. It involves a

PRP-K stand designed to check card elements for working condition before their installation in the apparatus, and also for periodically aging units of all types. This stand also makes it possible to search for out of order parts in card stages and repair them. The BSN-K stabilized voltage block, which ensures that the stand is supplied with all needed voltages, is also included here.

In terms of design, the PRP-K stand is made in the form of a small-dimensional, rectangular rack with an open-out panel, and it is conventionally divided into two parts (see Figure One below).

Figure One. The PRP-K Stand



First is the open-out panel, which is a control panel on which organs for controlling unit operation, monitoring organs, gauges, and a volt meter are located. The second is a block consisting of autonomous cells (pockets) for arranging digital computer cards and two multipurpose devices for checking the magnetic internal storage cube and the permanent storage cube. The cells in the block are distributed by types of cards.

Each cell is made in the form of a pocket for locating a card. Two guiding plates made of organic glass are set on the lower base of the cell and two on the upper. This design makes it possible to install a card and move it freely to the back, and during repairs to draw two-thirds of its width out of the cell, which ensures free access to the central points of any stage. Before installing the card in the cell, specially manufactured organic glass "sliders" are mounted and secured on its abutting parts. The card is set in the cell in such a way that the contact group is turned to the face side. The central contacts for feeding positive voltages should be located in the lower part of the cell, while those for negative voltages are in the upper part.

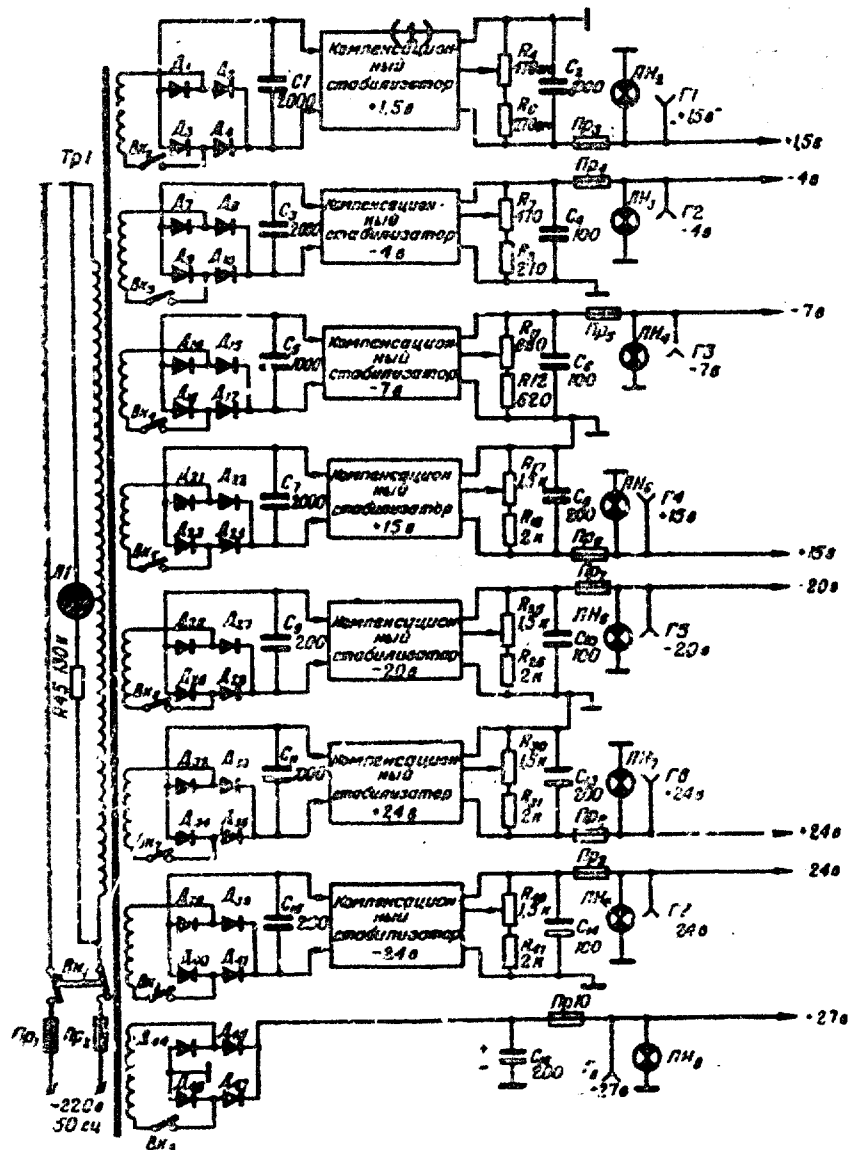
Installation wires for feeding voltage supply and input and output signals of the stages of the card are gathered into separate bunches and located in each cell to the left of the card. The installation wires are connected to the contact group of the card using five-plug sockets, which are numbered from the top down.

All cells in the stand are the same in design except for the group selector card cell. Its distinguishing feature is a screen made of sheet iron 1.5 millimeters thick. It is used to protect the basic installation of the stand from the effect of high frequency signals and excluding sighting. For this purpose, pulses of clock frequency are sent from output 1 of the group selector card to all consumers who are individual, but drawn into bunches by the screen cable, which passes along the face side at the top of the stand.

The BSN-K autonomous stabilized voltage block (see Figure Two, next page) supplies the PRP-K stand with the following rectified voltages. +1.5 volts, +15 volts, +24 volts, -4 volts, -7 volts, -20 volts, -24 volts, and +27 volts. Seven of these eight voltages (exception being +27 volts) are generated by the rectifier circuits with compensation stabilizers, which represent an automatic control system in which voltages at the point of output are maintained with the assigned precision regardless of oscillation in incoming voltages, current loads, and parameters of the circuit. In every voltage stabilizer, a potentiometer is envisioned to regulate outgoing voltage within the limits ± 25 percent of the rated value. The BSN-K block receives its power from a 220 volt AC network at 50 hertz. Currents are delivered from the output of the block to the stand along a connecting cable, and switches are installed on the face panel of the block for turning on each voltage.

In order to perform check, aging, and repair jobs, cards are installed in the appropriate cells of the stand,

Figure Two



Key: (1) Compensation Stabilizer [Others in line below are same].

Sh plug and socket units are joined to them, and voltage supplies are delivered. After this, supply voltages advance.

It is advisable to age cards from the kit of spare parts, tools, and accessories once every six months, at the same time as semiannual periodic servicing. Each card must be given at least an hour at this time.

Preparation of stand equipment and aging cards is done in the following order. After the cards are set in cells of the PRP-K stand and all Sh plug and socket units are connected to them, the BSN-K block is plugged into the stand and supply voltages are fed. The presence of supply voltages in the stand is tested by signal lights going on. Supply voltages are fed from the monitor pockets of the panel to the input of the voltmeter and their ratings are advanced. Then, using an IO6M (or other brand) oscillograph, each stage of the card is checked for functioning. In this the oscillograms taken from element outputs should correspond to established shapes. If there is no signal at the output of an element, it is necessary to search for a malfunctioning part in this stage. For this purpose, the card is drawn out of the stand in such a way that there is free access to any part of the stage and it is possible to check the presence of signals in the central points of the stage circuit. When the malfunctioning part has been found, the card is removed from the stand and the part is replaced. After the trouble has been eliminated, the card is again put into the stand and it is checked for functioning. If the signal at the stage output does not correspond to established technical specification for its parameters or shape, this card is left in the cell for aging.

When all the elements of the cards have been checked for functioning and malfunctions eliminated, the stand is set at a voltage for one or two hours of work. Then a check is made of the output voltages of card elements with rated supply voltages and the parameters are checked with change in all supply voltages except for +24 volts and -24 volts (from a rating of ± 15 percent). If the shape or parameters of the signal at the output of a particular element are distorted with lowered or increased voltage, the card is repaired. When all cards have been aged, the supply voltages are turned off, and the trouble-free cards are removed and placed in the kit of spare parts, tools, and accessories, and those which do not work are subject to repair and subsequent aging.

It is especially important to keep strict track of the aging which is done for each card in a special book which shows the date of aging, number of hours worked, and defects discovered.

Use of this stand equipment among the troops has considerably increased the reliability of digital computer technology, sharply decreased the time being spent restoring digital computers, and made it possible to constantly maintain expensive cards in working condition and repair them on the spot.

ASSEMBLY COURSES FOR ENGINEERS

Many years of experience convince us that assembly courses [sbory] are one of the forms for increasing the occupational knowledge of officers. Just before the training year, such assembly courses were held for engineers of the N chast, and a number of special technical subjects were studied at them. The knowledge gained will help them during the process of studying modern equipment with their subordinates. Participants in the assembly courses also exchanged progressive work know-how in organizing the use of combat equipment under different climatic conditions.

The reports and talks on these questions by officers I. Bانشchikov, D. Zhitkov, L. Oleynikov, and other specialists in organizing the use of modern equipment were of great interest.

At the assembly course, military engineers also acquainted themselves with the progressive procedures for radar repair among the troops worked out at the initiative of officers I. Zagorul'ko and I. Simkin. Its introduction into practice in the workshop headed by Captain A. Kholeyev made it possible to decrease the repair time for equipment and increase its quality.

At the end of the assembly courses, quizzes were accepted from participants on their knowledge of the equipment they operate and their ability to work on it. The best results were shown by officers N. Bانشchikov, A. Demin, P. Zakharov, and others.

OPTIMAL PERIODS FOR PERIODIC SERVICING

by Engr-Lt Col V. Fomenko

Establishing greater precision in the periods between and scope of periodic servicing during the operation of aviation equipment belongs, as we know, among the measures directed to, on the one hand, ensuring high operating reliability and, on the other hand, raising use efficiency. Specifically, the use efficiency of aircraft radioelectronic equipment depends significantly on the labor-intensiveness (in man-hours) of periodic servicing and the frequency with which it is done. It may be evaluated by an important indicator such as expenditure of equipment life during the time that periodic servicing work is being performed on it.

At the present time, engineering and technical personnel of aviation chast ordinarily devote constant attention to refining periodic servicing. A great deal of work has been done in this direction by the aviation specialists of the N chast. Having begun to refine the list of periodic servicing jobs for radio electronic equipment, they laid the basis for beginning to optimize it at the same time.

Everything began when pilots of the chast started to master aviation equipment that was new to them. While performing periodic servicing on the BRLS [onboard radar set], it was noticed that its working time under instrument monitoring of parameters compared with the time worked in the air between periodic servicings. This fact immediately put them on their guard -- with such a ratio of time worked on the air and in the ground, the BRLS might use up its service life between preventive maintenance times long before the airplane had been flown after leaving the mechanical maintenance chast. In addition, the temperature conditions of the BRLS needed to be considered -- with prolonged operation using current on the

ground, despite the presence of conditioners and other blowing equipment, temperature conditions are much more difficult than during flight. Overheating parts of the unit could have a negative effect on their durability and the service life of the BRLS as a whole. It was clear that all this was unacceptable for maintaining the equipment in combat readiness.

The cause of this situation was, no matter how paradoxical it may seem, the increased scope of parameters tested during periodic servicing. At first they paid no particular attention to this circumstance because they knew that the scope of periodic servicing and servicing periods for each type of aircraft and its equipment reflect accumulated operating experience. That is how things were with the temporary servicing instructions for the BRLS, which were compiled when it was not yet fully known how the equipment would work under actual operating conditions. This was the source of the increased scope of work, which needed to be decreased to an optimal level.

The same time periods and scope of periodic servicing for other units of the aircraft radio electronic equipment also were not optimal. And here is why. As we know, identical units can be installed in aircraft for different purposes. For example, take the ultrashort-wave communications radio, the automatic radio compass, the short-range navigation set, or other equipment. They are installed in interceptors, bombers, and transport planes as well. The same types of BRLS's can be installed on different types of interceptors, and so on. But the working conditions for the very same unit of radio electronic equipment will, naturally, differ on different types of aircraft. Furthermore, it should be added that the operating reliability of each unit taken separately differs. But the scope of periodic servicing for it is still the same for all types of aircraft. This means that it becomes necessary to optimize the times and scope of periodic servicing for the other elements of an airplane's radio electronic equipment as well.

Of course, this is not a simple question, and it is not easy to resolve it. Those who hold the opinion that it is difficult to establish optimal times for preventive maintenance under chaste conditions have produced a fairly convincing argument -- it does not appear possible to perform periodic servicing work on each unit at optimal times during the operation of radio electronic equipment because the times would differ for different units. One must agree with this. And it is difficult to achieve a precise and harmonious system which ensures the required readiness for every plane. This is because, in the first place, refining and "coordinating" the true preventive maintenance times with the preventive

maintenance periods for work being done on the aircraft, engine, and other equipment as a whole requires that a great deal of statistical material be processed and the parameter reliability of these units be calculated. In the second place, it is because it immediately becomes necessary to put the data obtained together overall in order to truly optimize the most efficient periods, which take account of the need to ensure the operating reliability of each separate unit. To do all this under operating conditions is, it goes without saying, difficult.

However, there is another, fully acceptable way to resolve this question -- to optimize, as much as possible, only the list of periodic servicing jobs on radio electronic equipment and coordinate this list with the existing, adjusted periods for periodic servicing usually performed on the aircraft. In this manner, the direction which, if adhered to, makes it possible to begin practical searching gradually took shape.

It should be noted that the experience of past years in operating comparatively less modern, but still fairly complex BRLS's fostered the conviction that optimization was necessary. They remembered cases in the chast where the BRLS on a certain plane worked flawlessly in the period between periodic servicings, but as soon as the plane came out of the mechanical maintenance chast, complaints began. Sometimes defects which could not be explained at first glance arose where, after careful adjustment of the parameters of every unit separately, the BRLS still worked unreliably. The reason for this was that, in addition to autonomous adjustment of parameters, a unique kind of overall adjustment of the parameters of the individual units was required, and this was not always done with the necessary precision. Therefore pilots were, perhaps, sometimes correct to express the opinion, "When you get a plane from the mechanical maintenance chast, look for surprises in the BRLS." They gave this much thought, but at the same time continued to observe the accepted periodic servicing regulation punctually and scrupulously carry out the entire list of jobs.

Because the BRLS was complex and, to some degree, "capricious," they understood that it was necessary to carry on preventive maintenance fully. They knew that it was possible to ensure trouble-free operation by timely and good quality performance of periodic servicing, as required by controlling documents of the aviation engineering service. At the same time, they saw that frequent, systematic dismantling and reassembling BRLS's to remove and install its units and particular assemblies as envisioned by the list of periodic servicing jobs for each period simply did not

justify itself. The number of defects actually detected during periodic servicing was sometimes lower than the malfunctions introduced during the actual servicing due to the large number of operations in dismantling and subsequently assembling the assemblies and units of the apparatus.

Engineering-technical personnel of the chast gave maximum attention to operating the new BRLS. They carried out the entire list of jobs envisioned by the temporary servicing regulation punctually. They maintained constant observation over change in the parameters being measured, determined which circuit nodes work most reliably, and improved testing and measurement procedures. Officers Ye. Prusov, V. Dzhezheily, and P. Parputis, specialists in the periodic radar equipment servicing group headed by Captain Technical Services N. Remorov, showed particular activism in these matters. An officer with a curious mind and an outstanding specialist with rich experience in operating different types of radar sets, Remorov was an initiator and enthusiastic participant in developing the optimization program. He was actively supported by Engineer-Lieutenant Colonel I. Kravchenko, who provided comprehensive help.

After a certain period of practical operation it became clear that certain parameters, as the most stable ones, could be completely excluded from the test, that others could be checked less often, and also that certain dismantling jobs did not need to be done. New data piled up from day to day. For example, it was discovered that the number of malfunctions discovered while performing the entire list of periodic servicing jobs was insignificant, while partial dismantling of units and assemblies for preventive maintenance and reinstalling them "contributed" specific defects which result from mistakes in this work. And by the way, the know-how from past observations was confirmed. Preliminary conclusions suggested themselves. The temporary list of periodic servicing jobs for the BRLS needed to be refined, especially because the unproductive, if it may be so expressed, working time of the BRLS during periodic servicing was literally swallowing up its service life.

But observations alone, of course, were not yet adequate to come forward with concrete proposals and firm substantiation for them. Additional experimental operation of the BRLS was required, with only tests of their functioning being made on the BRLS's singled out for this purpose. If necessary, specialists were supposed to make current repairs and, upon completion, check the parameters. During the period of experimental operation, periodic servicing (which did not, in this case, affect flight safety of the airplane) was eliminated. Such limiting conditions would make it possible, on the one hand, to check the operating

reliability of the BRLS and, on the other hand, to evaluate results of change in the frequency of preventive maintenance work.

With command approval, experimental operation was carried out for a certain time. Results were more than hopeful; all the BRLS's which were tested during this time worked almost entirely trouble-free. The interceptors in which they were mounted had maximum flying time, and a large number of training intercepts were carried out in them because the pilots, having learned the sets' "secret," had confidence in their stable operation and began to readily plan these aircraft for intercepts. During this time, increased responsibility for monitoring the condition of the BRLS on the aircraft and its functioning was assigned to specialists of the maintenance group. Exceptionally skilled equipment operation was required of them.

Not only was it important not to lose sight of the slightest deviations in equipment operation, the condition of units and assemblies, and changes in parameters being monitored, it was also important not to permit malfunctions through negligence or carelessness. Any such carelessness in work could negatively affect the reliability of final results from experimental operation. Therefore, exceptional precision and concentration was required of the aviation specialists in the maintenance groups, to say nothing of practical experience in operations, the ability to make independent, thorough analyses of BRLS operation, and a kind of technical intuition. It was not necessary for the head of the maintenance group, now Engineer-Captain V. Manekin, captains, technical service A. Kuznetsov and L. Poganyuko, or their subordinates to work on these qualities. They handled their mission successfully. As a result, data were obtained which made it possible to fully begin processing and generalizing accumulated factual material and to draw the first conclusions.

In the first place, the operating reliability of BRLS's corresponded fully to tactical and technical requirements.

In the second place, the results of operating BRLS's without periodic servicing confirmed earlier observations (during ordinary operation) as to the possibility of revising and optimizing the list of jobs in the temporary periodic servicing instructions. Now it was possible with full substantiation to propose that concrete changes be made in the time periods of certain tests and that some of them be completely eliminated from the list. Generalized data of about the same nature served as the basis for the large amount of work done on different types of interceptors which made it possible to optimize the list of periodic servicing jobs to a certain degree not only for BRLS's, but also for other units of radio electronic equipment and to coordinate this list with periodic servicing jobs performed on the aircraft over established time periods.

A confirmation of this is the unified periodic servicing for the modern interceptor-fighter. With even a brief familiarity, one's attention is drawn to the range of periodic servicing jobs at different times; it is now lower on the order than that which was done very recently, two or three years ago. What does this indicate? First of all, it shows the level of operating reliability of aircraft radio electronic equipment that has been achieved, which has made it possible to reduce its coefficient of preventive maintenance. As we know, it is characterized by the ratio between the number of hours spent on periodic servicing and preventive maintenance work to the service (or flight) time of the equipment. In other words, that optimization of the list of periodic servicing jobs which has been achieved has considerably reduced the labor-intensiveness of periodic servicing jobs at different times. It has decreased the time that radio electronic equipment is operated by current on the ground and thus secured a savings in its service life. As a result, interceptors spend much less time in mechanical maintenance chast for periodic servicing work and more time in readiness for use. The credit for this belongs to the engineering-technical personnel of the chast, who have made a major contribution to optimizing the list of periodic servicing jobs for the aircraft entrusted to them.

GUARANTEE OF TROUBLE-FREE COMMUNICATIONS WORK

by Sr Engr-Lt A. Safonov, Specialist 1st Class

Our podrazdeleniye is considered one of the best in the chast. For several years now, even under the most difficult conditions, personnel have ensured continuous communications and trouble-free operation of the radios.

One automatically recalls the exercises, which took place not long ago, in which our signal troops participated. According to one of the inputs, line telecommunications were completely "knocked out." At this time, the shift on duty was headed by Master Sergeant V. Kovalyov. The soldiers faced a difficult test.

Having received their mission from the senior officer, in a matter of seconds the signal troops made the necessary switches and secured the necessary communications at command post working stations. The equipment worked reliably. Throughout the entire exercise period, the tropospheric radio stations worked without interruptions.

This became possible, in the first place, because every soldier in the podrazdeleniye is a highly skilled specialist with an outstanding knowledge of the equipment and, in the second place, because periodic servicing work on the radio sets, which is the foundation for maintaining them in constant combat readiness, is always done very carefully in this unit.

The slogan under which these signal troops carry out their duties in performing preventive work on tropospheric radio sets is "High Quality in Periodic Servicing." They always devote fixed attention in the podrazdeleniye to this kind of mechanical maintenance of the equipment. And now, when young soldiers have come to replace the old-

timers, they are taught from the very beginning to develop a high sense of responsibility for mechanical maintenance of the radio sets. It is true that the experienced signal troops must work more intensively during these months. But they understand very well that only in this way, by directly teaching young soldiers during practical work, is it possible to instill the necessary equipment maintenance habits in them in a short period. This belief has been supported by all our experience in recent years. In our opinion, we have succeeded in finding a fully acceptable solution for a large, important problem -- putting young soldiers to work in a relatively short time.

It is not, of course, easy to train a young soldier to be a skilled radio mechanic capable of independently servicing multichannel tropospheric radio sets and standing duty as part of the shift. Usually the specialists are trained in training podrazdeleniye. However, this requires a considerable amount of time.

In order to train young soldiers for independent equipment operation in a short time, we stress practical mastery of the necessary professional habits and work procedures. For this purpose, the young soldiers thoroughly study the tactical and technical data and general layout of the radio sets and high frequency telephone equipment, the fundamentals of long-range communication, the tropospheric distribution of radio waves, and the rules of equipment safety within the limits of their future functional duties. In addition, demonstration training periods are held during this time at which experienced specialists such as Senior Sergeant S. Matkasymov, Sergeant A. Chukleyev, and others, demonstrate for the newcomers how to tune radio sets and enter into communication, how to prepare communications channels for operation, and procedures for servicing the equipment. It is true that, after such training periods, some soldiers sometimes feel a lack of confidence and doubt that they will be able to master the complex equipment in a short time. Experienced signal troops who have distinguished themselves in duty and during exercises, as well as soldiers with outstanding ratings in combat and political training help the new replacements to dispel these doubts. They talk with the newcomers frequently and pass on their own experience. This approach to the future signal troops' initial acquaintance with the equipment and their functional duties has fully justified itself. It offers an opportunity for young soldiers to borrow the most efficient procedures and habits in servicing and working on means of communication from those who are finishing their military service with high indicators in training. That is why our young soldiers are included in duty shifts as on-the-job trainees from their first days in the podrazdeleniye.

Experienced specialists teach them to carry out simple equipment servicing operations, for example to prepare and test connecting lines, to monitor communications channels using the bay's measuring generator, or to establish the magnitude of a particular parameter according to instruments on the front panel of the equipment. Later the young signal troops are already being taught to adjust the equipment, enter into communications, measure and regulate telephone channels, measure the parameters of various channels of the equipment, and eliminate the simplest types of trouble.

In addition to this, every young communications soldier regularly receives an individual assignment which usually envisions working through, by elements, the operations involved in getting the equipment ready for use. Let us note that after each stage of training, the podrazdeleniye commander carefully checks the knowledge and practical habits of each young specialist, first for servicing particular units and blocks, and later for the whole set.

Experience indicates that such an approach to training makes it possible, in a short time, to give young soldiers solid practical habits in servicing tropospheric radio sets, standing duty as part of a shift, and performing periodic servicing work in a high quality manner.

On the initiative of engineering-technical personnel in the podrazdeleniye, procedural cards have been compiled for each periodic servicing job. It gives the content of the job, a list of the mechanical maintenance operations, their order and method of performance, necessary materials, instruments, and tools, time for performance of particular operations, and the rated values of instrument readings in different states.

The procedural cards for certain periodic servicing jobs include operations envisioned for monthly, quarterly, and semiannual work.

Certain readers may say that such cards are a repetition of the requirements of instructions and manuals which regulate operation of tropospheric radio sets. It is possible to agree with them only to the extent that data from these documents is actually given on the procedural cards. But in addition, they contain a detailed description of the order of operations and the methods of equipment use developed by experience in the podrazdeleniye. These are not reflected in any instructions or manual. And this is the primary value of such cards. In addition, the cards developed by our engineers and technicians include supplementary operations whose necessity has been suggested by actual experience

in using tropospheric radio stations under conditions where the podrazdeleniye is located. In the hands of young soldiers it becomes a true guide to mechanical maintenance of radio sets along paths which they did not know.

Conducting periodic servicing work in a high quality manner is also facilitated by the fact that our signal troops have been taught to direct fixed attention not only to the primary units which are enumerated in operating instructions, but also to the so-called "secondary" ones which are sometimes not mentioned in the documents which control mechanical maintenance. For example, during periodic servicing the specialists carefully check the working order of the unit cooling systems. The fact is that the ceramal tubes used in the equipment are sensitive to overheating. The slightest malfunction in the cooling system can lead to inadequate air blowing over the tubes and their overheating, which may cause the appearance of cracks in the ceramics. In exactly the same manner, attention is given to checking and cleaning dust from the filters and external radiators of semiconductor instruments, and checking the quality of operation of the blast ventilators.

The efficiency of periodic servicing has become higher this year because the objective method of monitoring the work capability of radio sets has been introduced. In particular, we make wide use of monitoring by built-in measuring instruments by circular testing "on ourselves." First the magnitudes of supply voltages and the tuning of the receiver and transmitter are checked, and then a comparison is run between instrument readings and the table of rated readings for instruments in the assigned state. In case their readings deviate from the values given in the table, the causes of these deviations are immediately determined and measures taken to eliminate them.

A careful check of instrument readings makes it possible to detect and eliminate in time the slightest malfunction, which, during the course of combat work, can lead to the equipment going out of order. Once during daily periodic servicing while measuring the current of the screen circuit, Master Sergeant V. Koval' discovered a somewhat high reading on the IP-5 instrument. Looking over the unit, he saw that the contact of one of the switches was broken. This might have led to the entire unit going out later. The trouble was eliminated in time.

Measurement circuits of the instruments themselves are checked with equal care. After communication is established with the other station, the levels of carrying and monitoring frequencies are checked, and residual damping

of telephone channels is regulated. During the check of the antenna system, special attention is given to the tension of anchor wires and cables, the reliability of the anchor stake and slide fastenings, the absence of deposits of dirt under the support plates, and also the wholeness of the polyethylene film used to protect against moisture getting into the external plugs of cables and adjusting mechanisms.

During daily periodic servicing, in addition to the operations indicated in operating instructions, an AVO-5M instrument is used additionally to check the working order of the measurement circuits (resistors and condensers) of monitoring instruments in the bays, the power amplifier, the exciter, the voltage supply devices, the presence and working condition of spare tubes, fuses, protective equipment, and fire extinguishers. Before installation in the equipment, new ceramal tubes are subjected to rigidification. During the course of this periodic servicing, a circular check of the set "on itself" is made using reserve communications frequencies.

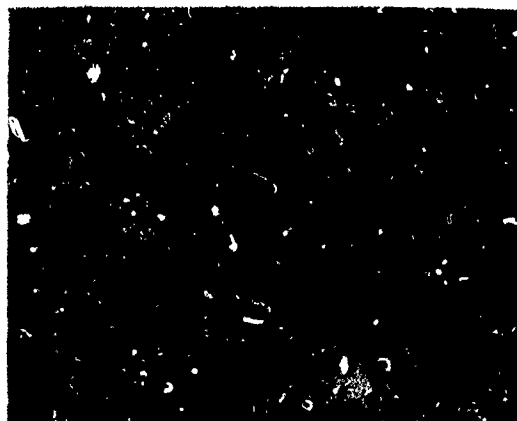
The monthly periodic servicing occupies a special place in the everyday work of our signal troops. During it all units are cleaned of dust, a check is made of the condition of installation, soldering, fastening of pieces, working order of tube panels, and reliability of the contacts of all plugs and switches. In addition the contacts are cleaned and adjusted, burned-out resistors are replaced, the reducers of the supply voltage regulator mechanisms are lubricated, and the impedance of the insulation of power and high frequency cables, as well as connecting lines, is measured. In addition, during monthly mechanical maintenance measurements are made of frequency and amplitude characteristics, the protection against interference of communications channels, output voltages of the most important units, and, where necessary, the diagrams of the levels of the P-304 apparatus are adjusted.

Experience shows that during periodic servicing special care must be given to testing part fastening, the tightness of bolts, and the condition of adjusting and other mechanisms.

Several years ago in our podrazdeleniye, there was an incident which had a negative effect on maintaining communication with the other station, but it taught us a great deal. While assembling the radio station antenna, the specialist who performed the operation was negligent and did not check the fastening of parts -- vibrators, feeders, plugs, and Y-connectors. During operation with winds, the antenna went out of order. Signal troops now check these units with special care.

Performing periodic servicing in a quality manner is a guarantee of trouble-free operation by communications equipment under any weather conditions. This is confirmed by the fact that for several years in our podrazdeleniye, there has not been a case of equipment of going out of order between periodic servicings. However, personnel understand very well that not everything has been done yet. Therefore, the podrazdeleniye commander and engineering-technical personnel are now laboring a great deal to improve methods for performing the most complex operations in order to reduce the time required to bring communications equipment from periodic servicing to a combat condition. In addition, they are working on finding more optimal work schedules for particular types of equipment while they are being regulated and adjusted, and on improving methods of teaching young soldiers how to search out and eliminate complex malfunctions and disorders.

Subordinates of Lieutenant Anatoliy Kononov compete under the slogan "The Year of the 24th CPSU Congress -- a Year of Outstanding Training and Service." Each week the platoon leader records results of their fulfillment of socialist obligations on the board.
(Photo -- K. Subbotko)



COMPREHENSIVE USE OF MECHANICAL TRAINING EQUIPMENT IN AN AUTOMATED CLASSROOM

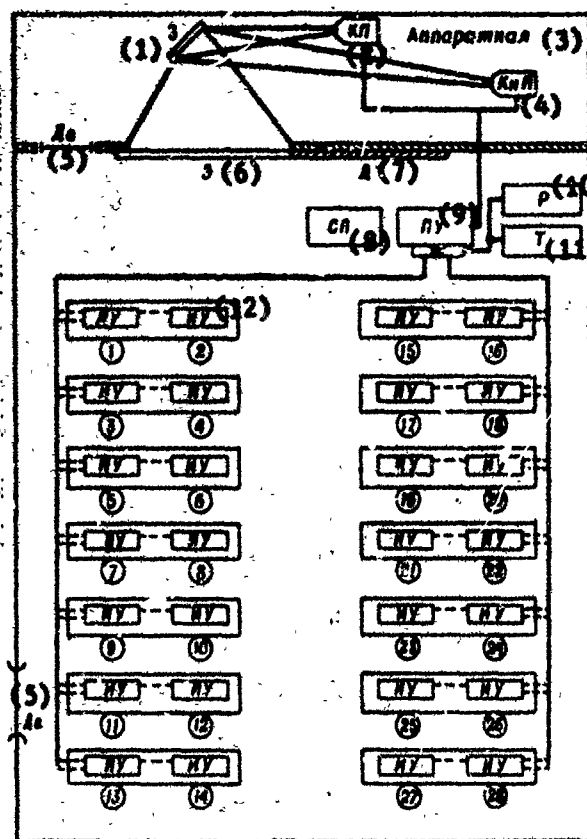
by Engr-Lt Col A. Mikhnushev and Engr-Lt Col V. Stroganov

Mechanical teaching equipment is being introduced increasingly widely in the teaching process at higher educational institutions and in troop combat training. Along with projection and sound-reproducing equipment and devices for simulation and modeling, qualitatively new mechanical equipment is also being used -- teaching and monitoring devices. In order to more fully realize the capacities of these pieces of equipment in different stages of teaching (communicating educational information, reinforcing knowledge, forming habits and skills, and testing the results of teaching), specially-equipped automated classrooms have been created at many educational institutions and in military chaste, and they are being used successfully. As experience demonstrates, they ensure a considerable rise in the labor productivity of training period leaders, make it possible to more fully utilize the trainees' learning capacities, and to stimulate activism among them during classes.

The basic condition for efficient utilization of automated classrooms is that high-quality teaching and monitoring programs be compiled. Furthermore, the characteristics of the mechanical devices and the special features of automated classroom equipment determine the methods of programming teaching and monitoring (selection of the program structure, form of trainee answers, order and rate for going through the program, and so on), the forms of teacher interaction with trainees, and the reliability of the evaluation of knowledge.

The general appearance and block diagram of the classroom are given in Figure One.

Figure One



Key: (1) Mirror; (2) Projector;
(3) Equipment Room; (4) Projector;
(5) Door; (6) Screen; (7) Board;
(8) Teacher's Desk; (9) Control
Panel; (10) Relay; (11) Fuse;
(12) Actuating Devices.

Its equipment includes projectors (the KPSH-4 movie projector and LETI-60 and Proton slide projectors), 28 trainee panels, a control panel with answer display indicators, and a glass classroom board.

The projector is designed for showing teaching information and control question tests. The trainee panels, control panel, and display unit make it possible to ensure that the trainees' knowledge is consistently monitored and results of monitoring are analyzed. The glass board may be used for ordinary chalk writing (right hand side of the board) or for showing "see-through" images (left half).

While situating technical devices in the classroom, it was considered that work with them should be outstanding in its comfort and simplicity, and no additional interference should be introduced during training periods. For this reason, all projection equipment was removed to a separate room (the equipment room) which is adjacent to the main room.

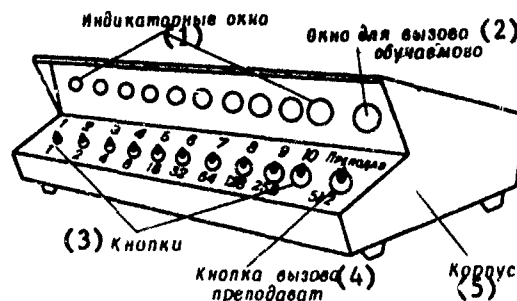
Remote control of this equipment is carried on from a special panel by buttons and switches. There is a niche in the wall between the classroom and equipment room, and the left half of the classroom board, which is made of semigloss glass, is mounted in it. It forms a light screen. The direction of the beam from the projectors to the screen is guided by a deflecting mirror. Changing the distance of the projectors from the mirror and the angle of turn of the latter ensures the necessary size and angle of approach of images on the screen. The differences in focusing distances for the movie projector and film strip projectors made it possible to use one mirror for all three pieces.

Locating projection equipment in this way has a number of considerable advantages over the generally accepted system where projectors are set right in the classroom. It eliminates visual and acoustic interference created by the working device. It makes it unnecessary to darken the room in advance. It does not clutter up the room. Furthermore, using the light screen creates additional opportunities for clearer presentation of material. For example, in those cases where the teacher needs to show the movement of changes in the characteristics of a particular system, he can use color chalk to depict these parameters and their transformations against a background of the illuminated initial characteristics and appropriate scale. As a result of this, not only does he save time and labor, but the visual accessibility of the material presented is considerably higher. When it is not being used for projection, the light screen can be used as an ordinary classroom board.

The technical devices for monitoring current progress are located in the primary classroom. Each working position is equipped with a trainee panel (see Figure Two below) with 10 buttons to record answers. A milk-colored window is

Figure Two

Key: (1) Indicator Window; (2) Window for Calling Trainee; (3) Button; (4) Button for Calling Teacher; (5) Housing.

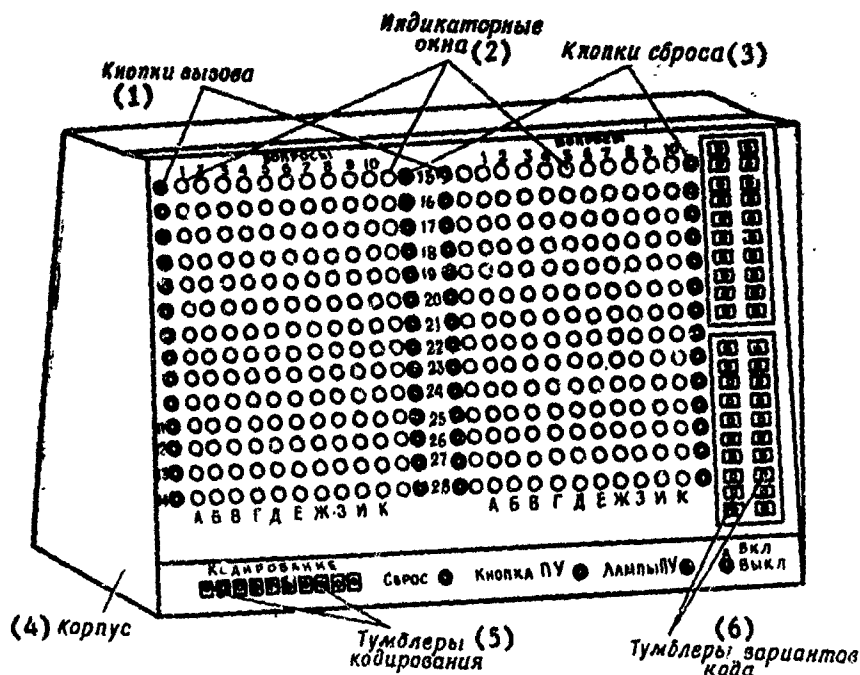


located above each button to give the sign of the answer. If a correct answer (or element of the answer) is recorded when the button is pressed, then a green light goes on in the corresponding window, and if the answer is wrong it is a red light. Each panel has a button for calling the

teacher and a window for calling the trainee, which ensures two-sided signalling during training periods.

All the trainee panels in the classroom have a common electrical circuit with the teacher's control panel (see Figure Three below) which serves to set the answer code, reflect the signs of answers from each working position, and receive and transmit service signals. From the control

Figure Three



Key: (1) Call Buttons; (2) Indicator Windows; (3) Clear Buttons; (4) Housing; (5) Encoding Switches; (6) Code Variation Switches.

panel, the teacher can turn the illumination of the indicator windows at the working positions on or off and remove answers previously registered when moving to the next question. The elements for controlling working positions are designed on the panel with indicator displays which contain 28 lines of numbered windows. Each line has 11 windows, 10 of which indicate the signs of the answers and one for calling the teacher. Just as at the trainee panels, the signs of the answers on the control panel are reflected by green or red light and the result is stored for the time that a question is being monitored (until the teacher pushes the "Clear" button).

The panel design makes it possible to set up one code variation of answers or four variations simultaneously. Furthermore, the panel makes it possible to monitor trainee actions without any indications at their working positions. The indicator may be turned on only after the teacher has analyzed and evaluated results, which eliminates the possibility of multiple corrections of previously recorded answers.

The main advantage of this system of monitoring devices for the classroom is its extensive methodological capacities. Unlike many well-known automated classrooms which primarily work with simple selection of forms of answers (a set of answers is given to a question and only one is correct), this classroom makes it possible to use questions with answers in various forms and, by the same token, greatly broaden the variety of methods used in programming the process of monitoring progress. Let us give several examples.

1. Questions Requiring an Answer in the Form of Simple Whole Numbers.

Determine the size of the synchronizing moment of a selsyn receiver M_s of an induction, synchronous transmission, if the angle of rotation of the rotor of the selsyn transmitter is 60 degrees, while for the selsyn receiver it is 30 degrees, and the value of the maximum synchronizing moment $M_s \text{ max} = 8$ gram-centimeters. (The answer, 4 gram-centimeters, is recorded by pressing the fourth button).

In those cases where the answer is a multidigit number, it is recorded as the sum of numbers in accordance with the rule of binary transformation. For example, the number 60 is recorded by pressing the third, fourth, fifth, and sixth buttons, which is equivalent to the sum of $32 + 16 + 8 + 4 + 0 + 0$ (the corresponding numerical values are indicated by each button).

2. Questions Requiring an Answer in the Form of Binary Numbers.

Determine the sum of the following binary numbers:

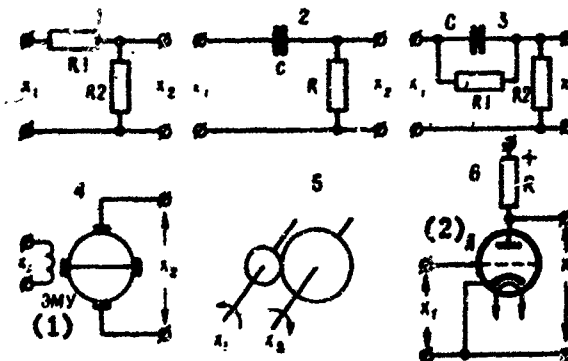
01000010
10100001
00010000.

(The answer, 11110011, is recorded by pressing the first, second, fifth, sixth, seventh, and eighth buttons.)

3. Questions Requiring Multielement Selective Answer.

Which of the electrical circuits and elements of automatic equipment shown in Figure Four below, have identical dynamic characteristics?

Figure Four



Key: (1) Amplidyne;
(2) Tube.

(The answer, the first, fifth, and sixth, is recorded by pressing the buttons with the corresponding numbers).

In teaching practice, wide use is also made of other question forms, particularly block-type questions which it is convenient to use to check knowledge of particular diagrams, charts, and characteristics. Where they are used, a code table is compiled in advance with an indication of diagram elements, chart sectors, and characteristics. Such a table makes it possible to ask a large number of questions orally to the entire group at once. Questions are given in approximately the following form, "What elements of the functional circuit of the automatic control system are described by the equation of a proportional (aperiodic, fluctuating, and so on) link?" or "On a chart of current change in the relay coil when it is turned off and on, indicate the sectors that correspond to the maximum (or minimum) value of coil inductance."

The classroom has been successfully used for practical training periods for three semesters. The presence of clear feedback during training periods makes it possible for the teacher to maintain close contact with students, maximally activate their work in performing calculations, and give timely help to those who fall behind. Thanks to the availability of mechanical equipment for various purposes in the classroom, at each stage of exercises the teacher can streamline his work.

A system of monitoring devices is used to check the students' readiness for training periods and also to monitor the correctness with which they perform calculations during exercises. For flexibility and convenience in posing questions, film strips are used which contain, in accordance with lesson plans for the exercises, questions and a list of answers to them. In the course of the training period, the teacher illuminates the next question on the board-screen and, while the students are thinking over the answer, sets up the code of this answer on the panel and asks that results obtained be recorded. Where there are a large number of mistakes (this is signalled by the windows on the display unit), the teacher calls one of the students to the board for an explanation of the process of solving the problem or himself gives this explanation.

Training films are used to explain complex processes. Of particular use are film strips (film with a fragment of a particular process, enclosed in a loop), which are shown in one or two minutes and graphically reveal the order in which the process being studied occurs.

In conclusion we would like to note that, despite the positive aspects pointed out above, these classrooms must be improved. Specifically, ways should be sought to reduce preliminary work by teachers to a minimum. It is also necessary to improve the design of mechanical monitoring equipment. After all, the existence of memory for only one assignment (or question) limits their capabilities for increasing the pace of individual monitoring. Furthermore, monitoring equipment ensures that the signs of elements of the answer are established, but it does not evaluate the fullness and correctness of the total answer. The teacher performs this function.

Solving all these problems will make it possible to use mechanical equipment in the teaching process even more efficiently and, consequently, sharply raise the quality of educational work.

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