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USSR Report

MILITARY AFFAIRS

(FOUO 27/79)

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PAMPHLET ON MILITARY DISCIPLINE

Moscow VOINSKAYA DISTSIPLINA (Military Discipline) in Russian 1977 signed to press 22 Dec 77 pp 1, 2, 3-6, 46-47, 48

[Annotation, Table of Contents, Introduction and Conclusion from the book by A. I. Zarubin, Izdatel'stvo DOSAAF SSSR, 40,000 copies, 48 pages]

[Text] [Annotation] In a popular form and using vivid examples the pamphlet shows the role of discipline in the Soviet Armed Forces and its significance for the combat readiness of the troops.

The pamphlet is designed for preinduction youth and servicemen.

Contents

A Letter to the Reader

Young friend! You at present are in school or working. In the morning you go off to school or a vocational-technical school, to the plant or to the fields. You listen to your teachers, you work at the machine or drive a tractor, plowing the land for the future crop. In the evening you head with

your comrades to the movies, to the stadium or club, you read a book, you watch television or study in a DOSAAF circle.

Along with millions of Soviet persons of the older generations and your confrers, you participate in the life of our great socialist motherland, and you are building a beautiful society which is unprecedented in the history of mankind, communism.

And of course, in the flow of various concerns, of large and minor considerations you certainly will remember the day when you must leave for military service. This necessity is dictated by the fact that our people must build a communist society under the conditions of the surviving danger of military attack from the imperialists.

Our party has steadfastly and consistently carried out the policy of peace proclaimed by the great Lenin. We are creating new plants and factories, power plants and oil fields, nurseries and schools, we are building enormous cities, we are draining swamps, laying roads and growing gardens in order that the life of the people may become even richer and more beautiful. But our enemies are inventing new weapons systems, and they are allocating fantastic amounts of money to equip and train their armies in order to destroy all of this.

The workers of the entire world look with pride and inspiration at our people as the pioneers of communism, they see in the Soviet nation the future of human society and draw strength and inspiration in our history for fighting for their liberation from the rule of capital. But the imperialists, in fearing that the sparks of our revolutionary fire will jump to their roofs, shower the country of Great October in a flood of lies and slander, and endeavor by any means to distort and defame the very idea of communism and to maintain the degrading system of exploitation.

The imperialists have endeavored by fire and sword to return our nation to the camp of imperialism. They sent hordes of interventionists armed to the teeth to stifle Soviet power during the first days of its establishment.

They repeatedly endeavored to instigate military actions against the Soviet nation during the years of the first five-year plans, but always received a proper rebuff from our valorous Armed Forces. On 22 June 1941, the German fascists committed a treacherous attack on the Soviet country, in aiming at destroying and enslaving our people. The most rabid anticommunists at present would do this with great satisfaction if they did not fear that the war instigated by them would end as the previous one did, and would not be the last page in the bloody history of imperialism.

The Soviet Army and Navy are a powerful factor for ensuring the peace and security of our motherland, the creative labor of the Soviet people, and are a guarantee for peace on the earth.

The military might and invincibility of our Armed Forces are based upon people, the Soviet soldiers whom our people have armed with first rate weapons and equipment, they have provided all the conditions for training and labor, and have provided all that is necessary for successfully carrying out the responsible tasks confronting them. One of the greatest patterns in the organizational development of the Soviet Army and Navy has been the periodic replacement of their personnel. While the officers and warrant officers ["praporshchik," "michman"] serve an extended time in the army, the basic mass of servicemen, the youth, serve only 2-3 years. Having served the time stipulated for them under the Law Governing Universal Military Service, they return to peaceful labor. And their place is taken by other young men.

In following this pattern your turn will come to serve in the Armed Forces, and to defend your motherland with weapons in hand. "To defend the fatherland," states Article 133 of the Soviet Constitution, "is the sacred duty of each Soviet citizen."

The interests of successful communist construction demand that you serve honestly and conscientiously, and be constantly ready to engage the aggressors and crush them. In order to meet these requirements, you must show a feeling of profound responsibility for military duties, understand all the importance of a soldier's duty, you must have a perfect knowledge and expertly control the weapons and military equipment assigned to you, and be flawlessly disciplined and organized. And you must always remember that while on military service you are personally responsible for the fate of the motherland.

The Soviet military, like the previous generations of the defenders of the motherland, night and day, in the summer heat and winter cold, vigilantly and constantly stand the difficult and responsible service of the defenders of the peace and happiness of their people, and are constantly ready to thwart the evil plans of the enemies. Many of the soldiers are outstanding men, class specialists and masters of their job. With a feeling of profound responsibility, as true Soviet patriots they spare neither their forces nor their time in mastering the complex art of modern combat. And precisely such soldiers--the outstanding men and class specialists--comprise the might of our army and are the true continuers of the heroic traditions of the Soviet Armed Forces.

You in your time will replace them and will carry out their duties. For this reason even now it would be good for you to know more about the army and of the procedures instituted in it.

From the pamphlet offered here you will learn of Soviet military discipline and of the demands which it places on servicemen.

[Concluding Word]

You have the good fortune to live in significant times. Under the leadership of the Leninist Communist Party, the Soviet people are successfully building a communist society. Our nation is becoming ever richer and more powerful, and its international prestige is ever higher. It has become the social vanguard of mankind and the bulwark of liberty and peace on the earth.

The peace-loving policy of our party and the Soviet government has won remarkable victories over the imperialist reaction. The carrying out of the historic decisions of the 25th CPSU Congress will raise our motherland to new heights of material and social progress, and will make the life of our people even better, more beautiful and happier.

In building communism, we, however, should not forget that in the imperialist camp there still are active and influential forces which find our successes not to their liking. Blinded by hate for communism, they do not see and do not want to see the realities of the modern world. These forces are doing everything to impede the process of the normalization of relations between the two world systems, and to attempt to halt the historically irreversible socialist transformation of human society. Precisely they inspire and support world counterrevolution, by various methods they endeavor to undermine progressive movements, they are increasing the military budgets and are continuing the arms race which is onerous for the peoples.

No one can be certain that at some moment these aggressive forces will not endeavor to put the weapons to use and turn back the wheel of history. Their weapons exist, and in large amounts. And as yet they do not wish to abandon their production but on the contrary allocate enormous amounts of money for this.

Our Armed Forces are defending the peace and security of peoples. This is now their noble mission and their purpose. In order that they can successfully carry out this mission, each Soviet soldier must profoundly understand his calling, his duty to the motherland and all working mankind.

You are a future soldier! And when you will be called into the army, try as quickly as possible to become a skillful, courageous fighter who terrifies the enemy. Let your filial love for the Soviet fatherland, your unflinching loyalty to our communist ideas, your personal unswerving loyalty to the military oath be for you a source of inspiration in your glorious military service!

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PARTY ORGANIZATION IN THE MILITARY COLLECTIVE

Moscow PARTIYNAYA ORGANIZATSIYA V VOINSKOM KOLLEKTIVE (The Party Organization in the Military Collective) in Russian 1977 signed to press 9 Aug 77 pp 7, 49-50, 51, 113-114, 115, 163-164, 165, 237-238, 239, 270-271, 272, 303, 304, 343-344, 345-347

[Annotation, table of contents, introduction, conclusion and excerpts from chapters 1-7 of book by LtGen M. G. Sobolev, Voyenizdat, 35,000 copies, 349 pages; 2nd Rev and Exp Ed]

[Text] Based on concrete examples, the author reveals the substance, forms and methods of the work of Armed Forces party organizations; he acquaints us with their special features and shows the role of communists in mobilizing all personnel to accomplish the decisions of the 25th CPSU Congress and the requirements of the USSR Minister of Defense on increasing the combat readiness of elements, units and ships in every way possible.

The book is intended for a broad group of active party members among commanders, political officers, students and officer trainees of Armed Forces educational institutions.

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Introduction

The 25th CPSU Congress was a prominent political event in modern times. As the Soviet citizen conducts an in-depth study of the decisions of the Congress, and primarily the report of L. I. Brezhnev, general secretary of the party Central Committee, "Report of the CPSU Central Committee and the Party's Immediate Tasks in Domestic and Foreign Policy"--all party organizations use the principles and conclusions of this report as a guide in their work on a daily basis--he becomes more clearly aware of the majestic program of communist construction which was adopted at the forum of Soviet communists.

The successful realization of the task planned by the party congress in the area of foreign policy, the economic, social and cultural development of our society, the communist indoctrination of the Soviet people and strengthening the nation's defense capability is inseparably linked to the future strengthening of the CPSU and to an increase in the level of activity and independent action of the party organizations.

The new USSR constitution, which was developed under the leadership of the CPSU and its Central Committee, reflects the historic accomplishments of the Soviet people during the years of Soviet rule; it provides a detailed description of the role and place of the CPSU in our nation; the CPSU is the leading and directing force in Soviet society, the nucleus of its political system and all governmental and public organizations.

The CPSU is the proven collective leader of our nation, the inspiration and organizer of all its victories. No matter where the Soviet people are located, they always feel its wise leadership and its beneficial, educational influence everywhere. Based on the decisions, plans and appeals of the CPSU, the material basis for communism is being created, socialist social attitudes are being developed and improved and a new man is being molded and educated. The party is directly organizing these creative processes and it is guiding them both on a country-wide scale and in all sectors where the new society is being created, right down to the smallest industrial labor collectives and military collectives.

Therefore, the large role that the primary party organizations, which make up the foundation of the CPSU, play is understandable. Their widespread network encompasses practically all the elements of Soviet society. Our party presently includes more than 390,000

primary organizations, over 400,000 shop organizations and approximately 530,000 party groups. This is an enormous force which the party continually relies on. The primary party organizations influence all apsects of the Soviet people's lives and activities; they reach each person. It is precisely through them that the party carries out its policies and decisions in localities, ensures that social and industrial processes develop in the direction required, ensures the approval of positive events and the elimination of negative ones and educates and leads the masses forward.

As our society advances toward communism, the party's leading, organizing and ideological indoctrination role steadily increases; this means that the requirements on its primary organizations also increase. "The degree of party leadership," Comrade L. I. Brezhnev pointed out in the CPSU Central Committee's keynote address to the 25th Party Congress, "is directly dependent upon how aggressively and independently the primary party organizations operate--the organizations which make up the foundation of our party.

"The primary party organizations are on the cutting edge of economic and cultural development; they operate in the very midst of the people. All their work actively promotes the unity between the party's policy and the rich creativity of the masses and it promotes successful accomplishment of economic, political and ideological indoctrination tasks."*

All of this completely applies to the Armed Forces party organizations which make up the CPSU's combat detachment. Through them, the party is firmly linked with the masses of servicemen; through them, it indoctrinates, unites, organizes and mobilizes Armed Forces personnel to successfully accomplish combat and political training missions, to stand duty in an exemplary manner, to maintain prescribed order firmly, to steadily increase force combat readiness and combat capabilities and to strengthen our motherland's defense capabilities. It is natural that, as the Soviet nation moves toward communism, the development of the scientific and technological revolution--and the fundamental, qualitative changes connected with it in personnel, weapons, organization, combat training methods, indoctrination and all the Armed Forces activities--increases the demands on primary party organizations in the military collectives of elements, units and ships, headquarters and directorates and various USSR Ministry of Defense military establishments, educational institutions, construction sites and enterprises. While working under the leadership of political agencies, the party organizations are called upon--together with the one-man

* "Proceedings of the 25th CPSU Congress," Moscow, 1976, p 67.

commanders--to actively promote timely and complete accomplishment of the missions assigned to the Armed Forces by the CPSU and the Soviet government.

The party views the further ideological and organizational strengthening of its organizations in the Armed Forces and a further increase in their aggressiveness and militancy as one of the crucial conditions for successful organizational development of the Soviet military, for maintaining a continuing, high level of combat readiness in the armed forces and for ensuring a durable peace and security for the Soviet people--the builders of communism. As is well known, this was reinforced in the party's program. "The CPSU's leadership of the Armed Forces and the increased role and influence of party organizations in the Armed Forces," it was written in the program, "are the alpha and omega of military organizational development."*

The CPSU Central Committee again directed attention to this in its Welcome to the Fifth Armed Forces Conference of Party Organization Secretaries (1973). "...An increase in the militancy of party organizations and in the aggressiveness of all communists is of special importance," this document states." For this purpose, it is important that each party organization is constantly concerned about increasing its ideological work, steps forward as a supporter of everything new and advanced, has an irreconcilable attitude toward deficiencies and initiates socialist competition for outstanding mastery of equipment and accomplishment of combat and political missions."

The Armed Forces party organizations are firmly and persistently implementing the party's policy and decisions. They are steadfastly increasing their aggressiveness and militancy. Their activities are based on the general principles of party organization developed by V. I. Lenin and on the standards and principles included in the CPSU Program and Manual. Everything that the communist-servicemen do and everything they live by is inseparably, implicitly linked with the party's life and with its revolutionary activities, traditions and future development.

At the same time, it must be taken into account that the party organizations in military collectives function under specific conditions in the socialist state's Armed Forces which are called

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*"KPSS v rezolyutsiyakh i resheniyakh c"yezdov, konferentsii i plenumov TSK" (The CPSU in Congress Resolutions and Decisions and Central Committee Conferences and Plenums) (hereafter, "The CPSU in..."), vol 8, Moscow, 1972, p 282.

upon to vigilantly protect and firmly defend the accomplishments of Great October, the honor, freedom and independence of the Soviet motherland and USSR national interests. This explains certain special features in the organizational structure of Armed Forces party organizations, the missions facing them and their work methods and patterns. The special features under discussion were reflected in the Regulations on Political Agencies and Instructions for CPSU Organizations in the Soviet Armed Forces, which were approved by the CPSU Central Committee. These documents are of primary importance to Soviet Armed Forces commanders, political agencies and party organizations.

How are the party organizations set up in military collectives? How do they live and work? What are the special features in the structure of these party organizations and how do they manifest themselves? What are the specific patterns and methods of their activities under various conditions? How do Armed Forces party organizations--under the leadership of political agencies and in close harmony with the one-man commander--accomplish the missions assigned to the USSR Armed Forces by the party and government? This book is devoted to these questions.

CHAPTER 1. THE PARTY'S COMBAT DETACHMENT

/Excerpts/ The CPSU is the proven leader of our nation. Its wise leadership determines the success of the Soviet people in building communism and strengthening our motherland's foreign policy positions. "The party's leading, mobilizing role," it was pointed out in the CPSU Central Committee's keynote address to the 25th Congress, "is not an abstract concept. It is life itself; it is all our daily, practical experience."*

The CPSU leadership is the primary source of the Soviet Armed Forces strength and military power. All issues of defense of the socialist fatherland, of military organizational development and of military theory and practice are resolved in our country in compliance with the party's policy and based on its instructions. Soviet servicemen respond to the party's steadfast concern for the development of the Armed Forces with fervid, filial love for the CPSU and its Leninist Central Committee. The most important mission for commanders, political agencies and party organizations is to further unite all servicemen around the CPSU, indoctrinate them in a spirit of endless devotion to the ideas of Marxism-Leninism and indoctrinate them in a spirit of Soviet patriotism and socialist internationalism.

* "Proceedings of the 25th CPSU Congress," pp 67-68.

The communists in the Armed Forces are our party's combat detachment. The widespread network of party organizations--which are organized in accordance with general party principles and considering the special features of the military--ensures their continual political influence in all military collectives. However, the structure of party organizations and the administrative and political patterns of their activities cannot be viewed as something set down in concrete. On a daily basis, all Armed

Forces supervisory party agencies focus their attention on developing and improving party organizations in accordance with the development of the party itself and in accordance with the changes taking place in military organizational development and Armed Forces organization.

In close harmony with the one-man commander--in whose hands all troop command functions are concentrated--political agencies and party organizations organize their practical activities in building political cohesiveness among personnel and in indoctrinating servicemen in a spirit of endless devotion to the motherland and in a spirit of being ready to defend its interests with weapons in hand. Strengthening unity of command in every way possible on a party basis and increasing the influence of political agencies and party organizations--which implement the party's policies in the Armed Forces along with commanders--is a single process which ensures that personnel of units and ships are trained at a level which meets contemporary requirements.

CHAPTER 2. IN THE PARTY'S FORMATION

/Excerpts/ Experience with party organization activities within the Soviet Armed Forces testifies to the fact that the CPSU is steadfastly conducting a policy to democratize party organization intraparty affairs. Only in exceptional circumstances and during wartime has the party restricted intraparty democracy in Armed Forces party organizations.

Military party organizations are called upon to continue improving intraparty relations. The problem is one of freely discussing the urgent problems of party policies and practice, delegation and accountability of party agencies, expanding the collective basis of party work and improving party information. "The persistent development of intraparty democracy and an increase in the standards levied on each party member are Leninist principles," the CPSU Central Committee's keynote address to the 25th party congress states, "not a passing phase. They are the basis of party development today."*

* "Proceedings of the 25th CPSU Congress," pp 64-65

The purity and strength of party organization ranks are very important conditions for their combat capabilities. The mission of Armed Forces political agencies and party organizations is to carry out the party's requirements regulating replacements even more persistently and insistently. The problem is one of strictly observing the principle of individual selection and of accepting the best servicemen of the leading professions into CPSU ranks--serviemen who occupy key positions in carrying out the missions of unit and ship combat readiness and who spare no efforts in selflessly accomplishing their military duties. At the same time, it is important to systematically draw all communists into active party affairs and to increase the role of various means of party influence in this respect--individual and collective means of influence, primarily party meetings--and it is important to make broader use of the proven indoctrination method of criticism and self-criticism.

Persistent observance of the principles of democratic centralism and strict compliance with the Leninist standards of party life and the principles of party leadership are very important directions for improving the party organization in the Armed Forces and they are powerful factors in increasing the initiative and creative activity of communist servicemen and the combat capabilities of party organizations.

CHAPTER 3. THE NUCLEUS OF THE MILITARY COLLECTIVE

/Excerpts/ As already noted, party work in military collectives has certain special features. However, this does not reduce the party organizations' role and responsibility for increasing the quality and efficiency of party work and it does not limit their initiative and creativity in the struggle to increase the combat readiness of the Armed Forces. While working in close harmony with commanders and their political deputies, the party organizations are called upon to have an active influence on all aspects of the life, combat training and service of personnel and to mobilize communists, Komsomol members and all servicemen to accomplish the combat training missions facing elements, units and ships.

Each party organization of an element, unit or ship becomes strong by relying on the masses, uniting and indoctrinating them and developing their responsibility for the group's success. Non-party activists are united around the party organization. The more assistants the party organization has, the more successful its work will be and the more noticeable its influence will be on personnel in all the primary areas of unit and ship life--combat and political training, socialist competition and strengthening military discipline.

With the methods inherent in it, the primary party organization is called upon to achieve a situation where the communists and all members of the military collective work in harmony and steadfastly strive for the common goal.

When organizing party work in military collectives under modern conditons, it must be remebered that educated and comprehensively trained young adults are now coming into the Armed Forces. Part of the young people are being drafted into the Armed Forces directly from schools and it is not easy for them to surmount the difficulties of military service which has become a great deal more complex. Naturally, the political and military indoctrination of these replacements require higher skills and more flexible forms of party influence on personnel from commanders and political officers.

While creatively using the proven means of mass political work and individual work directed at molding and strengthening each military collective, party organizations are daily achieving a situation where all servicemen, without exception, are steadfastly implementing the historic decisions of the 25th CPSU Congress, are selflessly carrying out their patriotic and international duties, are strictly observing the USSR Constitution, the requirements of Soviet laws and military regulations and the standards of communist morality and have a clear awareness that they have been assigned a responsible mission--defending the historic accomplishments of Great October.

CHAPTER 4. UNDER VARIOUS CONDITIONS

/Excerpts/ Party organizations are actively and productively functioning in all sectors and areas of Soviet military organizational development. Their efforts are concentrated on accomplishing the missions assigned to the USSR Armed Forces by the CPSU, missions which, as is well known, are expanding in accordance with the requirements of daily affairs: their scope is expanding and the subject matter is becoming more complex. This means that party organizations will have to tirelessly increase the quality and efficiency of their activities and they will have to take a comprehensive approach to the ideological, political, military, labor and moral indoctrination of communists, all servicemen and all Armed Forces blue and white collar workers.

It is well known that work goes well when its purpose and significance are clear to people. The better understanding communists and all servicemen have of the importance and

requirements for their work within the overall system of ensuring superior combat capabilities and combat readiness for the Armed Forces, the greater their energy and aggressiveness in accomplishing combat training missions. This is precisely what party organizations are called upon to achieve using the methods inherent to them.

In a regiment or on board ship, in a headquarters or in a directorate, in a military academy or in a military school, at a scientific research institute or in a medical institute, at a construction site or at an enterprise--everywhere, by personal example and in-depth explanatory work, communists are called upon to continue to mobilize servicemen and blue and white collar workers to accomplish the duties assigned to them in an irreproachable manner, to work selflessly with a high degree of organization and discipline and to courageously overcome the difficulties and obstacles on the path to achieving their goal.

The affairs and activities of the party organizations in military collectives of the various services and branch arms of the Armed Forces have their own special features. It is not necessary to list them since they were discussed above. It is only important to emphasize that party work has the most noticeable results when it is organized with due regard for these special features and when it is based on an in-depth knowledge of Armed Forces life, the missions being accomplished and personnel needs and requirements. Moreover, it must be remembered that these special features change and they are frequently transient in nature. Therefore, a creative approach is required in studying vital processes and events, in organizing party work and in struggling to improve its quality and efficiency.

In their multi-faceted activities, party organizations consider the requirements of modern warfare and strive to achieve a situations where all commanders and chiefs organize personnel training and indoctrination and have a clear understanding of the enormous moral, physical and psychological trials which the Soviet serviceman will encounter in modern combat and have a clear understanding that it is necessary to prepare him to defend the Soviet motherland with a surfeit of endurance--ideological, combat and moral.

The creative work of communist servicemen and of everybody they indoctrinate, organize and lead stimulates new successes in improving elements, units, ships and the Armed Forces as a whole for combat. Like streams, these successes flow into the mighty

river of the achievements of the Soviet people--the builders of communism. Popular wisdom says that a drop is nothing--the wind blows it away easily, the sun dries it out and the ground absorbs it. But, after combining with a large number of other drops, it becomes a sea and there is no longer any force which can destroy it. Thus, the military labor of Soviet servicemen, labor which is directed at strengthening the defense capability of the Soviet nation, flows into the enormous stream of successes in building communism, successes which are being achieved by our people under the leadership of the CPSU and its Leninist Central Committee.

CHAPTER 5. ON THE IDEOLOGICAL FRONT

/Excerpts/ The goal of ideological work in the Armed Forces is to form a scientific, Marxist-Leninist outlook in personnel and to inculcate in each serviceman: communist insight; unlimited devotion to the party, people and the Soviet motherland; a feeling of friendship for the people and socialist internationalism; intelligent discipline and superior vigilance; an ability to transform the political knowledge obtained into an active life position to successfully carry out his military duties; a readiness and ability to carry out his patriotic and international duty at any time in a worthy manner; and to defend the historic accomplishments of socialism.

Party organizations are called upon to organize their indoctrination work so that each CPSU member and candidate member--no matter what post he occupies or where he is located--is a messenger of the omnipotent Marxist-Leninist ideas and an avid champion of their implementation. The CPSU Manual requires the communists to conduct an in-depth study of the great teachings of K. Marx, F. Engels and V. I. Lenin and CPSU policies and decisions, explain them to the toiling masses and always set the example in implementing party ideals. Based on his position and calling, the communist can never waiver a single iota anywhere in his Marxist-Leninist ideological conviction and party principles. He must decisively fight any manifestation of bourgeois and revisionist ideology, moralities which are alien to us and survivals of the past in the consciousness and deeds of backward members of society. A communist does not have the right to pass by disloyal discussions. The person who is mistaken must be corrected, disuaded and helped to investigate the essence of the matter; the public enemy, the narrow-minded person who spreads another person's slander and who intentionally distorts vital events and facts, is publicly dealt a principled blow.

The ideological struggle does not accept or tolerate any compromise or appeasement. The strength of Marxist-Leninist ideas lies in their great, vital truth, reliability, scientific nature and militancy and in their principled and class irreconcilability to everything that is outmoded, reactionary or harmful. The ideas of communism inspire and unite the toiling masses; they mobilize enormous creative energy in them to successfully build the material basis for communism, to improve socialist social relations and to mold a new man. In the situation of the Soviet Armed Forces, Marxist-Leninist ideas, which have been mastered by the majority of the servicemen, are reflected in their superior military expertise, intelligent discipline, endurance, determination, courage, revolutionary vigilance and constant readiness to deliver a crushing defeat to any aggressor.

CHAPTER 6. THE PARTY ORGANIZATION AND THE KOMSOMOL

/Excerpts/ The communist indoctrination of young adults and the leadership of Komsomol organizations are important and responsible areas of party work. This makes it mandatory for party organizations to conduct an in-depth analysis of the affairs of Komsomol collectives, to direct the work of committees and bureaus on a daily basis, to transfer their knowledge and experience to them and to teach young activists how to overcome difficulties, i.e., it makes it mandatory for them to achieve a situation where Komsomol organizations assist commanders on a daily basis in indoctrinating ideologically convinced, intelligent servicemen who are patriots and internationalists, who are firm, skillful and courageous defenders of the socialist fatherland and who are mastering modern weapons and hardware to a tee.

One of the important missions of the party organizations is to assign young party members and candidate members to Komsomol work and to increase their sense of responsibility for the quality and efficiency of communist indoctrination for Komsomol members and young adults and for all the activities of Armed Forces Komsomol organizations.

CHAPTER 7. AT THE HEAD OF PARTY ORGANIZATIONS

/Excerpts/ The large and responsible missions facing Armed Forces party organizations stimulate them to constantly improve the level of party work and to improve their ideological and organizational activities among servicemen.

The quality and efficiency of party work is directly dependent upon the qualifications of party workers, their level of ideological and political training and practical experience, their ability to rely on active members and to make the greatest possible use of the creative forces of the entire communist collective. The following are important missions for political agencies and for unit and ship political deputies: carefully selecting party leaders, systematically improving their theoretical edge and inculcating in party organization secretaries and activists a high standard of party principles, the ability to objectively evaluate the results of their work and to compare them with general party and national interests and the ability to eliminate deficiencies in their work in a timely manner.

When the party staff conducts an in-depth analysis of the affairs of party collectives in all their diversity and when they have an objective influence on the qualitative development of these affairs, the daily leadership of party organizations by political agencies will be more noticeable. Political agencies, primarily formation political departments which are directly exercising their leadership of party organizations, must not devote their attention to superficial facts but to the entire range of the processes and phenomena in party reality.

A further improvement in the leadership of party organizations by superior party agencies cannot be achieved by any one-time action or by using any single work method. Success in this matter lies in a comprehensive approach and in developing and implementing measures which will have the greatest effect on an overall increase in the work of Armed Forces party organizations by having an effect on the primary areas of party life, the selection, ideological tempering and training of party activists and arming them with advanced techniques.

CONCLUSION

/Text/ The duties of the primary party organization are broad and multi-faceted. It has large and responsible missions. Everything that the military collective does and everything that it lives by are directly and immediately included within the interests and concerns of the party organization. It is responsible for everything. Moreover, when the communists are welded closely together by the unity of their thoughts, will and actions and when they raise, discuss and resolve urgent problems in a principled manner, the strength of the party organization's influence on the masses is greater and more profound.

Closely united under a Leninist banner around the Party's Central Committee and armed with the historic decisions of the 25th CPSU Congress, the Armed Forces party organizations are actively operating in one of the primary, most important and responsible areas of national development. Under the leadership of political agencies and together with the one-man commanders and their political deputies, the party has entrusted the party organizations to strengthen and raise, in every way possible, the combat capabilities and combat readiness of the USSR Armed Forces, which are called upon to vigilantly protect and, in the event of an enemy attack, steadfastly defend the Soviet motherland and its national interests. A deep understanding of the importance and responsibility of this mission stimulates enormous creative energy in communist servicemen. Each of them is aware that by successfully accomplishing his party and military duties and by increasing the combat readiness of his element, unit or ship, he is thereby contributing to a common party and national cause and directly participating in the construction of communism.

Under the leadership of the CPSU, our Soviet nation is confidently proceeding toward communism. It is not afraid of the storms and tempests which are raging in the modern world. No attempts by international imperialism and its underlings--bourgeois ideologists, revisionists and renegades of various stripes--

are able to divert it from its straight and narrow course, nor are they able to restrain its firm pace. The Soviet people are armed with a true compass--the omnipotent doctrine of Marxism-Leninism. An experienced helmsman--the CPSU--is steering them to their goal. This arouses a legitimate pride in communists, and at the same time, it increases their responsibility for their personal successes and for the state of affairs in their collectives and in the country as a whole. They are conscientiously working in the areas entrusted to them; they are devoting all their strength, capabilities, knowledge and experience to the common cause. This is precisely what ensures high prestige for the party organizations.

The Soviet servicemen are rallying more closely around the communists; they are following them and they are not sparing any effort or time in further increasing the combat capabilities and combat readiness of the Armed Forces and in strengthening the defense capability of the USSR and all the fraternal countries of the socialist camp. Soldiers and sailors, sergeants and petty officers, warrant officers, officers, generals and admirals, blue and white collar workers of the Soviet Armed Forces see their party organizations as their closest leaders, mentors and educators, organizers and instigators of collective labor and as the creative force which always entices and allures them to good deeds and inspires them to renewed success in combat and political training. This is the pledge that our Armed Forces are honorably handling and they will honorably handle the large and responsible missions assigned to them by the CPSU.

The enormous political and labor enthusiasm of the Soviet people and our servicemen--enthusiasm which was evoked by the decisions of the 25th CPSU Congress and the glorious anniversary of Great October--reached new heights due to the national discussion and unanimous approval of the USSR Consititution. The hearts of our people were filled with pride for the successes achieved. The unshakable confidence and conviction in the correctness of Lenin's ideas, the wise leadership of the CPSU and the prominent victories in constructing communism stimulate new energy in us and arouse us to selflessly work on behalf of the further strengthening of the Soviet fatherland's economic and defensive might.

9001
CSO: 1801

SOVIET COMMENTS ON U.S. AIR FORCE AND AIRCRAFT

Improved Airborne Command Posts

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 4, Apr 79 signed to press 6 Apr 79 pp 45-47

[Article by Lt Col B. Grigor'yev: "Improved Airborne Command Posts of the USA"]

[Text] In the global system for operational control of the U.S. armed forces, an important place is assigned to airborne command posts (ACP) which, in the estimation of the American command, are less tied down in conducting general nuclear war. It is emphasized in the foreign press that the primary job of an ACP consists of providing stable and reliable control of the armed forces in the event of a breakdown of ground-based command posts.

Since 1962, specially equipped EC-135 airplanes of various modifications (in all, more than 40 aircraft) have been used in the U.S.A. as ACPs. At the beginning of the seventies, the military and political leadership of the U.S.A. came to the conclusion that the existing EC-135 airplanes in operation do not satisfy the demands made of them: they were not designed for an extended period in the air; they have insufficient work area space; they are fitted with obsolete communications, automated processing and data displays; and they are poorly shielded from the harmful elements of a nuclear explosion. In this connection, a program for developing improved JCS [Joint Chiefs of Staff] and SAC [Strategic Air Command] ACPs was approved in 1973 and is expected before 1983.

ACP composition, function and deployment. Currently, there are three E-4A airplanes in the First JCS ACP Squadron which were developed based on the Boeing 747 wide-bodied aircraft. According to American press reports, the JCS ACP is the alternate point for controlling the armed forces during the outage of the main command center in the Pentagon and the alternate at Ft. Ritchie (90-95 km northwest of Washington). In the event of a state of emergency, it is intended for the accommodation of the U.S. President and a group of accompanying persons. It is not ruled out that the Secretary of Defense or Chairman of the JCS may be with the President or at the head of a separate

group in the ACP. In accordance with the adopted program, the First JCS ACP Squadron was redeployed in the second half of 1977 from Andrews airbase (state of Maryland) to Offut airbase (Nebraska) at which the ACP aircraft of the SAC commander is also based.

The joint basing and maintenance of the JCS and SAC ACPs, in the estimation of the American command, will provide significant savings of resources which are expended on their maintenance and servicing. Additionally, after the SAC commander's E4B ACP goes into operation, it will make it possible to realize an interchangeability of the JCS and SAC ACPs which will significantly increase their operational use potential.

In order to carry out the tasks of alternate control point of the U.S.A.'s supreme military-political leadership, one of the JCS airborne command post aircraft will be constantly on combat alert at Andrews airbase in preparation to receive the President and accompanying persons aboard at any time.

According to foreign press reports, until the redeployment of the JCS ACP to Offut airbase, one of its aircraft on the ground was on constant 15-minute combat readiness while periodically performing training flights. The flight norm was 25 hours per month. Combat alert in the aircraft was provided by five crews.

ACP characteristics. The total useable space in the E-4A aircraft is 429.2 square meters. Located on its upper deck is the crew cabin, navigation equipment, and the crewmembers' rest accommodations. On the middle deck are the work accommodations for the supreme military-political leadership and operational staff and their rest area as well as stowage for a portion of the equipment. On the lower deck is the radioelectronic and communications equipment and auxiliary accommodations.

The work area of the middle deck is divided into compartments. Located in them specifically is the conference room of the supreme military-political leadership with nine working positions; a projection compartment; accommodations for conducting conferences; the working room of the operations group with 29 work positions; a display console for data on emergency situations; and the technical control facility for operating the communications subsystems.

Installed in the supreme military-political leadership's compartment are three display screens for incoming data, the president's control panel and three telephones (four according to several foreign press reports). One is known by the designation "the red telephone" (it has an automatic encoding system) and is intended for communications with the command posts of the strategic forces. The second is intended for communication with all the command posts of the armed forces of the U.S.A. The third is for communicating with the NATO headquarters staff.

In all, as many as 95 people may be on the E-4A aircraft, including 27 flight and engineering and technical personnel, and the operations group of 39 people (18 of them officers).

Improving the ACP. American military specialists consider that the operation of the E-4A aircraft as ACPs will make it possible to accumulate and correlate the experience received and use it in developing an improved ACP (the E-4B aircraft) which will be distinguished by more modern equipment, primarily communications facilities and automated data processing and display.

According to foreign press reports, the E-4B aircraft has the following characteristics: a maximum take-off weight of 363 tons; length, 70.5 m; wing span, 59.6m; maximum speed, 980 kph (at 9,000 m altitude and 272 tons loaded weight); service ceiling, 14,000 m; 12 hours flight endurance without refueling.

Installed in the aircraft are F 103-GE-100 turbofan engines (static thrust of each, 23.8 tons), an inflight refuelling system which provides continuous 72-hour airborne watch, and a new 1,200 kVA electric power system for the radioelectronic and communications equipment.

The foreign press notes that the airborne command post in the E-4B aircraft will be fitted with modern radioelectronic equipment and communications facilities which will make it possible under any conditions, to maintain reliable communications with all the control points of the global operational control system of the U.S. armed forces. In so doing, great attention is being centered on protecting the fuselage and individual components of the equipment from the effect of a nuclear explosion's electromagnetic pulse.

According to foreign press data, the E-4B ACP is planned to have 13 individual communications subsystems, the main ones of which are:

--A communications subsystem via the DSCS-2 earth satellite system. It is considered that its band (7,250-8,400 MHz) will provide the ACP with reliable communications during the employment of nuclear weapons and active and passive jamming.

--A communications subsystem operating in the AFSATCOM satellite communications system in the VHF band. By this means, the supreme military-political leadership plans to establish teletype communications directly with the ICBM and strategic bomber launch control points.

--An HF and VHF communications subsystem, the composition of which will be six 1 KW-power transmitters and seven receivers. They will provide operations on 75 telephone and telegraph channels and can be used in the air-ground and ground-air networks simultaneously in various combinations.

--A long- and ultra-long wave communications subsystem (considered the most durable during a nuclear explosion) which operates in the 14-60 KHz band. It is intended for carrying the instructions of the supreme military-political leadership to the strategic forces (ICBMs, SSBNs and bombers). A new, high-power transmitter is installed aboard the ACP with an antenna (about eight km long and 1.5 cm in diameter) which is let out through a narrow hatch in the fuselage.

Also mounted in the ACP is an internal telephone communications system which will be able to accommodate 150 telephone units (it's planned to increase the number to 225).

By 1983, the American military command envisions buying six E-4B aircraft, three of which will be used as JCS ACPs and three as SAC ACPs. According to foreign press data, the cost for developing and testing the aircraft and equipment will be $353.2 million by the end of 1981. In addition, $499.5 million are ear-marked for servicing and technical maintenance, and $28.1 million for establishing auxiliary maintenance buildings. Thus, the total sum of the expenditures will be $880.8 million.

The first E-4B aircraft is planned to be fully filled out with all the necessary equipment and delivered for SAC ACP operation in mid-1979 and the subsequent two during 1980-1981. In 1981-83, the three E-4A aircraft currently used as JCS ACPs are expected to be converted to improved E-4B ACPs.

In the opinion of American military specialists, the introduction of the new E-4B aircraft into the airborne command post service of the JCS and SAC will enable the supreme military-political leadership to receive a more precise means of control of the strategic offensive forces to which a main role is allotted in the aggressive intentions of American imperialism.

Phantom Aircraft Construction Program

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 4, Apr 79 signed to press 6 Apr 79 pp 48-51

[Article by Engr-It Col (Res) I. Alekseyev: "The Phantom Tactical Fighter")

[Text] In mid-1978, a number of articles appeared in the American military press which were devoted to the production of the 5,000th fighter-bomber of the F-4 Phantom series. The authors of the publications emphasized that these aircraft hold first place in the U.S.A., both in duration of serial production (the first test flight of an experimental model was conducted 27 May 1958) and in scale of production.

The Phantom is considered the most common tactical fighter in the air forces of the NATO member countries. In addition to the USAF and USN, these aircraft have been adopted by the air forces of Great Britain, the FRG, Greece and Turkey, as well as Israel, Spain, Iran, Japan and South Korea. They are given a significant place in the aggressive plans of the militarist circles of the U.S.A. They continue, as before, to be sent to the troops. By its combat capabilities it will, in the opinion of American military specialists, meet modern requirements up to the beginning of the eighties.

During 20 years of operation, the McDonnell Douglas F4 has been produced in more than 20 various modifications and variants. According to foreign press data, by 1974, the firm had orders for the production of 4,974 fighters: 3,976 of them for the Pentagon; 998 planes for export. The total cost of the production program for the U.S. Defense Department was $10,491 million. The average cost for a single series-produced model is $2.64 million.

The dirty war unleashed in Southeast Asia by the American imperialists exerted great influence on the scale and pace of F-4 fighter production. Thus, in the period 1966-68, the production rate was 50 planes a month on an average, and reached the maximum in the beginning of 1967 (70 planes).

The F-4 Phantom fighters of the various modifications and variants are basically identical in their aerodynamic arrangement. In the process of operation, the aircraft have been continually modernized with the aim of increasing combat effectiveness, primarily by fitting them with more powerful engines, improved weapons systems, and on-board radioelectronic equipment. With the exception of the fighers purchased by Great Britain, all these have been equipped with J 79 turbojet engines from the American firm, General Electric. Brief data on the fundamental modifications of the F-4 fighter, taken from the foreign press, are cited below.

The F-4A (in all, 47 aircraft were manufactured for naval aviation) is a two-place, supersonic, all-weather, long-range, tactical fighter intended for intercept of airborne targets at high altitude using air-to-air guided missiles; assaulting ground, shore and marine targets; and for direct air support of ground forces using conventional and nuclear bombs, air-to-surface guided missiles, unguided rockets and other types of weapons. The typical external indicators are: a low, swept wing (the sweep is 45 degrees along the leading edge) with some positive dihedral; a slab stabilizer with negative dihedral; and a single vertical stabilizer empennage. Based on the peculiarities of operating a fighter aboard an aircraft carrier, the outer wing is made to fold. A brake hook is located underneath the tail section of the fuselage, by which, during the fighter's landing on the aircraft carrier deck, braking is accomplished by means of engaging one of four arresting gear cables.

The aircraft fuselage is all-metal, semi-monocoque construction. The landing gear is tricycle. The power plant consists of two J79-GE-2 turbojet engines with maximum thrust of 7,300 kg in afterburner. Fuel (7,570 liters) is stowed in two wing- and six fuselage tanks. In addition, a 2,270 liter capacity fuel tank can be suspended beneath the fuselage and two tanks with a capacity of 1,365 liters suspended on wing pylons. The fighter is fitted with an airborne refuelling system, the receiving probe of which is found in the left side. In flight it is retracted flush with the fuselage surface.

Aircraft armament: six Sparrow-3 air-to-air guided missiles, four of which are suspended beneath the fuselage in a semi-flush position, and two on wing

pylons. The fighter can carry conventional or nuclear bombs. The AN/APQ-72 weapons control radar system is mounted in the nose section of the fuselage.

The F-4B was produced only to the order of the USN command (in all, 649 airplanes were built). The first series of fighters (40 planes) were equipped with J70-GE-2 engines. In the rest, J79-GE-8 turbojet engines (with 7,700 kg maximum thrust in afterburner) were installed. These aircraft have more improved on-board radioelectronic equipment: AN/APQ-72 radar; A/A 24G computer for producing flight parameters; ASA-32 autopilot; AN/ASQ-19 communications, navigation, and IFF system; AN/AJB-3A aircraft position display and bombing system; AAA-4 infrared sight, etc. Aircraft armament was also increased. Added are: six Sparrow-3 guided missiles or four Sparrow-3 and four Sidewinder air-to-air guided missiles, the Bullpup air-to-ground guided missile, unguided rockets, conventional bombs of varied designation and size, nuclear bombs, and other munitions. The maximum weapons load is 7,250 kg. Armament is located on four fuselage and five [sic] wing attachment points.

The F-4C was serially produced from 1963 to 1966 and supplied to the USAF. In all, 583 aircraft were manufactured, of which 36 were purchased by Spain. The powerplant consists of two turbojet J 79-GE-15s with a maximum thrust of 7,700 kg in afterburner. On-board radioelectronic equipment are: AN/APQ-100 radar, AN/AJ3-7 bombing system, AN/ASN-48 inertial navigation system, AN/APN-155 low altitude radio altimeter, AN/ASN-46 navigational computer, and radio communications equipment. A part of the USAF F-4C fighters (two squadrons) were fitted with special equipment intended for jamming an enemy's air defenses. They were equipped with reconnaissance receivers, jamming transmitters, devices for ejecting dipole reflectors and carried anti-radar guided missiles.

The F-4D was supplied to the USAF (757 aircraft) and was purchased by Iran (32) and South Korea (36). In comparison with the previous modifications, a portion of its radioelectronic equipment was more improved. In particular, it was fitted with the AN/APQ-109 radar, AN/ASN-63A inertial navigational system, ASG-22 gun sight, and AN/ASQ-91 weapons control electronic computer system.

The F-4E began to enter USAF line units in 1967. According to the estimation of American specialists, by virtue of its tactical and technical characteristics, armament, and on-board equipment, it is the most improved of the Phantom series of airplanes. The F-4E is widely employed not only in the U.S.A. (809 aircraft were purchased), but also in the air forces of other countries: Australia (24), Greece (56), Israel (204), Iran (177), Turkey (72), FRG (10), South Korea (19) and Japan (13). The fighter is fitted with two J79-GE-17 turbojets (maximum thrust with afterburner, 8,120 kg; without afterburner, 5,400 kg). The new AN/APQ-120 radar is included in the weapons control system. Distinct from fighters of other modifications, a built-in 20mm, six barrel M61A1 Vulcan cannon (640 rounds of ammunition) is installed in the aircraft and is intended primarily for destroying targets at short distances during aerial combat. In addition, its maneuverability was

improved by the installation of controllable wing slats on the leading edge of the wing. They occupy 70% of the span of each wing and assure the performance of a 180 degree turn within 15.5 seconds (at about 700 kph airspeed and 3,000 m altitude). It is noted that this time would be approximately 20 seconds for a fighter without slats. Under otherwise equal conditions, the turn radius was reduced by 20%.

Since 1973, F-4E aircraft have begun to be fitted with the ASX-1 television device which makes it possible to accomplish visual identification of air and ground targets at great distances. Through the USAF Tactical Air Command's "Wild Weasel" program, a portion of the F-4E aircraft (they are getting the designation F-4G) are being fitted with radioelectronic jamming equipment (specifically, the APR-38 system) which will provide the capability to detect, identify and determine the location of an enemy's operating radars and to employ anti-radar guided missiles or other types of weapons against them. The F-4G will be able to function independently or in a group of strike aircraft, providing them with the necessary data on the detected radars. Through the program, it was planned to outfit 116 F-4G aircraft with the APR-38 system (two in 1976, 15 in 1977, 60 in 1978 and 39 in 1979).

The F-4EJ is a variant of the American F-4E fighter which was purchased by Japan. In accordance with an agreement concluded at the end of 1968 between representatives of the U.S.A. and Japan, the first two fighters were supplied without any changes by the American firm, McDonnell Douglas. The remaining 125 fighters were manufactured under license with the delivery of some structural parts and components from the U.S.A. Construction of the F-4EJ fighters in Japan is being accomplished by the firms, Mitsubishi and Kawasaki. The first flight of an F-4EJ was performed in January 1971. The customer introduced several changes in the aircraft's equipment and armament. Specifically, it was fitted with gear for warning of irradiation of the aircraft by an enemy's radar and with the Japanese-produced AAM-2 air-to-air guided missile.

The F-4F is a variant of the F-4E fighter acquired by the command of the FRG air force and is distinguished from it mainly by the equipment on board. Delivery of the airplanes to the FRG (175 units) was carried out from May 1973 to July 1976.

The F-4J (an improved variant of the F-4B fighter) was delivered to line units of USN aircraft carrier aviation and USMC aviation in 1966-1972 (522 planes). It is intended for use as a fighter-interceptor with a reserve capability for inflicting strikes on shore and marine objectives. Mounted in the aircraft is the J79-GE-10 turbojet engine (maximum thrust in afterburner, 8,120 kg), the AN/AWG-10 doppler impulse control systems, the AN/AJB-7 bombing system, and the AN/APQ-59A multi-functional radar. The flight and technical characteristics and armaments are, in the main, the same as the F-4E fighter, with the exception that the built-in Vulcan cannon is absent. In order to extend the period of operation in the units and to improve the tactical and technical characteristics, the F-4J fighters are now being modernized (the variant has received the designation F-4S): the engines are

being improved, the heavy-duty structural elements of the fuselage are being reinforced, and the wing is being fitted with slats which will provide a reduction of landing speed by 20 kph.

The F-4K is a variant of the F-4B which is being delivered for the British Navy (52 planes). The first squadron of these aircraft, under the English designation FG.1 Phantom, entered the aviation complement in March 1969. The American engine in them was replaced with the more powerful RB. 168-25R Spey turbojet bypass engine from the English firm Rolls-Royce (maximum static thrust without afterburner, 5,670 kg; in afterburner, 9,440 kg). The change of engines, as reported in the foreign press, did not provide the expected results, however. By such important characteristics as the combat ceiling, radius of operation, and maximum speed, the English Phantom is inferior to the American one. Foreign specialists consider that one of the reasons for the reduction of the fighter's flight characteristics in the unfavorable position of the engine exhaust cross-sections coupled with the significant increase of bottom drag. In the aircraft, the composition of the on-board equipment is partially changed, due chiefly to change of armament. Thus, besides the American Sparrow, Sidewinder and Bullpup guided missiles, the fighter may be armed with the Martel, and in place of 70 mm unguided rockets, French 68 mm unguided rockets are used. The fighter's armament may also be strengthened by the hanging of three units with 20 mm, six-barrel Vulcan cannons on it.

The F-4M is basically analogous to the F-4K fighter. It was purchased by Great Britain for its air force (118 planes) and has the designation FGR.2 Phantom. Distinct from the FG.1 fighter, the tips of its wingd do not fold and also the arrestor hook is absent. Delivery of the fighter to air force line units began in August 1968. Some quantity of the aircraft was delivered in a training variant.

Apart from what is described above, the RF-4B, C, and E tactical reconnaissance aircraft were also developed and produced by the McDonnell Douglas firm. They are all variants of the tactical fighters of the specific modifications, aboard which photo-reconnaissance equipment was installed in place of armament.

The RF-4C was produced on order of the USAF. Its serial production (505 units) ran from May 1964 to February 1972. The aircraft was fitted with three basic reconnaissance systems: the AN/APQ-102 side-looking radar, the AN/AAS-18 infrared set, and a set of interchangeable aerial photo camera systems for oblique and panoramic photography. An AN/APQ-99 surveillance and navigational radar is also located in the lengthened nose section of the fuselage.

Since 1965, the RF-4B (46 planes produced) has been in marine aviation service. The reconnaissance equipment is analogous to that installed in the RF-4C aircraft and is in the nose section of the fuselage which has been lengthened by one meter.

The RF-4E was purchased by the FRG (88 units), Israel (6), Iran (16), Japan (14), Turkey (14), and Greece (8). Distinct from preceding modifications (RF-4B and RF-4C), the composition of the aircraft reconnaissance equipment was somewhat changed.

The tactical and technical characteristics of the various modification and variants of the F-4 Phantom differ slightly from one another. Basically, these differences concern maximum speed, service ceiling, and manueverability due to fitting the fighters with engines of different power. As reported in the foreign press, the F-4E and F-4J feature the best flight characteristics: their maximum speed and service ceiling exceed by 200-250 kph and 1,000-1,500 m, respectively, the comparable characteristics of the fighters of the remaining modifications. According to the latter data published in the foreign press, the F-4E fighter has the following basic tactical and technical characteristics:

Crew	2
Weight (kg)	
Maximum take-off	28,000
Empty	13,760
Weapons load	7,250
Maximum wing loading (kg/m^2)	569
Maximum air speed at 11,000 m altitude (kph)	2,300
Rate of climb (m/sec)	250
Service ceiling (m)	about 18,000
Combat radius (km)	
Fighter-interceptor variant	1,300
Fighter-bomber variant	800
Ferry distance (km)	800
Dimensions (m)	3,185
Length	19.20
Height	5.02
Wing span	11.77
Wing area (m^2)	49.20

The total accrued flight time of some of the first modification fighters from beginning of operation to the present has reached about 5,000 hours.

The F-4 fighter is continuing in serial production in the U.S.A. (12 planes monthly on the average). Thus, compared with the initial contract, which called for the production of 375 aircraft in all (closure of the production line was planned in 1965), the total production of the Phantom fighter was increased more than 13-fold. Production of the F-4EJ in Japan is expected to end in 1980-1981.

Pilotless Aircraft Capabilities

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 4, Apr 79 signed to press 6 Apr 79 pp 51-52

[Article by Lt Col I. Chistyakov: "The 432d Tactical Drone Group"]

[Text] In the United States Air Force [USAF] in recent years, considerable attention has been given to the development of drones which, in the opinion of American specialists, are one of the important means for conducting aerial reconnaissance and radioelectronic warfare, along with piloted aircraft.

As reported in the foreign press, drones were used rather extensively during the aggressive war unleashed by the American imperialists in Southeast Asia. Currently, their operational use rests with the Tactical Air Command [TAC].

In 1976, a special subunit was formed in USAF TAC--the 432d Tactical Drone Group (Davis Monthan Air Base, Arizona), becoming part of the 12th Air Force [armiya]. It includes the 11th and 22d Drone Squadrons. Until 1976, the 11th Squadron was attached to the 355 Tactical Fighter Wing and the 22d (formerly designated the 350th Strategic Reconnaissance Squadron) had been part of the 100th Strategic Reconnaissance Wing.

There are 44 AQM-34V radioelectronic warfare drones in the equipment of the 11th Air Squadron (20 of which are in operation and 24 are in combat-ready condition in warehouse storage) as well as five DC-130A carrier aircraft. Each of the DC-130A aircraft is able to carry four drones, launch them, and control the flight.

The AQM-34V is an improved variant of the AQM-34EW drone which was used by the American air force for jamming air defense radar equipment during the Vietnam aggression. It is fitted with a 740 kg-thrust J 69-T-29 turbojet engine. Its flying speed is 740-800 kph and employment altitude 3,000-10,000 m. The aircraft is equipped with two wing pylons on which ALE-2 or ALE-38 containers with anti-radar reflectors can be suspended. In addition, five active jamming sets can be installed in them (one operates in the band up to 250 MHz and two in the 500-1000 and 2,000-3,000 MHz bands respectively).

Reconnaissance drones of several modifications are in the equipment of the 22d Squadron. The main one of them, the AQM-34M, is intended for conducting aerial photo reconnaissance from low altitudes. In all, there are 37 AQM-34M drones in the squadron; of them, 12 are in operation and 25 are in a combat-ready state in warehouse storage.

The AQM-34M aircraft is fitted with a single J 69-T-41A turbojet engine (thrust 870 kg). Its flight speed is 740-1,000 kph. It can fly at altitudes up to 16,000 m, but aerial reconnaissance is, as a rule, carried out at altitudes of 150-300 m. The aircraft's reconnaissance equipment includes one Fairchild KS-120A aerial photo camera with a film supply of about 2,000 m (the film width is 70 mm and frame dimensions 64x240 mm). Instead of the

KS-120A, another aerial photo camera can be installed (the choice is made depending on the mission and the conditions for carrying it out.

In addition to the AQM-34M, there are other reconnaissance drones in the 22d AS, including the AQM-34L (TV) which, besides an aerial photo camera, is fitted with a television camera, making it possible to conduct aerial surveillance with the transmission of the data in real time to a ground-based command post.

Launch and flight control of the reconnaissance drones are carried out from DC-130E carrier aircraft (there are four such aircraft in the squadron, on each of which two drones can be suspended).

After carrying out a combat mission, a drone is withdrawn to the recovery area where it lands using a parachute. It is transported from the recovery area by air aboard specially equipped CH-3 helicopter.

In addition to the 11th and 22d Squadrons, training and other auxiliary subunits are in the 432d Group. There is a total of 830 men in it, 117 drones of various modifications, 12 DC-130A and E carrier aircraft, and ten CH-3 helicopters.

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SOVIET COMMENTS ON U.S. LASER WEAPON DEVELOPMENT

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 5, May 79 signed to press 4 May 79 pp 35-39

[Article by Col B. Romanov]

[Text] The military-political leadership of the USA continues to intensify the arms race, and it is trying to achieve military superiority over the USSR, developing fundamentally new types of weapons on the basis of current achievements in different areas of science and technology. Because quantum electronics has been enjoying swift development in recent years, particularly in regard to high energy lasers, American imperialists are laying great hopes on creating laser weapons.

Foreign armament experts are interested in the laser, or the optic quantum generator, owing to its capability for generating very narrow beams of radiation containing highly concentrated electromagnetic energy propagating at the speed of light. Depending on the power and duration of the laser's emissions, the nature of this effect on a target will vary.

The destructive action of powerful laser emissions manifests itself mainly as a practically instantaneous increase in temperature of the irradiated surface, which can result in overheating of the surface, its ignition, burning, or other thermomechanical damage.

We can gain an idea of the vulnerability of targets to threshold laser power from the following figures: A laser with output power of 15 kw (the scattering diameter at the laser focus would be 1 mm) can cut an aluminum plate about 13 mm thick at the focus of the beam at a rate of 2.3 m/min.

In the estimation of foreign military experts powerful laser emissions may be effective against aerospace vehicles and electron-optic observation, reconnaissance, and weapon guidance resources. Moreover they can disturb the normal operation of infrared, television, and radar homing heads in guided missiles, bombs, and projectiles.

Laser emissions are highly dangerous to human organs of vision. Thus exposure of the eye to emissions with an energy density greater than 1 joule/cm^3 would result in total loss of vision.

It follows from reports in the foreign press that intensive research is being conducted abroad to work out the tactical characteristics and specifications of high energy lasers used as the basis for creating laser weapon systems. In the USA, for example, work is being done on three basic types of high energy lasers--gas dynamic, electroionizing, and chemical.

Briefly, the principal of action of the first of these is as follows. A mixture of fuel and air is ignited in a combustion chamber. Ninety percent nitrogen to which a small quantity of water or helium is added is sprayed into the incandescent combustion product (1,200-1,500°C) containing up to 10 percent carbon dioxide (CO_2). This excited gas mixture is fed under high pressure through a framework of supersonic nozzles into a chamber under a high vacuum, as a result of which the mixture quickly expands and cools as it passes into an optic resonator formed out of the system of mirrors. Here, due to a sharp drop in temperature the gas mixture releases energy in the form of light quanta, and thus laser emissions are generated (wavelength 10.6 μ). Consequently in a so-called gas dynamic CO_2 laser the working gas mixture is subjected to thermal pumping. A laser with low emission power is used as a master generator to raise the effectiveness of the laser's work. In the opinion of American experts the low efficiency of the gas dynamic laser, which is for practical purposes about 1 percent, makes such devices extremely cumbersome, and it requires high consumption of fuel and gases to obtain high power laser emissions.

We know that the pumping action in an electroionizing laser is the product of an electric discharge in the working gas mixture, which is initially ionized by an electron beam. Thus its composition may include electron guns. But there are also other possibilities for achieving preliminary ionization which would exclude the use of an electron beam. Lasers with an efficiency attaining 20-30 percent already exist today. However, high-power sources of electricity would have to be available for work with a high energy electroionizing laser.

Emissions are generated in chemical lasers due to excitement of the working gas mixture by energy released as a result of reactions between fuel components.

The USA is working on chemical lasers in which hydrogen, deuterium, and fluorine or its compounds are used as the fuel components. These components are introduced into a combustion chamber, in which the chemical reaction proceeds. The resulting working gas mixture is fed through a framework of supersonic nozzles into an optic resonator. The wavelength of the emissions of a chemical laser using hydrogen and fluorine (HF) is 2.8 μ, while that of a fluorine-deuterium (DF) laser is 3.8 μ.

According to estimates made by American experts the quantity of energy per unit weight of fuel components assumes the following typical values for the types of lasers examined here: 6-10 kilojoules/kg for gas dynamic lasers, 40-60 kilojoules/kg for electroionizing lasers, and 100-200 kilojoules/kg for chemical lasers.

High energy lasers may be operated in both continuous and pulsed emission modes.

Special optic systems containing metallic mirrors having a higher reflection factor are being developed to shape a powerful, narrow laser beam and aim it at the target. These mirrors are being made in particular out of copper-molybdenum alloys with a dielectric coating, and they employ a forced cooling system, liquid as a rule. Mirrors of this type may withstand emission densities greater than 100 kw/cm^2.

American experts have stated that problems in transmitting powerful emissions over great distances in the atmosphere are also being encountered in the creation of laser weapons.

We know that when radiation passes through the atmosphere, the radiant flux attenuates due to absorption and scattering of energy. The degree of this attenuation depends on the state of the atmosphere. It should be noted that there are several areas in the spectrum in which the atmosphere is transparent. These are the so-called atmospheric transparency windows. The infrared regionsof the spectrum in the 3-5 and 8-12 μ ranges are of practical interest as windows. It is at these wavelengths that modern foreign high energy lasers operate.

Propagation of super-powered laser emissions in the atmosphere elicits arisal of nonlinear effects that include, in particular, defocusing of the beam due to heating of air along its path and electric breakdown of the atmosphere. This imposes additional requirements on the emission output power and the time of emission or the pulse repetition rate.

To achieve maximum intensity in emissions striking a target, the laser beam must be highly directional. Its divergence (θ) depends on emission wavelength (λ), and the size of the outlet aperture (d)* with a consideration for the laser's optic system, and it is expressed as the ratio

$$\theta = \frac{1.22\ \lambda}{d} \quad \text{(radians)}.$$

Thus the lower the emission wavelength and the larger the laser's outlet aperture, the smaller is the angle of divergence of the laser beam, and consequently the greater is the concentration of energy within it. It is believed that divergence should be about 10^{-4} -10^{-5} radians.

It has been reported that considering the conditions under which a powerful laser beam must pass through the atmosphere, continuous-emission lasers would be more advantageous at lower ranges while pulsed lasers would be better at greater ranges. Outer space, in which energy losses would be minimum over great distances, is believed to be a practically ideal medium.

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*The outlet aperture is defined as the diameter of the emissions spot (in the absence of the optic system this would be the diameter of the radiating body)--*Editor*.

The energy capabilities of lasers, the conditions under which emissions propagate through the atmosphere, and their destructive action on the target will define the place and purpose of laser weapons in the future. It is believed that lasers may enjoy application mainly as defensive resources for the ground troops, though some foreign military experts foresee a possibility for using them at short range for offensive missions as well.

It has been noted in the foreign press that the following would be the most probable areas of combat application of laser weapons: antiaircraft defense of ground objectives (ships) and troop concentrations against low-flying airborne targets; protection of airplanes, mainly bombers, from air-to-air and ground-to-air missiles; destruction of manpower and combat equipment.

The possibilities for creating three types of laser weapons are being studied: low power--to blind and incapacitate manpower (mainly combat crews); medium power--to blind electron-optic apparatus of various purposes and subject low-flying or close-range targets to destructive forces; high power--to subject antiaircraft, antimissile, and cosmic defense systems to destructive forces.

A graph representing the effect of laser emissions on a target depending on emission densities can be used to estimate the range of a laser weapon with output power from 100 kw to 10 Mw and an optical laser beam focusing system with a diameter of 0.5-2 meters.

The computations did not account for thermal emissions and plasma formation, and the laser emission absorption factor was assumed to be equal to 1 for nonmetallic materials and 0.1 for metals. The effect of atmospheric absorption, beam defocusing, air ionization, and vaporizing target material are approximated in the graph (correspondingly the cross-hatched zones *a*, *b*, *c*, *d* [figure not reproduced]).

The region used to determine the characteristics of the laser weapon lies within the cross-hatched strip on the graph, the lower and upper boundaries of which mark the limiting emission densities for targets exposed to lasers with an output power of 100 kw (optical focusing system diameter--0.5 meters) and 10 Mw (2 meters) respectively.

Many major American companies and scientific organizations have been asked to participate in the work of creating laser weapons, which has been going on in all branches of the US Armed Forces since the 1960's. Ranges for testing high energy lasers and weapon models have been built.

The ground troops are developing a mobile laser weapon system intended for close-range troop antiaircraft defense. Tests on such a system, mounted on an armored transporter modified for this purpose, were conducted in the mid-1970's. The experimental model was designed on the basis of an electroionizing CO_2 laser with an output power of 10-50 kw operating in continuous emission mode. It was reported that during the tests a helicopter was hit by a laser beam at a range of about 900 meters.

According to the opinions of foreign military experts laser weapons may enjoy successful application mainly against high-speed low-flying maneuverable airborne targets, including guided missiles. In contrast to conventional antiaircraft resources, which required consideration of the time needed by a missile or an airplane to intercept the target and computation of the target lead coordinates, the need for all of this is avoided with a laser weapon, the destructive energy of which travels to the target at the speed of light. For practical purposes this deprives the target of its possibilities for evasive maneuvers. Moreover the laser beam can be aimed at a new target quickly.

Tests were conducted on a high energy chemical laser developed on order of the navy in 1978 at one of the test ranges of the USA. During the tests, a "Tow" antitank guided missile was destroyed by a powerful laser beam. Target search and tracking was performed by a special infrared laser beam guidance and control system.

The air force is also working on a laser weapon to protect bombers against antiaircraft missiles. American military experts believe that provision of laser weapons to bombers will improve their ability to surmount enemy antiaircraft defenses.

High alertness in relation to the aggressive schemes of militarist circles in the USA and in NATO countries, and the unity of peace-loving foreign policy and the readiness to properly repel an aggressor are the starting points of the policy of the CPSU and the Soviet government related to the country's defense capabilities. Our party is doing everything to see that the Soviet Armed Forces would continue to have all of the resources they need to perform their constitutional duty of defending the socialist fatherland. "Our country's economy, science, and technology are now at such a high level," noted USSR Minister of Defense Marshal of the Soviet Union Comrade D. F. Ustinov, "that we are now in a position to create, within the shortest time, any form of weapon upon which the enemies of peace would want to lay their hopes."
[429-11004]

CSO: 1801

SOVIET COMMENTS ON PROTECTION AGAINST NEUTRON WEAPONS

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 5, May 79 signed to press 4 May 79 pp 39-42

[Article by Cand Mil Sci, Col G. Ivanov]

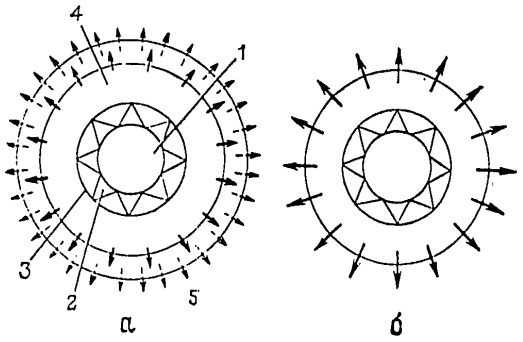
[Text] The US government's decision to begin producing neutron weapons has elicited angry protests from the peace-loving society of all countries against this barbarian resource of mass annihilation of people, and it naturally places the problem of defending ourselves against such weapons on the agenda. As we know, the most dangerous factor of explosion of a neutron weapon is the action of the initial radiation, the bulk of which consists of neutron emissions, this being the source of the weapon's name.*

Before we can correctly assess the possibilities for protecting against neutron weapons and correctly choose the defense resources, we would need to gain a clear idea of the basic features of their design responsible for the high initial radiation yield, and of the mechanism of interaction between neutrons and gamma-radiation on one hand and the target substance on the other.

According to foreign press reports neutron weapons are low-power thermonuclear devices differing structually from classical strategic thermonuclear weapons (see figure). Both types contain thermonuclear charges, and nuclear detonators, the principal of operation of which is based on fission of heavy nuclei, are used to initiate the synthesis reaction. However, in ammunition of the second type the substances subjected to synthesis are encased in a uranium-238 shell which traps fast neutrons generated in the course of the reactions. This is done to increase the total energy of the burst, inasmuch as uranium-238 nuclei split in response to the action of fast neutrons. In neutron weapons, meanwhile, the outer shell is absent, owing to which a tremendous quantity of fast neutrons emerge out of the weapon in the course

*See ZARUBEZHNOYE VOYENNOYE OBOZRENIYE No 10, 1977, pp 37-39--*Editor*.

of synthesis. We should add to this that the thermonuclear charge of a neutron weapon consists of heavy hydrogen isotopes (deuterium--^{2}H, and tritium--^{3}H). The thermonuclear fusion reaction of the nuclei of these isotopes is typified by the fact that a significant quantity of neutrons with an energy level of 14 Mev--that is, with much more energy than in the case of nuclear fission reactions--are released. These features of neutron weapons are precisely what are responsible for the greater yield of initial radiation and its highly injurious action.*



Basic diagrams of a classical thermonuclear (*a*) and a neutron (*b*) weapon: *1*--fissionable material (uranium-235 or plutonium-239); *2*--conventional high-explosive charge; *3*--deflectors; *4*--thermonuclear material; *5*--uranium-238 shell

In order to correctly select the resources and means of protection against neutron weapons, we would have to understand the mechanisms of action of neutrons and gamma-emissions on various substances.

Interaction between neutrons and a substance is characterized by scattering and absorption.

Scattering of neutrons by the nuclei of different elements may be elastic and inelastic. The former type of scattering recalls the collision of two billiard balls. The total kinetic energy after collision is the same as before it, and it is only redistributed between the colliding particles. Such scattering occurs in relation to all neutron energy levels and all nuclei. Given a particular collision angle, the proportion of the neutron's

*For greater detail, see ZARUBEZHNOYE VOYENNOYE OBOZRENIYE, No 9, 1978 pp 27-32--*Editor*.

kinetic energy transmitted to the nucleus depends only on the mass of the latter. The lower the mass of the nucleus, the greater is the proportion of energy it may receive. Theoretically, when a neutron strikes a proton head-on, it may transmit all of its kinetic energy to the proton. Hydrogen-containing materials are especially effective in slowing down neutrons with energy levels below 0.5 Mev.

Inelastic scattering is characterized by the fact that part of the neutron's kinetic energy is first transformed into internal energy of the nucleus in its path; this internal energy excites the nucleus. Then the excess energy of excitation is released in the form of gamma-emissions. Naturally inelastic scattering may occur only in the event that the neutron has a sufficient reserve of kinetic energy to place the nucleus in an excited state. The level of this energy threshold depends on the nature of the nucleus and it is quite variable in relation to different elements. Experts note (in a certain approximation) that inelastic scattering may occur with many, though not all, heavy or moderately heavy nuclei, for example uranium, barium, or iron, if the energy level of the neutron is from several tenths of a kev to several dozen Mev. Inelastic scattering is possible with light nuclei if the energy levels of the neutrons are higher. Thus significant scattering may occur in relation to nitrogen atoms at energy levels about 1.6 Mev, and in relation to oxygen atoms at energy levels greater than 6 Mev.

Neutron absorption means capture of neutrons by the nuclei of different elements. The most general type of capture reaction is so-called radiative neutron capture, following which the nucleus emits gamma-rays. It occurs when neutrons encounter nuclei of any elements. In this case the probability that slow neutrons will be captured is significantly greater than the probability that fast ones would be captured. Cadmium is highly efficient as an absorber of neutrons through radiative capture.

Special mention should be made of neutron absorption by nitrogen nuclei. The nuclei are excited as a result of such capture, which causes arisal of intense high-energy gamma-emissions.

Another form of capture reaction may occur when a fast neutron collides with a nucleus; in this case a composite nucleus that releases a charged particle (a proton, a deutron, or an alpha-particle) forms. In these cases the nuclei remain excited, and they subsequently release gamma-rays. Such reactions happen most frequently when fast neutrons encounter light nuclei.

Foreign experts feel that gamma-emissions also have an effect on living organisms, though much weaker than that of neutrons. As an example it is believed that given an identical radiation dose, development of leukemia and cataracts or occurrence of genetic changes in cells due to the biological action of neutrons manifest themselves about six times more strongly than in response to gamma-emissions. Nevertheless the action of gamma-rays must be taken into account, inasmuch as the intensity of this action accompanying explosion of a neutron weapon, based in particular on emission of gamma-quanta in the course of absorption and inelastic scattering of

neutrons, is extremely high. It is especially important to account for generation of high-energy gamma-quanta in the course of inelastic scattering of neutrons by iron nuclei, inasmuch as iron is the principal ingredient of armament, and this effect transforms it from a source of protection to a source of dangerous gamma-emissions.

The following reactions that reduce the energy of gamma-quanta and annihilate them may occur when gamma-emissions interact with a substance.

A high-energy (more than 1.02 Mev) gamma-quantum passing in the vicinity of nuclei may be annihilated, breeding a pair of charged particles (an electron and a positron). Here breeding is highly probable in the presence of the nuclei of elements with high atomic numbers.

At gamma-radiation quantum energies of 1 Mev and below the so-called Compton effect plays the principal role: As a result of this effect a gamma-quantum striking one of the electrons rotating about an atomic nucleus transmits part of its energy to it, altering the direction of its own movement. The probability of Compton scattering grows as the atomic number of the element rises.

If a gamma-quantum has an even lower energy level but one that exceeds the bonding energy of the electron in the atom next to which it passes, this gamma-quantum may transmit all of its energy to the electron and be annihilated; the electron, meanwhile, is knocked out of its orbit around the atom, creating a so-called photoelectric effect. The probability of this process grows as the atomic number of the element increases, and it decreases dramatically as the energy of the quantum increases.

The cumulative effect of the three reactions described above is such that the absorption coefficient for different materials is minimum for gamma-quanta of particular energy levels (3.5 Mev for lead, 10 Mev for iron, 17 Mev for common concrete, and 50 Mev for water). This is taken into account in the selection of shielding materials. On the whole, the probability of gamma-radiation absorption grows as the density of the substance and the thickness of the shielding layer increase.

Inasmuch as the effectiveness with which neutrons and gamma-emissions are attenuated depends on many oppositely operating factors, protection against fast neutrons and high-energy gamma-rays is an extremely complex problem. It can be solved effectively only by selecting and utilizing an entire complex of protective materials. Thus in the opinion of foreign experts the speed of very fast neutrons should first be moderated by inelastic scattering (materials containing barium and iron are effective in this regard). Then to slow them down even more, the neutrons should be subjected to elastic scattering in mediums containing elements bearing low atomic numbers. Hydrogen-containing materials are thought to be appropriate to these goals. Slow neutrons, meanwhile, can be absorbed by nuclei of many elements.

Attenuation of Initial Neutron and Gamma-Radiation
Traveling Through Different Structures

Shelter Types	Gamma-Radiation Attenuation	Neutron Radiation Attenuation
Upper Stories of a Multistory Residential Building	1.1-1.25	1-1.1
Lower Stories of a Multistory Residential Building	1.6-3.3	1.25-3.3
Basements	3.3-10	3.3-10
Concrete Bunker:		
Wall Thickness--23 cm	5-10	2-3
Wall Thickness--60 cm	50-140	5-10
Partially Buried Shelter Covered by a Dirt Layer 90 cm Thick	50-140	20-100
Underground Shelter	250-500	100-500

It has been noted in the Western press that concrete and moist earth provide some protection from both neutron and gamma-radiation. Although these substances do not contain elements having large atomic weight, nevertheless the significant quantity of hydrogen atoms they contain makes it possible to slow down and capture neutrons, while presence of calcium, silicon, and oxygen makes absorption of gamma-emissions possible. As an example a layer of concrete weakens the neutron flux produced by explosion of a thermonuclear weapon by about a factor of 10. To offer the same protection, a layer of moist earth would have to be 45 cm thick.

The protective properties of concrete are enhanced by including iron oxides in its composition (limonite for example), or by placing small chunks of iron (metal chips, shavings, and so on) in the concrete. Similar results are obtained by adding the mineral barite, which contains barium, to the concrete. A layer of such concrete 18 cm thick weakens the neutron flux by a factor of 10. In the opinion of American experts certain advantages may be offered by presence of boron in the shielding material (for example

in the form of colemanite), inasmuch as the isotope boron-10 quite readily captures slow neutrons. And although this process is accompanied by release of gamma-quanta with an energy level of 0.48 Mev, it would not be difficult to weaken this energy. Lithium-6 is thought to be a good neutron absorber; moreover its use is not accompanied by release of gamma-rays.

Judging from materials in foreign publications about the protective properties of some shelters, underground defensive structures (covered trenches, air-raid shelters, and so on) may dependably protect personnel from the action of initial radiation produced by explosion of a neutron weapon, given presence of concrete or earth of sufficient thickness. However, it is emphasized in this regard that protection must be afforded from all directions, inasmuch as both neutrons and gamma-rays are capable of scattering.

The Table (above) presents data from foreign publications on the degree to which initial neutron radiation and gamma emissions are attenuated on passing through various structures.

The most complex problem is believed to be that of survival of the crews of tanks and other armored vehicles. A layer of armor 10 cm thick exposed to the explosion a neutron weapon would attenuate the flux of high-energy gamma-quanta, formed following capture of neutrons by atmospheric nitrogen nuclei, by not more than a factor of 10.

Attenuation of fast neutrons by armor would be even lower. According to reports published in the foreign press about 50 percent of the impinging flux of fast neutrons would pass through a layer of armor 25 cm thick. Moreover, as was noted above, absorption of neutrons by materials of which the armor is made would cause release of gamma-emissions lethal to the crew. This is why American experts believe simply increasing the thickness of armor would hardly reduce the danger of radiation exposure, and that it would at the same time increase the tank's weight unjustifiably. They feel that integrated utilization of both light and heavy materials would be required in armor intended for protection against neutrons.

Because it is so difficult to increase the protection against fast neutrons afforded to personnel in armored structures, some Western specialists are placing their greatest emphasis on improving the tactics of armored and mechanized formations as the way to reduce the damage that might be caused by retaliatory strikes from the opposing side As an example they suggest concentrating tanks only in the initial phase of penetration of enemy defenses, followed by their maximum permissible dispersal. Moreover, inasmuch as induced activity in armor following an explosion would be insignificant, people are looking at the possibilities for quickly replacing (right on the battlefield) exposed crews with the goal of permitting further use of the military equipment in combat activities.
[429-11004]

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SOVIET COMMENTS ON NATO FIGHTER-BOMBER TACTICS

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 5, May 79 signed to press 4 May 79 pp 43-50

[Article by Cand Mil Sci, Asst Prof, Col B. Khlunovskiy]

[Text] Preparing for war against the Soviet Union and other countries of the socialist fraternity, the ruling circles of capitalist countries in the NATO bloc are continuing to strengthen their armed forces. Tactical aviation is given a significant place in their aggressive plans. It has been given a number of important missions, to include direct air support to ground troops, isolation of the region of combat activities, and some others that could be completed only by striking enemy ground targets, which would mean surmounting the enemy's antiaircraft defenses.

Studying the experience of local wars in Vietnam and the Near East, foreign military experts have noted antiaircraft resources to be highly effective. In particular, by their estimates the Israeli Air Force lost about 100 airplanes in just the first 3 days of the war in October 1973, 90 percent of them being lost to surface-to-air guided missiles and antiaircraft artillery fire.

Foreign experts believe that in the event that combat activities are initiated in European theaters of war, NATO aviation would encounter even stronger opposition, and that it would suffer significant losses, as a result of which it would be unable to complete all of the missions posed to it. Judging from this the Pentagon and the military departments of other NATO countries have started to devote more attention to the problems of surmounting antiaircraft defenses by airplanes in tactical aviation, the main striking power of which consists of fighter-bombers.

Western military experts note that the onboard equipment and weapons of fighter-bombers do not permit them to strike enemy ground objectives without entering into the effective zone of antiaircraft resources. This is why they feel it necessary to implement concrete measures to insure successful combat activities, the most important ones being as follows, judging from the experience of local wars and the results of exercises and flight tests of aviation equipment and weapons: reconnaissance to determine the locations and

characteristics of antiaircraft resources, their annihilation along the flight route and in the vicinity of the targets, selection of the proper flight route and profile, performance of maneuvers, application of electronic jamming resources, use of diversionary groups, provision of fighter cover to strike airplanes, and correct organization of the combat formations.

The foreign press reports that scouting the enemy aircraft resources is one of the most important forms of support to the combat activities of tactical aviation. Such reconnaissance must be performed continuously prior to and during the flight of the fighter-bombers.

In the former case the main goal of reconnaissance is to determine the types and precise locations of surface-to-air missile complexes, antiaircraft artillery, and fighter airfields, as well as the characteristics and operating modes of the defensive weapon control systems. It is conducted mainly by special manned and unmanned reconnaissance airplanes outfitted with various reconnaissance equipment (aerial cameras and infrared television, and other apparatus). The reconnaissance data are used to prepare the fighter-bomber crews for the combat mission (selection of the flight route and profile, determination of the support resources required and of the organization of the combat formation, and so on).

In the latter case the mission of reconnaissance is to determine more precisely the locations of known and newly revealed antiaircraft forces and resources within the zone of the flight route to be taken by the fighter-bombers and in the vicinity of the target so that their characteristics and operating modes could be determined. This information is used to evaluate the threat to friendly airplanes presented by enemy antiaircraft resources and to make decisions concerning the use of electronic countermeasures and performance of one form of maneuver or another, and to guide designated airplanes to the locations of guided missile complexes, antiaircraft artillery positions, and fighter airplanes for their annihilation.

Radar stations are an inseparable part of the control and guidance apparatus of practically all modern air defense systems. It is believed abroad that one of the main resources for their reconnaissance is onboard radiotechnical reconnaissance apparatus; this is why much attention is being devoted to its development. Presently the tactical airplanes of the NATO air forces are outfitted with various types of devices capable of determining, with a certain degree of reliability, the location, principal characteristics, and operating modes of radar stations supporting air defense systems, and which can warn the crew of an impending strike (attack), and so on.

The foreign press has reported that a number of countries are making improvements on apparatus of this sort and creating new such apparatus. As an example the USA is modernizing its AN/ALR-75 onboard station, which produces light and sound signals warning the pilot that his airplane is being picked up by an enemy radar station. From these signals he can determine the type of radar station and the weapon system it is controlling.

In 1977 the U.S. Air Force received the AN/APR-38 onboard station, which is intended for detection of ground radar stations and guidance of weapons to them. According to data published in the foreign press it is being installed aboard F-4 airplanes, and it is distinguished from the previous model in that it operates with high precision even when the density of radar signals is significant. In addition to the usual blocks, its composition includes a receiver intended for detection of antiaircraft guided missile launches, which in the opinion of American experts would permit a fighter-bomber to initiate a maneuver to evade the missile in time.

Annihilation of air defense resources, the Western press reports, is believed to be the main way to insure that fighter-bombers would surmount enemy air defenses successfully.

Analyzing the lessons of the war in the Near East the American journal NATIONAL DEFENSE pointed out that annihilation of surface-to-air missiles is presently a prerequisite of air superiority, and until such time that the latter is obtained, direct air support to ground troops would come at a very high price.

Foreign military experts define the term "annihilation" as knocking out active air defense resources (surface-to-air missile complexes, antiaircraft artillery, fighters) and their control apparatus by missile and bomb strikes. In this case they believe a radar station to be the most vulnerable place of an air defense system. Bombs and guided and unguided missiles are used to strike surface-to-air missile complexes, antiaircraft artillery, and fighters at airfields, as well as other objectives.

As was noted in the American journal AIR FORCE the most effective resource for knocking out air defense system radar stations is aircraft-carried antiradar missiles, for example the Shrike guided missile.

Depending on the situation, fighter-bombers armed with Shrike guided missiles can attack the radar station of an enemy air defense system from both low and high altitude. When attacking from low altitude, the missiles are launched outside the zone of illumination of the airplane by the radar station being hit. The missile performs programmed flight in the first two legs of its trajectory (horizontal flight and climb). In the third leg, which begins at the summit of the trajectory, it switches to passive homing mode. When attacking from high altitude, the entire trajectory of the missile is within the illumination zone of the radar station, and therefore the guided missile switches immediately to the homing mode.

Studying the experience of combat application of Shrike guided missiles, American experts came to the conclusion that they have a number of significant shortcomings. Here are a few of them: the missile's homing head "loses" the radar station after it ceases to operate; there are difficulties in supplying the missiles with homing heads having characteristics corresponding to the data of the radar station to be hit. Moreover Shrike guided missiles are often launched prematurely from an F-4D fighter-bomber due to

errors made by the airplane's computer. According to data in the foreign press all ground-attack airplanes of the U.S. Navy and most fighter-bombers of the U.S. Air Force are armed with this missile.

Improvements are constantly being made in existing antiradar missiles, and new ones are being created. As an example as long ago as 1976 General Dynamics Corporation began developing the Standard ARM antiradar missile, and in 1974 the Texas Instruments Company began work on the HARM, or the high-speed antiradar missile. The latter is to be supplied to airplanes such as the A-4, A-6, A-7 (see insert [insert not reproduced]), F-4, F-14, P-3, and S-3. Fighter-bombers can also use other weapon systems to annihilate or suppress enemy radar stations, surface-to-air missiles, and artillery at relatively safe ranges. They include the Maverick guided missile and guided glide bombs.

As American military experts see it, suppression of air defense systems should usually be assigned to F-4G airplanes intended especially for this purpose (created in the "Wild Weasel" program), or to conventional fighter-bombers that usually travel ahead of the strike groups. The number of airplanes and their payload are determined depending on the situation.

In the opinion of foreign military experts the choice of flight routes and profile significantly influences the effectiveness with which fighter-bombers can surmount enemy air defenses. Correct solution of this problem would mean destroying the objectives with the least losses.

Analyzing the experience of combat activities in Southeast Asia and in the Near East, the foreign press notes that the routes usually taken by fighter-bombers passed over regions containing weak or suppressed air defenses, as well as through zones that could not be illuminated by enemy radar. In this case, to insure covert approach to objectives, the flights were performed in most cases at low and minimum altitude, capitalizing on cover afforded by the terrain.

As an example American fighter-bombers and ground-attack airplanes struck objectives in the vicinity of Hanoi predominantly at low altitude from the direction of the Gulf of Tonkin, their routes paralleled the (Tam Dau) Range and the (Kui-Yen-Tu) Mountains, and the targets were usually approached by surprise from the northwest and northeast respectively.

The basic premises governing the choice of flight route and profile mentioned above can be found in modern official documents regulating the use of NATO tactical aviation. They are broadly employed in the course of preparations for combat and in all sorts of aviation exercises.

Foreign military experts feel that maneuvering by fighter-bombers reduces the effectiveness of countermeasures by enemy air defenses.

Maneuver is defined in this case as change of an airplane's flight parameters (altitude, speed, direction) with the goal of reducing the probability of being hit by a surface-to-air missile, antiaircraft artillery fire, or enemy fighters. A maneuver is performed with a consideration for the nature of the enemy grouping and the combat capabilities and principals of application of the opposing side's antiaircraft forces and resources. There can be three types of airplane maneuvers--antimissile, evasive, and antifighter.

Illuminating the experience of combat application of tactical aviation, the foreign military press notes that fighter-bombers performed the most diverse maneuvers in so-called local wars.

The antimissile maneuver usually takes the form of an abrupt climbing turn by the fighter-bomber toward the missile, followed by a dive. At the end of his dive the pilot turned the airplane 90° when far away enough from the target to do so; when too close to the target, the pilot turned to his combat course. The pilot determined the moment of missile launch visually or with the help of onboard reconnaissance apparatus or from reports by crews flying other airplanes.

Fighter-bombers flying to their targets made evasive maneuvers by turning 30-40° right or left of the main course and then flying parallel to the main course for 30 seconds, and on leaving the target they performed an abrupt climbing maneuver (with afterburners on) while simultaneously changing the direction and speed of flight. Other evasive maneuvers were performed as well, in particular "scissors," spins, and so on.

However, in the opinion of foreign military experts maneuvering and other tactics are not truly effective unless they are accompanied by electronic warfare resources. As a confirmation of this they cite some examples of combat activities in the Near East. In particular, in October 1973 Israeli fighter-bombers attempting to surmount air defense systems approached targets covertly at low altitude (20-25 meters) capitalizing on the terrain for concealment, and to suppress the radar system they used Shrike antiradar missiles; they were not very successful, however, and they suffered large losses (from surface-to-air guided missiles and antiaircraft artillery) (Figure 1 [Figure 1 not reproduced]). Later they began combining maneuver with broader application of jamming and passive interference, and the airplane losses decreased significantly.

As was noted above, electronic warfare has important significance to the success with which fighter-bombers surmount air defense systems. In this case electronic suppression entails creating passive interference or jamming electronic devices in control systems, mainly radar stations used for detection, target indication, and guidence of surface-to-air missiles, antiaircraft artillery, and enemy fighters. To create interference, NATO air forces rely extensively on dipole reflecters (for passive interference) various jamming transmitters, infrared traps, and other resources.

Included among passive interference resources is the automatic ALE-40 dipole reflector dropping device created in the USA. It consists of four modules that are suspended from a fighter-bomber or another airplane intended specifically for interference creation. Each module carries 30 cartridges filled with dipole reflectors of different lengths (selected depending on the operating frequencies of the enemy radar).

So-called infrared traps are used to jam the infrared homing heads of surface-to-air and air-to-air guided missiles.

Jamming transmitters have enjoyed broad application in the air forces of the NATO bloc countries. They are mounted on fighter-bombers and on special airplanes (helicopters). Transmitters are turned on in accordance with a plan written prior to the flight (on the basis of intelligence data) or when operating enemy radar is detected by onboard reconnaissance receivers.

The foreign press reports that a tendency for creating onboard automated complexes that perform radiotechnical reconnaissance, determine the "degree of threat" posed by detected radar stations and suppress them (they tune in and turn on the appropriate jamming transmitter and produce commands to drop dipole reflectors and launch antiradar missiles), produce signals to begin performing maneuvers, and so on has been noted in the USA and other capitalist countries in recent years.

Such complexes are mounted aboard special airplanes, one of which is the EF-111A, and airplanes designed by the USA for electronic warfare (Figure 2 [figure not reproduced]). Traveling in the combat formations of the strike groups, these airplanes can perform reconnaissance and jam radar stations in the enemy's air defense system. Sometimes depending on the tactical situation they will create interference while remaining outside the effective zone of the enemy's antiaircraft resources. The EF-111A is outfitted with a system that warns the crew that the airplane is being illuminated by enemy radar, an automated jamming and passive interference complex, and other equipment.

The foreign press reports that expendable jammming transmitters are enjoying increasingly greater application in the air forces of the USA and some other countries. These are dropped from manned and unmanned aircraft, shot from guns, or delivered to a given area by missiles.

The extensive arsenal of present and future electronic warfare resources once again demonstrates the great significance foreign military experts attach to use of such resources in the combat activities of aviation.

Diversionary groups have the mission of misleading the enemy with the goal of insuring successful penetration of an air defense system by strike groups of fighter-bombers.

According to data in the foreign press American aviation made broad use of diversionary flights simultaneously with jamming and creation of passive interference during the war in Vietnam. As an example, groups of U.S. Navy airplanes flew above the Gulf of Tonkin in zones 80-120 km from Haiphong at altitudes of 300-7,000 meters. They often emerged from this zone and traveled toward Haiphong at an altitude of 2,000-5,000 meters. Then they returned, or struck objectives on the shore of the gulf. All of this was done to distract air defense radar posts while groups of fighter-bombers (containing 4-8 airplanes each) attempted to approach objectives in the vicinity of Haiphong unnoticed from another direction (overland) at an altitude of 200-300 meters and hit them by surprise.

In cases where fighter-bombers were given the mission of suppressing air defenses, diversionary groups entered the effective zone of air defense radar at an altitude of 2,500-3,000 meters, drew fire on themselves, and maneuvered energetically, while the groups of strike airplanes hit the radar stations, surface-to-air missile complexes, and antiaircraft artillery positions from the opposite side at an altitude of 300-1,200 meters.

Foreign experts believe that use of diversionary groups makes it much more difficult for the opposing side to organized air defenses, and thus it makes it easier for fighter-bombers to strike their target; however, when strong air defenses must be penetrated this means considerable expenditure of the efforts of tactical aviation on auxiliary actions. They feel that the solution to this problem may be found in broad use of unmanned aircraft, to the creation of which much attention is presently being given abroad.

Fighters provide cover to strike groups by flying within their combat forations (as escorts), by maneuvering as groups in zones located in the most probable approach paths of enemy fighters, and by blockading enemy fighter bases.

The U.S. Air Force organized fighter escorts to strike groups when countermeasures by antiaircraft resources were weak. In this case the covering groups arrived at the target together with the strike groups and maneuverd 1,000-1,500 meters above them during the time of the attack. They left the target simultaneously.

When air defense countermeasures were strong, cover was provided by maneuvering in zones located away from the objective of the strike. In this case the covering fighters traveled towards the target together with the strike groups, but on approaching the target area they left for their predesignated zones and remained there until the fighter-bombers completed their raid. After this they returned to their bases on their own.

In the opinion of foreign military experts the airplane pair was thought to be the foundation of the combat formations of covering fighters when an aerial battle was expected, the pair usually flew in a "probing" formation (with an interval of up to 300 meters between the airplanes and a spacing between pairs of 600-800 meters). When flying within their zones, the pairs stacked

themselves at altitude intervals of 1,500 meters (beginning at 3,000 meters). Following detection of enemy fighters or on receiving a warning of approaching fighters, they engaged them in aerial battle or distracted them from the fighter-bomber strike groups.

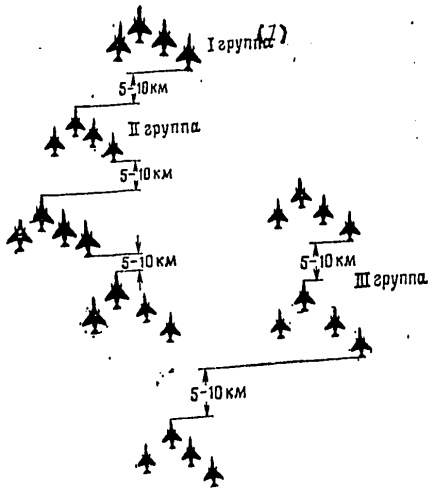

Figure 3. Combat Formation of Tactical Fighters Flying to Their Target (One Variant)

Key: 1. Group

The way combat formations are organized, foreign military experts believe, plays an important role in raising the effectiveness with which fighter-bombers surmount enemy air defenses. As the foreign press notes, combat formations are being constantly improved as the amount of opposition afforded by air defenses increases. As an example while at the beginning of combat activities in Southeast Asia American fighter-bombers operated in tight, unmaneuverable combat formations and without dependable protection from enemy counter measures, as the enemy's air defense system grew stronger the number of airplanes in the support groups increased, the fighter-bombers in the strike group began to fly in more-dispersed combat formations, broader use began to be made of interference, and so on.

Later, fighter-bombers operated mainly in combat formations extended in depth, where the strike group flew as a "column of flights" while air defense suppression groups located themselves in front or on the flanks (located in this way, they could freely maneuver and suppress surface-to-air

missile complexes and antiaircraft artillery in front, to the right, and to the left of the combat formation). Airplanes providing cover against attacks by enemy aviation usually followed behind and 1,500 meters higher. One of the variants of a combat formation of fighter-bombers and support airplanes is shown in Figure 3. Approximately the same combat formations are presently being employed in tactical air exercises conducted by NATO combined air forces in European theaters of war.

Foreign military experts believe that while during the wars in Southeast Asia and in the Near East allocating 50-60 percent of the forces to surmount air defenses was thought to be normal, as surface-to-air missiles, antiaircraft artillery, and weapon control systems develop this figure will grow significantly. They suggest solving the problem by improving the fighter-bombers, their onboard weapons, their electronic warfare resources, and their tactics. They place special emphasis on integrated use of all resources and on improving combat support. All of this once again confirms that significant attention is being devoted to the problems of surmounting air defenses in the military preparations being made by the aggressive NATO bloc.
[429-11004]

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SOVIET COMMENTS ON NATO EARLY WARNING AIRCRAFT

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 5, May 79 signed to press 4 May 79 pp 50-54

[Article by Cand Tech Sci, Engr-Maj V. Kirillov]

[Text] Foreign military experts believe that existing ground radar cannot fully satisfy today's requirements for detecting airborne targets and guiding fighter-interceptors to them, especially at low altitudes. This is why much attention is being devoted abroad to developing long-range radar spotting aircraft and their control systems.

The following are said to be the most sophisticated foreign long-range radar spotting aircraft: the AWACS E-3A (deliveries to the U.S. Air Force began in March 1977), the E-2C Hawkeye (adopted by the U.S. Navy in 1973), and the English AEW Nimrod (presently under development).

In the opinion of foreign experts long-range radar spotting aircraft must perform the following basic missions: detect and indentify airborne targets within a radius of 300-700 km in the entire range of altitudes, and detect objectives on the water surface; process and transmit data on the aerial and marine situation to ground-based command posts; guide friendly airplanes to targets in the air, on the ground, and on the water surface.

These missions are supported by an automated information collecting, processing, and transmitting system installed aboard the long-range radar spotting aircraft. The basic components of this system are:

A pulse-Doppler detection radar outfitted with a digital echo signal processing system;

IFF radar;

a navigation complex that precisely determines the location of the long-range radar spotting aircraft and the coordinates of observed targets relative to it;

radiotechnical reconnaissance apparatus providing additional information on the aerial and ground situations;

apparatus intended for reception and transmission of digital information to friendly fighters and interacting spotting aircraft and to ground and ship-based command posts, and a complex of communication apparatus;

a central computer intended to control all components of the system;

apparatus at specific workplaces intended to support interaction between the operational group and the computer, and to display the situation.

Information on the onboard equipment of the E-3A and the AEW Nimrod airplanes collected from the foreign press is presented below.*

The E-3A (Figure 1 [Figures not reproduced]) was created out of the civilian wide-body Boeing 707-320, and it has the following tactical characteristics and specifications: maximum takeoff weight--approximately 147 tons; cruising speed--670 km/hr (at an altitude of 5,150 meters); practical ceiling--13,400 meters; patrolling time without air-to-air refueling: above the home airfield--11.5 hours; above regions 960 and 1,600 km away from the home airfield--8 and 6 hours respectively.

The airplane is outfitted with modern electronic equipment, and in the opinion of experts it is the most expensive in the entire history of aircraft design.

It carries the AN/APY-1 radar set built by the Westinghouse Corporation, serviced by a phased antenna array located above the fuselage in a streamlined housing (diameter 9.1 meters). This radar can detect airborne targets up to 450 km at high altitude and up to 320 km at low altitude. The antenna (7.3×1.5 meters) consists of 30 waveguide rods, and it shapes a highly directional beam, the bearing of which can be controlled by ferrite phase shifters. It is rigidly secured to the streamlined housing, which is made of laminated fiberglass, and it rotates together with the housing in azimuth. The reason for this design concept stems from the desire to reduce the level of lateral antenna emissions produced by nonuniformity of the streamlined housing. The central part of the antenna block contains the phase shifters and the control devices, the high-frequency apparatus of the radar receiver, and the IFF antenna, the emission direction of which is opposite to that of the radar.

The radar apparatus (except for the transmitter's output and driver cascades) is made out of solid-state components. The total weight of a series-produced radar is 3,434 kg. This is almost half the weight of the initial variant. This reduction in weight was achieved, according to the foreign press, as a result of using laminated printed boards and redesigning the apparatus components, the number of which was reduced from 100,000 to 78,000.

*For details on the E-2C airplane, see ZARUBEZHNOYE VOYENNOYE OBOZRENIYE, No 1, 1979, pp 77-80--*Editor.*

The AN/APY-1 has several modes, which can be turned on during a single rotation of the antenna at different azimuths. For this purpose the scanning zone is subdivided into 24 sectors, and in each of them the radar set operates in one of the following modes, selected depending on the situation:

pulse Doppler, without azimuth scanning of the beam. This mode is used for initial detection of moving targets on the background of the underlying surface;

pulse-Doppler with azimuth scanning of the beam (±30°). Target flying altitude can also be measured in this mode as well.

These modes make use of a pulsed signal having a high repetition frequency; the return signal is processed in narrow-band filters, owing to which the effects of incidental reflections is eliminated;

early warning of targets located above the horizon (a pulsed signal with a low repetition frequency is emitted). In this case it is thought to be relatively simple to measure target range precisely, though incidental reflections must be absent;

direction finding in relation to jamming sources with the radar transmitter turned off. In this mode the operater can determine the bearing to the jamming source, and if the jamming persists for a sufficiently long time its location can be determined by triangulation;

detection of targets on the water surface (to be introduced within the next few years as the radar undergoes modernization). This mode makes use of a pulsed signal with a very high range resolution which, in the opinion of foreign experts, permits detection of small targets as well.

It has been reported in the foreign press that a number of steps have been taken to raise the resistance of the AN/APY-1 radar to interference. In particular the carrier frequency can be quickly changed and the radar can be operated at several frequencies at a time to surmount frequency-dependent jamming. Asynchronous pulsed interference can be avoided by varying the pulse frequency, while passive interference can be surmounted by operating the radar in its pulse-Doppler modes.

Signals from the radar's receiver are transmitted to a specialized processor which subjects the echo signals to initial processing; the processor determines the coordinates and radial velocity of detected targets, and it feeds these data in digital form to the central computer, which causes the targets to be displayed as blips on television screens at the operator workplaces (there are 9 of them in series-produced airplanes). In the principal operating mode the upper part of the screen is intended for display of the general situation, while the lower part displays auxiliary alphanumerical information. Targets are locked on for tracking manually by the operator.

According to data in the foreign press the processor of the radar set and the IFF systems make it possible to correspondingly detect 600 targets and 200 return signals within one scanning cycle (10 seconds long); however, the central computer cannot support the tracking of more than 250 airborne targets, which in the opinion of foreign experts is one of the shortcomings of the AWACS system. Moreover the central computer monitors the state of the system and automatically searches for faults (the built-in monitoring system keeps track of 98.5 percent of the electronic apparatus). Extensive application of redundant circuits, back-up apparatus, and automatic monitoring should insure a rather high average full operating time for the entire system (it is 28 hours according to foreign press reports).

The airplane carries a flight crew of four and an operational crew of 13 persons. The tail section of the airplane's fuselage contains a rest area, which makes is possible to increase the size of the crew for long patrols.

Presently the Boeing Corporation is modernizing the AWACS system under the agreements of a $153 million contract signed with the U.S. Air Force. Judging from foreign press reports the requirements include: Modernization of the radar with the goal of creating the possibilities for detection of targets on the water surface; improvement of the central computer's software system, enlargement of its memory by a factor of two, and enlargement of the number of operator workplaces to permit tracking of more than 350 targets; improvement of resistance to interference and the covertness of the data transmission system and the communication channels; improvement of the airplane's self-defense subsystem, to include outfitting it with radiotechnical reconnaissance and electronic suppression resources.

The corporation is planning to produce an improved AWACS system beginning with the 19th airplane, construction of which is expected to be finished in early 1980. The modernized E-3A's will be outfitted with JTIDS (joint tactical information distribution system) apparatus.*

According to foreign press reports the command of the U.S. Air Force is planning to have 34 E-3A airplanes worth a total of more than $3.7 billion by mid-1980. The high cost of the AWACS system motivated the ruling circles of the USA to encourage its partners in the aggressive NATO bloc to help finance this program. However, due to serious disagreements on the distribution of outlays by different NATO countries, it was not until December 1975, following 4 years of negotiations, that a final decision was reached. According to this decision, beginning in 1982 the combined air forces of NATO will receive 18 E-3A airplanes.

Great Britain assumed the most independent position: Despite the USA's proposal for purchasing 350 Harrier airplanes in exchange for an agreement to participate in the financing of the AWACS program, Great Britain decided to develop its own long-range radar spotting aircraft system, the AEW Nimrod.

*For greater detail, see ZARUBEZHNOYE VOYENNOYE OBOZRENIYE, No 3, 1979, pp 50-54--*Editor*.

The AEW Nimrod (Figure 2 [Figure not reproduced]) was developed out of an antisubmarine airplane, and it is distinguished from the latter by the design of the nose and tail of the fuselage and the composition of onboard equipment. Its principal characteristics are: Maximum takeoff weight--80.5 tons; maximum speed--925 km/hr; practical ceiling--12,800 meters; patrolling time--approximately 10 hours. The command of the British armed forces plans to use AEW Nimrods in interaction with NATO's SAGE air defense system, AWACS airplanes, and ships of its own navy.

The airplane is outfitted with a multiple-mode pulse-Doppler radar set produced by the Marconi-Elliot Company; the antennas of this radar (twin reflectors rotating synchronously in azimuth) are located in streamlined housings at the airplane's nose and tail. English experts believe that this design concept avoids shadowing of the radar antenna by the airplane's wings and fuselage in all azimuth directions. The IFF and radar antennas are combined, which makes it easier to identify return signals from friendly aircraft with the echo signals received by the radar set. Both of these antennas are stabilized in relation to bank and pitch by means of gyro platforms, which also eliminate the influence of elastic deformations of the fuselage. Receivers of the radiotechnical reconnaissance system, which feed their information to a central computer, are installed in streamlined housings beneath the outer wings.

The radar echo signal processing device can be used to detect moving targets on the basis of Doppler frequency shift, if their velocity exceeds 20-30 km/hr. As is noted in the foreign press, this gives the Nimrod certain advantages over the E-3A, inasmuch as the latter can only detect targets moving at speeds greater than 170 km/hr.

The radar set has several operating modes employing different pulse repetition frequencies and different forms of probing signals; targets can be detected on the water surface in one of the modes. Modes are selected depending on the state of the underlying surface so as to achieve the greatest probability of target detection. The radar measures target bearing, range, and altitude, as well as the target's speed (the data are processed by a central computer).

The airplane's computer automatically supports detection, lock-on, and tracking of targets, and it controls the work of the radar set, the IFF system, and the electronic warfare resources. The crew consists of 4 pilots and 6 operators, 2 of whom are responsible for evaluating the tactical and navigational situation while the others classify the targets, guide airplanes to them, transmit data, and maintain functional control over the apparatus. When necessary the number of workplaces can be increased, thus broadening the airplane's possibilities.

It has been reported in the foreign press that the RAF is to receive Nimrod AEW long-range radar spotting aircraft in 1982. It is expected that they will serve in the air force for the next 25 years. In all, eleven airplanes costing a total of $440 million have been ordered.

Judging from reports in the foreign press, countries in the aggressive NATO bloc are continuing to improve their air force control system, feeling that use of long-range radar spotting aircraft in Europe would make it possible not only to raise the effectiveness of air defenses but also significantly simplify the task of controlling tactical airplanes striking ground and marine targets.
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