



**FOREIGN
BROADCAST
INFORMATION
SERVICE**

JPRS Report

DISTRIBUTION STATEMENT A

Approved for public release;
Distribution Unlimited

Soviet Union

AVIATION & COSMONAUTICS

No 12, December 1987

19980601 136

DTIC QUALITY INSPECTED 3

REPRODUCED BY
U.S. DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL
INFORMATION SERVICE
SPRINGFIELD, VA 22161

10
53
A04

Soviet Union

AVIATION AND COSMONAUTICS

No 12, December 1987

JPRS-UAC-88-006

CONTENTS

11 MAY 1988

[The following is a translation of the Russian-language monthly journal AVIATSIYA I KOSMONAVTIKA published in Moscow. Refer to the table of contents for a listing of any articles not translated.]

Performance of the Air Force Rear Services Summarized [A. Zakrevskiy; pp 1-3]	1
Primary Party Organizations Contribute to Flight Safety [B. Vorobyev interview; pp 6-7]	4
Young Party Organization Secretary Revives Squadron [S. Manyukov; pp 8-9]	7
Obstacles to Introducing Psychological Findings Identified [V. Ponomarenko interview; pp 10-11]	11
Creating an Advantage in Aerial Combat Through Stratagem [G. Drugoveyko; pp 12-13]	13
Air Force Personnel Propose Resource, Labor Saving Inventions [unattributed; pp 16-19]	17
Economist Explains Principles of Economic Reform [N. Karasev; pp 18-19]	20
Border District Aviators Serve Alert Duty [N. Vasilevskiy; pp 20-21]	22
Discussion of Antyufeyev Article Summarized [Yu. Kulikov; pp 22-23]	25
Experiments Conducted by Soviet-Syrian Crew in Mir Complex [G. Glabay; pp 28-30]	28
Biomedical Research Conducted in Interkosmos Program [V. Degtyarenko; pp 32-33]	31
West German Forces Labeled Offensive, Right-Wing [L. Chernousko; pp 34-35]	33
History of Aerial Combat in Second Period of Great Patriotic War [Yu. Kislyakov; pp 36-37]	36
Service Vehicle Drivers Support Night Flying [A. Kocherov; pp 40-41]	39
Speed, Altitude, ECM Identified as Breakthrough Assisting Factors [V. Dubrov; pp 43-44]	40
Index of Articles Published in 1987 [pp 46-47]	43
Articles Not Translated From AVIATSIYA I KOSMONAVTIKA, No 12, December 1987	50

AVIATION & COSMONAUTICS

Performance of the Air Force Rear Services Summarized

91440066a Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 12, Dec 87 (Signed to press 3 Nov 87)
pp 1-3

[Article by Lt Gen Avn A. Zakrevskiy, air force deputy commander-in- chief for rear services, USSR Honored Military Pilot: "The Aviation Rear and Combat Readiness"]

[Text] Airplanes and helicopters equipped with sophisticated armament and with enemy detection and fire control resources that make success possible in the complex missions of modern combat are the foundation of the air force's fighting power today. The high skills of the flight crews, constant alertness, and the mobility and maneuverability of the air force depend to a great degree not only on flying and technical personnel but also on the work of soldiers in air force rear services, on their occupational training and organization.

The modern rear of the air force is a large and complex troop economy. Managing it, maintaining air units and subunits in constant combat readiness and knowing how to properly organize training and indoctrination are difficult and troublesome work. Significant changes have occurred in recent years as a result of reequipping of units and subunits in the air force rear: Air garrisons have been equipped with complex and expensive airfield technical support resources used to prepare airfields for flying, to fill aircraft with fuel, oil and special liquids, to charge them with compressed and liquefied gases, to monitor equipment and various machine units, to start engines and to carry out other important measures.

Officers, warrant officers, NCOs and soldiers of the air force rear must often work in a complicated situation. This requires good special skills, deep ideological conviction and political maturity, strong psychological and physical tempering, diligence, steadfastness and creative inspiration from them. A specialist in the air force rear not possessing these qualities would hardly be able to conscientiously fulfill the wide range of responsibilities associated with providing material support to the combat training of aviators, with improving their personal life, with providing services to military posts, with satisfying the needs and requests of officers, warrant officers and the families of military servicemen more fully, and with supplying them everything they need for normal study and life.

The experience of the best air garrisons confirms that wherever real concern for the individual and his needs is displayed not just in words but also in concrete deeds, one finds a favorable moral climate, and the personnel attain the best results in training, service and socialist competition in less time. At the same time, problems concerned with raising alertness and combat readiness,

tightening discipline and maintaining firm order in air force units and subunits are inseparable from the personal affairs and leisure time of the aviators. This is why these problems are kept in the center of attention of the absolute majority of commanders, staffs, political organs and party and Komsomol organizations.

Implementing decisions of the 27th CPSU Congress and of the January and June (1987) CPSU Central Committee plenums, and the requirements stated in orders of the USSR minister of defense and the air force commander-in-chief, personnel of the air force rear worked with high enthusiasm and inspiration in the year of the 70th anniversary of Great October, attaining definite successes in combat and political training and in fulfilling socialist pledges. The military collectives headed by officers Yu. Matorin, L. Popenko, V. Kaydin, N. Ptushka and others are among the leaders.

Serious attention is devoted here to qualitative indicators and end results. And this is understandable. New, increasingly more complex tasks associated with maintaining the air units and subunits in constant combat readiness and raising their mobility and maneuverability are being posed before personnel of the air force rear. The assortment of materials and equipment used in the air force has expanded significantly, and consumption of such materials has increased by several orders of magnitude. The requirements on their storage, transportation and thrifty use have grown more complex. This is why commanders, staffs and party organizations are now attaching special significance to technical training, to mastering new machines and mechanisms, to seeking the most effective methods of their use, and to economy and thrift.

Exercises and well organized lessons in the commander training system are the best means of improving the skills of specialists in the air force rear and of acquisition of the necessary skills for work in a complex situation. Most exercises were carried out in the year of the 70th anniversary of Great October at a high organizational and methodological level, with full exertion of moral and physical effort. Commanders, staffs and active party and Komsomol members are expunging formalism and stereotypy more and more decisively from their organization. They have become more efficient, resourceful and bold in their work, and results are evaluated with greater objectivity and incisiveness.

The unit in which Officer V. Sokolovskiy serves was more successful than others in the last training year in carrying out the tasks of material and technical support to aviator training. Soldiers of this unit showed that they were well trained in preparing for redeployments, that they were well rehearsed in swift deployment of the subunits and services in an unfamiliar locale, and that they were able to supply the air regiment with everything

necessary for combat training activities at two airfields without interruption. Sokolovskiy's subordinates interacted competently with the regiment's air force engineer service.

Efficient work in servicing the flight shifts has become a matter of state importance to specialists in the rear services. The leading collectives make a persistent effort to ensure that fuel truck drivers, operators of airfield jet engine starters, personnel of airfield maintenance subunits and POL services and other specialists would not create conditions leading to flying accidents.

Maintaining airfields in reliable operating state has great significance to successful solution of this important problem. The resilience and cleanliness of landing strips, taxiways and airplane parking aprons, and exemplary condition of their services play an especially large role in this regard. One of the main tasks of commanders of technical air subunits responsible for airfield maintenance is to keep landing fields in constant combat readiness. It must be remembered in this case that now that winter has set in, airfield operation has become significantly more complex, requiring selflessness, high professional skill, effective use of hardware and mechanisms, faultless execution of responsibilities and complete devotion from the personnel.

We have many subunits that are carrying out this task successfully. The steadfastness and proficiency displayed by subordinates of Communist N. Yaganov may be held up as an example. They often have to prepare the airfield for flying in poor weather conditions. But this does not keep the soldiers from honorably handling the most serious situations and successfully repelling the onslaught of snowstorms raging over the landing field. This is achieved through efficient organization of the training process, maintenance of firm order and well organized party-political work aimed at ensuring flight safety.

The effectiveness of personnel training and indoctrination is in many ways the result of taking an integrated approach in combination with activation of the human factor and utilization of the most important principles of restructuring, such as relying on the living creativity of the masses, developing initiative and instilling responsibility in the people for conscientious fulfillment of their official responsibilities. This leading subunit follows an immutable rule: conducting a thorough critique after every flight shift, taking note of all of the positive things in flight support, announcing the names of those who excelled, and learning from the experience of the best. And if shortcomings are encountered, they are discussed loudly for all to hear, and specific steps are taken immediately to efficiently correct the mistakes.

This approach to the training and indoctrination of Communist Yaganov's subordinates makes it possible to avoid stereotypy and stagnation in the training of rear service specialists, and to achieve new successes in

training and in competition for exemplary flight support. But things of a different sort are encountered as well. Indifference and self-satisfaction are still encountered and the right conclusions have not yet been made from mistakes made in the past in some places. Some people display inertia in the fight against stagnant phenomena in the course of restructuring. Thus officers V. Say and V. Knyazev did not devote adequate attention to maintaining the airfields in constant readiness. Owing to this, engines had to be removed from some airplanes prematurely because of damage by foreign objects sucked up by them from the pavement of the landing strips and taxiways. Conditions making flying accidents possible arose and a threat to flight safety was created due to carelessness in airfield operation. The situation was corrected.

We need to decisively and strictly curtail the actions of those officials who try to justify their mistakes by various sorts of causes out of their control, who fail to penetrate deeply into the content of the training process, who are unable to understand what positive things restructuring can do in improving rear support to the combat training of aviators, who do not seek specific ways of improving such training and who do not display adequate concern for the personal needs of the personnel.

The readiness coefficient of machines and machine units in one of the subunits was below the established norm at the fault of Captain V. Aleksin, chief of the motor vehicle, electrical and gas service, who failed to carry out maintenance and repair on time. Unfortunately neither Aleksin himself nor his chiefs are concerned by this state of affairs. How can we talk about restructuring under such conditions, and what kind of acceleration could we possibly achieve in intensifying the training process?!

Flight training quality and flight safety depend to a certain degree on POL specialists. They have done a great deal to ensure uninterrupted, high quality provision of fuel to airplanes and helicopters. For example officers A. Varfolomeyev and V. Kiryanov invested a great deal of labor into creating optimum conditions for uninterrupted receipt, reliable storage and prompt issue of jet fuel and its delivery to flight-ready airplanes. They are distinguished by conscientious military labor and a careful attitude toward economizing on fuel and lubricants. These progressive officers are rightfully referred to as right-flank soldiers of the socialist competition initiated in the subunits of the air force rear in honor of the 70th anniversary of the Soviet Armed Forces.

The experience of these and other progressive laborers of the air force rear indicates that in the conditions created by the changes occurring in our society, success belongs to those who work in the new way, in the spirit of restructuring, to those who decisively reject unjustified work methods and styles in their constant search for improvement. Today it is very important for the commander, his deputies and for each person who teaches and indoctrinates to display not only exactingness but

also fatherly concern for subordinates. After all, mutual respect, support and assistance enrich the training process, saturate it with elements of novelty, unite the military collective and create a dependable foundation within it for a healthy moral atmosphere and proper mutual relations.

The authority of the commander and of the staff officer plays a great role in high quality flight support. I would like to say a few words here about the place of the representative of the central administration of the air force rear. He could do a great deal to mobilize the personnel of the units and services to implement party directives, to develop glasnost, criticism and self-criticism, to fulfill orders of the USSR minister of defense and the air force commander-in-chief concerned with eliminating mismanagement and indifference, and to wage an uncompromising struggle against improper use of materials and equipment and against other negative phenomena.

Considering this, we need to make sure that not a single case of an unobjective assessment of the real state of affairs or of the results of the personal activities of officials in the course of the growing process of restructuring would be left unattended by the party and administration. Experience shows that not all officers from the administration of the air force rear visiting the units display intolerance of shortcomings, adherence to principles, high exactingness, competency and responsibility in the performance of their party and service obligations. Some of them do not take the trouble to deeply penetrate into the essence of problems in the troops which the unit and subunit command is unable to analyze and properly resolve on its own. And some officers are incapable of replying competently to questions asked by the personnel, or to provide specific, documented answers.

An officer of the central administration of the rear services is obligated to keep up with the modern requirements, and to go to the people not with the primitive baggage of previously known truths and principles but with a fresh viewpoint on the urgent problems of modern times and with new approaches to flight support, to improving the personal conditions of the aviators and to strengthening discipline and organization. He must react efficiently to the problems facing the personnel. Examples of such officers in the central administration of the air force rear are P. Samoylov, Ya. Yershov, G. Bobrov, K. Yevtikhov, A. Kovalchuk and others.

One of the most important prerequisites of combat readiness of the air force rear, and of high effectiveness of its activity, is tight military, planning, production and executive discipline, the role of which has grown significantly in modern conditions. This must be deeply understood and constantly remembered by every specialist. Without strict and precise compliance with the requirements of the manuals, and without unquestioning fulfillment of the orders and instructions of commanders and chiefs, it is impossible to count on success in

fulfilling the intense plans of combat and political training facing personnel of the air force rear in the new training year. Conscious discipline pervades the intricate military mechanism and binds it together. And the higher its order, organization and efficiency, the better and more reliably it functions. Fewer failures and mistakes are made and no accidental injuries to people and damage to combat equipment are encountered in such a collective.

"An unconscientious attitude toward the work is especially intolerable today," noted CPSU Central Committee General Secretary Comrade M. S. Gorbachev in his report to a joint solemn meeting of the CPSU Central Committee, USSR Supreme Soviet and RSFSR Supreme Soviet. "A person armed with up-to-date knowledge and equipment produces more and more products, and his labor depends more and more intimately on the activities of thousands of other participants of social production." Omissions or carelessness by an aviation specialist can cause extremely serious consequences in the army environment.

What is important here is competent personnel placement, closeness to people, availability of personal services for them, firm military order, faithfulness to the collective's glorious combat traditions, and diversified, cultured leisure pursuits for servicemen. Competently publicizing combat traditions and indoctrinating nobility, courage and heroism in the airmen using the examples offered by heroism committed by our soldiers in the defense of the socialist fatherland and in the performance of their international duty are acquiring special significance to combat readiness.

The military posts are transforming and improving from one year to the next. Many modern residential buildings, residence halls for officers, clubs, stores, tea rooms, medical centers, personal service combines and other economic and service facilities have appeared in them. New buildings for flight control and for maintenance of aircraft and motor vehicles, and break rooms for flight crews, engineers and technicians have been built in many units on the basis of modern standard designs. These difficult issues are being resolved creatively and concernedly in the units in which officers V. Klimenko, M. Masliyenko and V. Kamenetskiy serve.

Successful fulfillment of the tasks of the new training year will depend in many ways on the condition of the training material and equipment base and on its effective use. Deserving of attention in this regard is the experience of the subunits headed by officers A. Krivonogov, A. Korshunov and Yu. Sokolov, in which innovators have created many original devices and models that help the command to intensify the training and indoctrination process and to raise its quality and effectiveness.

A substantial contribution to improving the diet of the soldiers is being made by our caretakers, and chiefly the laborers of subsidiary farms, which produce up to 15 or

more kilograms of meat and vegetables for every serviceman receiving rations. And in the units in which officers G. Sokhanich, B. Sergeyev and A. Klimov serve, subsidiary farms satisfy almost half the annual demand for meat, milk, eggs and vegetables. This is a worthy contribution to implementing the country's Food Program.

It should be noted that the multifaceted activities of the air force rear are inseparably associated with economic work. Careful expenditure of materiel and money has enormous political and state significance today. After all, every economized ruble, every saved kilogram of fuel, and truly thrifty consumption of other material valuables are contributions to our common property and wealth. All of this could be used to improve the personal conditions of aviators. But it must be admitted that people are still not truly concerned everywhere for improving economic activity, or taking it seriously. The time has come to work this situation out, to draw up specific measures and to promote economic activity in all units of the air force rear.

The personnel are taking a serious examination in this period of winter training for aviators. In these harsh conditions it is not easy for rear services specialists to support the flying, to maintain the airfields and approaches to them in constant combat readiness and to create comfort and warmth in military posts. But our soldiers are ready to do everything necessary to better support the selfless military labor of aviators. This is what personnel of the air force rear see as their main task, their objective in the year of the 70th anniversary of the Soviet Armed Forces.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1987

11004

Primary Party Organizations Contribute to Flight Safety

91440066b Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 12, Dec 87 (Signed to press 3 Nov 87)
pp 6-7

[Interview with Gds Lt Col B. Vorobyev, air regiment party committee secretary: "With Concern for Flight Safety"; date and place of interview not specified]

[Text] The air force's primary party organizations are conducting their election meetings.

Communists are evaluating their activities in the course of the recently started restructuring effort strictly and in accordance with their principles, and they are trying to impart the needed acceleration to intensification of training and indoctrination. Boldly revealing shortcomings in their military and party work, they are mapping out the specific ways of correcting them and persistently fighting to upgrade the quality of combat training and to provide dependable support to flight safety.

The editor's office asked Guards Lieutenant Colonel B. Vorobyev, secretary of the party committee of a Guards fighter air regiment, to describe how this work is organized in the unit's crews and subunits.

[Question] Boris Mikhaylovich, accountability reports and elections are an important time in the life and activities of every party organization. Could you please tell us the kind of results in training, in tightening discipline, in raising combat readiness and in ensuring flight safety the regiment's communists have begun this campaign with?

[Answer] Discussing the importance of the main annual meeting in the life of every party collective, I would like to emphasize that the elections are being conducted in party groups and shop organizations under the indelible impression left upon each of us by our celebration of the 70th anniversary of Great October. Striving to greet the 70th jubilee of the Soviet Armed Forces just as worthily, the unit's communists are actively preparing for the 19th All-Union Party Conference in the course of the restructuring effort.

The regiment finished off its training year with certain accomplishments in combat and political training. But the results could have been much higher, had certain aviators, especially young ones, not made such disappointing mistakes. For a while, Guards Lieutenant Mozharov lowered his diligence in flight preparations, and as a consequence he soon made a mistake that almost led to a flying accident during interception of an airborne target. Mistakes also had a negative effect on the quality of the young officer's aerial skills. Communists were troubled by this situation. Squadron commander Guards Lieutenant Colonel Mozgovoy, who was a party committee member, and deputy squadron commander Communist Guards Major Gelmich, who was a flight commander, talked with the pilot about flight safety measures. The young pilot came to understand that he was not going to get any special favors, he changed his attitude toward his development as an aviator, and he came to understand that in the interests of the common effort and flight safety, he had to prepare carefully and responsibly on the ground for every assignment in the air. Time passed, and Guards Lieutenant Mozharov mended his ways. Now he flies without criticism.

The combat training experience of Guards Captain Babkin, Guards Major Shishkin and other experienced pilots shows that the quality, effectiveness and consequently the safety of flying are directly dependent on the level of organization of the personnel's ground training. If it is high enough, the results would be correspondingly high. The party committee makes a constant effort to see that flight and squadron commanders would rely on the best procedures in the course of the training in order to get every pilot to deeply understand the features of a forthcoming flight and to improve his knowledge of aviation equipment, aerodynamics and tactics. Ground training is planned and conducted in our unit in such a way that

it would invariably be relevant to the exercises being carried out at the particular time. We devote our main attention in this case to independent study by the aviators, to their deep analysis of the guidelines and the training literature, and to development of the needed habits in trainers and in airplane cockpits. The entire process of such training is permeated by the spirit of socialist competition.

[Question] What innovations have appeared in your unit in assimilating the best experience?

[Answer] First of all there is of course the completely different, more demanding approach to the effectiveness of indoctrination and to attaining high end results. When we publicize and introduce the best experience, we try to clarify its essence in accordance with the spirit of the times: how and by what means are the best workers able to activate the human factor, and how do they implement the known principles of restructuring—reliance on the living creativity of the masses, developing the initiative and responsibility of aviators, introducing elements of democracy into party work and raising its effectiveness.

The regiment party organization delves deeply and systematically into the training process, and using its own methods, it influences training effectiveness and quality and promotes safety. As an example the experience of organizing preliminary training for the flight crews and technical personnel of the squadron in which Guards Major Ganichev is the deputy commander for political affairs and a regiment party committee member was studied on the initiative of communists Arestov and Gundarev. After this, a recommendation was made to hold meetings in the flight party groups and party organizations with an agenda focusing on what the communists have to do to achieve sensible use of training time devoted to preparing the personnel and equipment for flying. Such meetings were held. The discussion during them was principled and incisive, and many specific proposals for upgrading quality and flight safety were introduced. As a result, preliminary flight preparations in the squadrons improved noticeably.

Today the attention of the regiment's communists is centered on the problems of accelerating intensification of the training and indoctrination process and raising the effectiveness of an inseparable part of this process—the socialist competition in honor of the approaching 70th anniversary of the Soviet Armed Forces. The efforts of our commanders, political workers and all communists and Komsomol members are directed at ensuring prompt and complete fulfillment of individual and collective socialist pledges.

At recent election meetings in party groups of the air squadron in which Guards Major Ganichev, military pilot 1st class, is the deputy commander for political affairs, communists discussed the progress the crews and groups were making in fulfilling their anniversary

pledges. Successes were noted and the causes of mistakes made by aviators in combat training, in competition and in observing flight safety measures were analyzed in the reports given by the party group organizers and in statements made by the communists. The following important fact was noted in particular: When a crew or flight is put on alert, not all pilots help the ground specialists to prepare their fighters for take-off. And yet, one of the main items of our pledges is to surpass the time standard for making equipment and armament combat ready. Moreover, flight safety also depends to a certain degree on the strength of such on-the-job contact.

[Question] Please tell us about this in greater detail.

[Answer] The commander and secretary of the flight party organization play a major role in maintaining on-the-job or, more accurately, fighting contact between flight crews and specialists of the air force engineer service. In their majority, in our unit they respond critically as a rule to every violation of flight safety rules, and attentively analyze its causes.

Once Guards Senior Lieutenant Sysoy made a mistake in his landing calculations, he performed incompetently in the final landing phase, and as a result he nearly had a flying accident. Clarifying the causes, flight commander Guards Captain Shaposhnikov and flight party organization secretary Guards Senior Lieutenant Grechanov came to the conclusion that Communist Sysoy had relaxed in his training and reduced his responsibility for preparing for each flight, laying his hopes on his accumulated knowledge and professional habits. Sysoy was strictly criticized at a flight party meeting by communists Shaposhnikov and Petukhov and by the secretary of the party organization. His mistakes were thoroughly analyzed in the flight, after which Guards Captain Shaposhnikov conducted several supplementary lessons with him and flew some check flights. This strict, demanding approach benefited the pilot.

Incidentally it has recently become the rule in the air squadron commanded by Guards Lieutenant Colonel Kholodilin—the subunit to which the flight mentioned above belongs—that any mistakes made by pilots must be carefully analyzed with the help of notes in the flight leader's journal, in which literally every violation of the requirements of flight documents governing the safety of work on the ground and in the air is documented. Every aviator promptly makes the appropriate conclusions for himself after every such critique.

In order to strengthen the reliability of fighting contact in the flights, we take pains to enhance the role and responsibility of commanders in aviator training. Most of them are competent and demanding instructor pilots. But the reserves have not been exhausted. Special short courses are regularly conducted in order to raise the teaching proficiency of flight commanders. In the last course of this sort the regiment commander, a military pilot-sniper, described the procedure by which tasks

must be assigned to the crew and to the flight. His deputy shared his experience in checking out piloting technique and correcting mistakes. The deputy commander for the air force engineer service described how he maintained control over the condition of the materiel, and what role the flight commander plays in carrying out a good housekeeping day. And the regiment political worker offered a thorough analysis of the status of the work being done by flight commanders to indoctrinate subordinates.

In the course of restructuring, inviting party organization secretaries to attend such courses together with flight commanders has now become an occasional practice. Working together, they learn to organize training and indoctrination of pilots and specialists of the air force engineer service correctly, and to avoid going on to more complex exercises before previous, less-difficult ones have not been fully comprehended. In my opinion raising the organizational and indoctrinating role of flight commanders is one of the important prerequisites of ensuring accident-free flying.

[Question] Boris Mikhaylovich, what sort of assistance has the party committee provided to flight party organizations in raising the influence communists have on preparing and conducting election meetings?

[Answer] It has now become a regular practice for us to study an issue locally—in the crews and in the flights—before submitting it for discussion to the collective, especially in the course of election campaigns. We usually assign this work to the most knowledgeable members of the party committee, who in turn recruit other communists to help them, chiefly from among experienced aviators. They help the secretaries of the primary party organizations to prepare the report materials and to draft a resolution.

But words and deeds still differ sometimes. For example, the party committee is seriously troubled by the flight safety problem, it is exerting considerable effort to promptly solve it, but there have been no noticeable results. This is explained in part by the fact that we have not yet been able to encourage all communists to carry out specific jobs as indoctrinators and organizers. Sometimes we “drown” in general appeals, our pressure to restructure the mechanism of party leadership is weak, and we do not work persistently enough to transform general party directives into the energy of practical actions by communists.

Let us consider the election meeting held by the party organization of the flight commanded by Guards Captain Shaposhnikov. Many things were discussed in the report given by party organization secretary Guards Senior Lieutenant Grechanov, which took half an hour, and in statements by communists, but one thing could be put in a nutshell: The flight's affairs were in full view of everyone. They spoke briefly about the successes that had been attained during the training year, and about the

generally rather high grade received in the final inspection. But then the communists went into greater detail on the unsolved problems, on the mistakes in air, fire and tactical training and on raising quality and flight safety.

In what lay the strength of the party organization, by what means was it able to have an effective impact on the flight's life and training? Following the June (1987) CPSU Central Committee Plenum the command imposed higher requirements in crew combat training and flight safety upon the subunit's aviators. Guards Captain Petukhov, Guards Senior Lieutenant Grechanov and others had developed a jaded and somewhat stagnant opinion of their occupational proficiency. They had to fundamentally reexamine their point of view, consider ways to improve their proficiency, and think seriously about how to organize their work so as to completely fulfill the high socialist pledges they adopted in honor of the 70th anniversary of Great October.

In that difficult period when even experienced aviators sometimes returned from flying dissatisfied with their results because they had not been able to complete a harder exercise, in the period in which doubts as to whether the new, stiffer requirements on combat use were realistic infected the spirit of a number of the air warriors, the party organization played its mobilizing and organizing role with special force. Communists in Shaposhnikov's flight deserve credit for the fact that they led the work aggressively and actively. They organized a fighting core in their collective; they were able to unite it, to encourage it to attain the highest indicators, rather than the mediocre indicators that would have produced guaranteed results for them. This required reexamination of the individual and collective pledges. The new goals planned by the aviators took heed of present requirements brought about by the effort to restructure and accelerate intensification of the training and indoctrination process.

Communists were the first to boldly attack the difficulties. The decision they arrived at during the party meeting was important and principled. It was transformed into concrete forms of work with pilots, engineers, technicians and junior aviation specialists. Individual and group discussions, meetings and experience exchange evenings were conducted with the aviators. The party organization was not doing anything new in terms of its forms of work. The main ones it relied on included maintaining direct contact with the people, influencing the soldiers on a daily basis, encouraging communists to set a personal example, and capitalizing on the influence of their lively, truthful and mobilizing words.

In their effort to reach the command's objectives of raising flight quality and safety, Guards Captain Shaposhnikov, Guards Senior Lieutenant Grechanov and other communists in the flight scouted out effective ways to improve aerial skills, technical and fire proficiency

and tactical maturity. On several occasions they suffered the bitterness of failure themselves. But after several meetings in which the communists discussed and analyzed the causes of the mistakes and exchanged their experience, the results improved with subsequent flights.

With time, the hard work of the communists produced the desired results. By as early as the middle of the summer training period the flight's pilots began to perform all of their flying assignments confidently, and by the end of the training year the success grew and stabilized.

[Question] What are the regiment command and party committee doing to utilize the reserves for raising the combat readiness of the crews and subunits and flight safety, uncovered in the course of the election campaign?

[Answer] I think that enough has been said about raising the effectiveness of competition between the crews. It is the main catalyst of growth in the skills of our pilots and specialists of the air force engineer service. This was discussed specifically and thoughtfully in the party election meetings held in all of the flights.

The command and the party committee also attach great significance to technical propaganda, to raising the technical culture of the aviators. To help the flying personnel, engineers and technicians we conduct seminars, question-and-answer evenings and theoretical discussions. The subject of the most recent theoretical discussion was how to make competent and effective use of the flying characteristics of a fourth-generation fighter during aerial combat at maximum altitude with guaranteed safety. Officers Kholodilin, Grigoryev and other pilots who had accumulated a certain amount of experience discussed the procedures they used when flying at maximum altitude. Special flight cases were thoroughly analyzed in another discussion. There was a certain amount of benefit from collective discussion of the following issues in the seminar: "Flying in Adverse Weather," "Carrying Out Flying Assignments at Night in Adverse Weather" and "Flying in Direct Proximity to the Ground."

Talks by communists Popov, Mozgovoy, Shishkin and other well-trained officers on the following topics left clear impressions in the minds of the aviators: "Flying a Fighter in the Clouds," "High Discipline and Circumspection in the Air—The Main Condition for Preventing Flying Accidents" and "Landing—A Special Element." All of the talks were based as a rule on examples from the life of the Guards collective. Responding to orders from the commander and decisions of the party organization, the best pilots shared their accumulated experience and observations, and they provided advice on how to accelerate development of young pilots in the conditions of restructuring.

This approach to the effort, multiplied by strict compliance of communists with Lenin's norms of party life and with his commandments to Soviet soldiers, is helping to strengthen combat readiness, raise alertness and prevent near-accidents in the air.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1987

11004

Young Party Organization Secretary Revives Squadron

91440066c Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 12, Dec 87 (Signed to press 3 Nov 87)
pp 8-9

[Article by Maj S. Manyukov: "Work Above All"]

[Text] At the moment of take-off, the world surrounding Senior Lieutenant Yuriy Kakoshko narrowed down to a concrete strip rushing past him into the distance and the barely visible line far away where the sky merged with the ground. There beyond the horizon, in the sky above the training ground, 1st Squadron had already begun its combat work. Lieutenant Colonel V. Zakharyashchev and Major L. Fadeyev, recognized experts, made their attack with a marksman's precision. Now it was time for the young pilots to act.

A heavy feeling quickly settled over his body. The G-force pressed him ever-tighter into his seat. This sensation brought the pilot's mind back to the dynamic acceleration of his aircraft.

In terms of his social affairs and his life, Senior Lieutenant Kakoshko's recent experiences were reminiscent of such a dynamic take-off: The unanimous decision to elect him, a young flight commander, as secretary of the bureau of the squadron's primary party organization was perceived by him as a command to accelerate his activities to their maximum pitch.

Back then, before the first meeting after the elections, he was beset by anxiety as he carefully thought out his every word. But when he stepped up to the podium all of his thoughts condensed into just a few phrases.

"We need to clearly define the end result toward which the aviators must work, and to change our ways so that there would be less emphasis on making things look good for the reports and more real work."

He briefly listed his proposals: to stop copying the regiment's plan for party political work as a way of making their own measures seem so much grander, to seek their own methods, to change the format of meetings and to adopt the practice of making personal evaluations of the work of communists.

The party leader deliberately posed the issue so bitingly—he may even have gone a little overboard. It was just that he wanted very much to stir some life in the people as quickly as possible, to get their attention. As he was talking, he noticed that the response varied. Senior lieutenants A. Yakovenko and S. Budylin gazed at him approvingly. They had confidence in him ever since he headed the squadron Komsomol group. But comrades who were beyond him in age, knowledge and experience did not conceal their doubts. He's too eager, they thought, let's hope his innovations don't backfire on him.

But Kakoshko himself was firmly convinced that such eagerness was precisely what was needed. After all, the squadron had forfeited its outstanding title. This meant that party work was on the skids, and consequently there was no time to lose.

He glanced at the squadron commander. Lieutenant Colonel Zakharyashchev winked approvingly: Hang tough, secretary. Kakoshko had no way of knowing how meticulously they discussed the possible candidates for party leader of the subunit in the political department. Political department chief Lieutenant Colonel V. Klinkovskiy and the squadron commander were of the same opinion: They needed a fighter, an enthusiastic person capable of becoming not a formal but a real leader. They also thought about ways to break the stereotype evolved over the years, where an officer of a higher rank was traditionally recommended for the secretary post—for example the squadron chief of staff or deputy commander.

They did a little arithmetic and came up with the estimate that the average age of communists in the squadron was barely over two and a half decades. Young officers have their own, nonstandard points of view: That which appears immutable and routine to older officers is assessed differently, uniquely. And that meant that the forms of party work had to be adjusted for the age and unique features of the collective. After all, young people react more keenly to all things. And as long as young people made up the majority of the squadron's primary party organization, a leader capable of understanding the moods, thoughts and feelings of lieutenants better than anyone else was needed. This is why the political department recommended Senior Lieutenant Kakoshko as a candidate for secretary. They took everything into account: His time of service as a member of the party buro and a Komsomol leader, his adherence to party principles, and his confidence in honing his flying skills. There were doubts as well, of course: Being so young, he is too eager, he has not been around long enough.

The secretary's first speech seemed to confirm that there might be some reason for doubt. "Anyone can criticize and berate," is what the stares of his comrades seemed to say. "But what do you propose instead?"

And Kakoshko did propose, and argue:

"Take for example the morning or evening discussions on specific topics that we plan several times a month for the soldiers. Such discussions are held often at the regimental scale, after all. And all we are doing is copying what they do, sometimes even using the same topics. We organize the discussions, but not even a quarter of the aviators show up: Some are on guard duty or serving details, and others have unexpected work on the equipment to do. I think that we need to work with small groups, individually, so that not a single person would be left out. This would require every communist to participate, and not just active members."

Kakoshko's proposal was supported. Many recalled that the state of discipline had a serious effect on the year's results. More precisely, there was one particular incident that cast a shadow over the entire collective. Some of the aviators had been caught drinking. A decision was made to activate individual work with people by giving out specific assignments.

The secretary dwelled substantially on a key issue—the influence party members have on the effectiveness of combat training and flight safety. Analyzing the work in the flights and hearing what communist commanders had to say were proposed as a first step. With whom were they to begin? The secretary had no doubts. He offered himself up as a candidate. This approach—beginning with oneself—elicited approval.

Soon after the flight commanders had given their accountability reports, the squadron held an open party meeting. The agenda was a timely one: intensifying party influence on combat readiness and promoting flight safety. Moreover the meeting was held in a not quite usual way. Not in the stillness of a conference room but right at the airfield after flying, without the table with a red tablecloth and water pitcher. Instead of giving the traditional report, the commander analyzed the nature of near-accidents in the squadron in recent years, and the secretary briefly described the kind of work the buro was carrying out in order to prevent them. They read the draft of their resolution right away, at the very beginning of the discussion. They proposed making some changes, and working together to decide how to organize party work in this direction.

Abandoning the previous practice, no one kept a list of those who spoke. Kakoshko rejected this method of forced volunteering as a means of increasing participation at meetings right away, from his first moments as secretary. He pinned his hopes on something else: rather than providing ready-made recipes which some speakers serve up at a meeting, simply outlining the facets of the problem clearly in order to force each person to think, compare and participate in the decision making process. After all, collective thought, a friendly "brainstorm" on a problem is always more objective than the opinion of a single individual. Moreover personal responsibility for

fulfilling a decision arrived at jointly is higher. This was precisely the goal of the reports made by the squadron commander and the secretary—intensifying general interest.

Kakoshko's hopes were justified. There was no shortage of speakers. Neither experience-wizened majors A. Ageyev and L. Fadeyev nor young aviators senior lieutenants S. Kalinin, S. Budylin, A. Konyashkin and V. Kashikov were bashful in their evaluations; they made their proposals in a business-like fashion, they thought aloud, they debated, and they argued, defending their points of view.

The young pilots spoke earnestly about planning quality and about increasing the flying time, especially in adverse weather, by reducing the amount of unscheduled time in the planning table. They suggested that the buro should study how well the requirements of the guidelines were being fulfilled in this regard.

When they summarized the discussion they found that hardly a single item in the draft resolution had been left untouched. But what was most valuable was that generalities were supplanted by ideas for practical work. The personal responsibility of communists for flight safety was also embodied in concrete form. Discussing their agenda for the immediate future, besides listening to planned accountability reports they also decided to seek out and punish any party member guilty of creating the conditions of a near-accident.

As a body they also determined the methods by which to change the style of party work in order to make it more flexible and efficient. They agreed to not wait for the next party or buro meeting to resolve urgent problems, and instead to convene briefly in order to make decisions and act without delay.

Party buro member Major L. Fadeyev noted that not all flight commanders were organizing the use of the trainer by subordinates with identical effectiveness. This issue was discussed that same day at the meeting. The reaction to mistakes in fulfilling flying assignments was just as quick. As an example Senior Lieutenant S. Budylin analyzed the film from the flight recorder and offered his conclusions.

Such daily communication among the communists helped to raise glasnost, mobilized them, awakened their thinking and encouraged greater mutual exactingness. When in one of the meetings the work previously done was evaluated, it was found that not only had the resolutions of previous meetings been fulfilled to the letter, but also a number of additional measures were implemented to meet the needs of daily flying.

"The seedlings of new approaches are before us," said Major L. Fadeyev at the meeting. "It is important for them to put down deep roots, and to serve as a basis for even more dynamic restructuring of the style and methods of party work."

His opinion was supported by V. Zakharyashchev, A. Ageyev, V. Mineyev and others. They all converged on the thought that one of the main ways to fulfill the party's requirements is to improve the practice of making personal evaluations of the example set by communists. They decided to evaluate the work of the primary party organization on a monthly basis, and to make such an evaluation the first item on the agenda of each meeting. They set up a visual display of the evaluation given to the entire spectrum of the party and military duties of the aviators.

Soon after, the display, which was positioned in a visible place, became the center of everyone's attention. The secretary heard words of approval, words of disbelief and even angry exclamations: "Why? For what reason?" After all, the most unpleasant oral criticism cannot wound the ego as deeply as detailed information about an individual's attitude toward the common work displayed for all to see. And until this attitude is changed, the eyes will burn and the ego will be pierced owing to the bright marks on the display serving as a daily reminder. A clear distinction between active and passive party members was made by the contrast of two colors—red and blue.

Senior lieutenants O. Kichkimet and S. Kalinin and Warrant Officer P. Lazarishchak were forced to think about how to correct the mistakes they had made in their work, and how to make a more active contribution to fulfilling party assignments. Moreover the buro members were able to see more clearly the points in individual indoctrination of communists to which they had to apply more effort.

For example no one had doubted that Captain V. Grudko, secretary of the shop party organization of the squadron's administration, was making an active contribution, but the display revealed a clear lack of effort in organizational work. Thus he was forced to make an accountability report on his style of leadership. And senior lieutenants S. Budylin and V. Kashikov had to talk about the way they were fulfilling permanent duties and about the personal influence they were having on the work of active Komsomol members. Moreover they had to talk not in generalities, but specifically—about individual indoctrination work.

Budylin listed general measures he was implementing rather glibly. But a question that seemed so simple at first glance stopped him short.

"What is Komsomol member Drozdov's first name?" Kakoshko asked. "How does he stand out in the collective, what is his attitude toward the work, what are his interests?"

The senior lieutenant could find nothing to say.

Questions from buro members provided considerable food for thought. They also thoroughly analyzed how well communists and members of the squadron's Komsomol committee were organizing the effort to implement the initiative "A Komsomol Guarantee of Quality to Each Sortie" proposed by the subunit's younger personnel. Ways in which the buro could help were roughed out.

The practice of personal evaluations was initially meant to serve as a means of indoctrination, of raising the activity of communists, but its meaning soon acquired another aspect. It became a sensitive barometer of the moral climate in the collective, and it exposed the weak places in party work and in measures of influence upon the people, and through their conscience, on the organization of the work.

Glasnost raised the responsibility of the buro members because personal evaluations always began with them. A display titled "Affairs and Concerns of the Primary Party Organization" helped to make the evaluations more specific. Excerpts from decisions of party meetings, the work plans of the buro and instructions to communists are posted on this display. It serves as a daily reminder of the most urgent problems and tasks of the party members for the next week and month.

Each time Yuriy Kakoshko returned to the display to fill in the next columns, he was pleased to note that the color red was becoming more and more conspicuous. While in the beginning the display was dominated by experience-wized senior officers, now the young officers were noticeably crowding their position. Senior lieutenants S. Budylin, V. Kashikov, A. Andreyev, A. Konyashkin and Yu. Serdyukov began to accept responsibility for party work more boldly, and they were taking confident strides in increasing their persistence and initiative.

These changes pleased the secretary, but they also forced him to think about how to encourage creative enquiry to the maximum. He thus came up with the idea of holding a party debate before a tactical flying exercise. Kakoshko expressed his suggestion to the squadron commander.

"That's a purely Komsomol type of function in my opinion," said Vladimir Sergeyevich Zakharyashchev. "But let's try it anyway, let's make it a kind of experiment. The main thing is encourage real debate, and not just idle words."

One question was raised for debate: What could they do to perform their mission in the exercise better? As it turned out, many problems were involved.

"Considering the sprinter's pace the work is going to have, we armament specialists are going to have a rough time of it. Think about the load that each specialist in the group will have to carry," Lieutenant A. Gorbatov voiced his apprehensions.

"Don't forget that we can give you a hand," airplane technician Senior Lieutenant Yu. Serdyukov joined the discussion. "Let's get down to it and determine how we can help each other out specifically."

The coordination between the aircraft armament group and the aircraft technicians was worked out just about down to each operation and minute up to take-off time.

Tactics were discussed in especially great detail, with considerable participation. Officer Yakovenko set the tone of the discussion:

"What if we go against the stereotype?" he asked, and then suggested several different ways to approach the target depending on weather and on the "enemy's" air defense system. "I don't think we've ever tried these particular approaches."

Both top-class and young pilots expressed their opinions. They evaluated the options and eagerly debated them as equals, thoroughly discussing each interesting idea. Later on the points of agreement were accounted for in the commander's decision.

During the tactical flying exercise, experienced air warriors executed a sniper's strike on air defense resources, clearing the way for the attack group, which flew in after them, energetically maneuvering at low altitude to slip across the simulated front line. A few minutes later the flights subjected the target to a fire storm two by two.

After the aviators landed they learned that they had made an accurate hit, and that the inspector deemed the tactics to be bold and interesting.

The work went into full swing on the parking apron. Lieutenant A. Gorbatov, Senior Lieutenant Yu. Serdyukov, Captain A. Sergeyev, Warrant Officer P. Lazarishchak and other ground specialists did not distinguish between their responsibilities and those of others. Mutual assistance made it possible to significantly reduce the turnaround time of the missile carriers.

Back in the air again. This time as interceptors. It was not that long ago that only experienced officers were flying intercept missions in minimum weather. Now the young pilots confidently piloted their aircraft after them into the clouds. The second sortie also produced high scores.

A few days later when they were summarizing the results the aviators learned that 1st Squadron had recaptured

the outstanding title. Special mention was also made of Senior Lieutenant Kakoshko's flight.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1987

11004

Obstacles to Introducing Psychological Findings Identified

91440066d Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 12, Dec 87 (Signed to press 3 Nov 87)
pp 10-11

[Interview with Maj Gen Med Serv V. Ponomarenko: "Who Will Break Down Interdepartmental Barriers?"; date and place of interview not specified]

[Text] In their letters to the editor of our journal, military aviators touching upon the problems of improving combat skills often complain that assistance from scientists is lacking in this area. In particular they note that a gap has developed between the procedures of tactical flight training and of moral and psychological training of aviators, and not in favor of the latter.

Our correspondent met with Major General of Medical Service V. Ponomarenko, a professor and a doctor of medical sciences who deals with the problems of aviation psychology, and asked him to reply to some questions troubling readers of this journal.

[Question] In what directions are aviation psychologists working, and what has already been done to upgrade the quality of moral and psychological training of flying personnel?

[Answer] Unfortunately, professional psychologists have not yet established an official niche in aviation. That is in spite of the fact that moral and psychological training, which is a means of shaping the volitional qualities of aviators, has enormous significance and has a bearing on a wide range of officials. The two forms of training—psychological and professional—cannot be carried out separately. They are organically interwoven.

Why, then, do we observe a gap between them? In my opinion this can be explained to a significant degree by the fact that some commanders are not adequately informed in the area of psychology. This lack of knowledge is compensated in the best case by common sense. But where, one would ask, is this knowledge to be acquired if flight schools offer only a condensed course in psychology, one divorced from the specific features of aviation at that? I think that we need fundamental restructuring of both education and personnel policy in this regard.

Scientists proposed an initiative to create a special psychological service in the air forces. This proposal, which was supported by the air force commander-in-chief, essentially calls for staffing medical services at key

points with professional psychologists, and for initiating a one-year psychological training program in the troops for persons with a higher education, who would then become unofficial psychologists.

A course in aviation psychology is now being prepared for flight schools, a manual on psychophysiological training is being written, and a new form of accountability which foresees establishment of classes in the units to analyze psychological mistakes made by the crews, including ones associated with design shortcomings of work stations, is being introduced.

[Question] How in your opinion should the work of professional psychologists be conducted in the units?

[Answer] Moral and psychological training is, first of all, a system of layered advanced education of aviators. The first layer of this training in a sense represents the foundation of the air warrior's personality, which is laid back in secondary school and in military school. His moral qualities—selflessness, honesty, unselfishness, conscientiousness and so on—are formed by methods commonly encountered in pedagogics. All of this manifests itself spiritually as devotion to the selected profession, moral purity and a sense of collectivism. After that, the job of psychologists working in contact with commanders, political workers and physicians is to develop long-term motivation and the pilot's need for flying.

The second layer is represented by development of the cognitive sphere in application to the specific features of flying. What is implied here is not simply developing thinking, memory and other mental functions, but raising natural endowments to the level of flying capabilities. Note that the part of the pilot's cognitive sphere which is "responsible" for spatial orientation remains in the background for the moment.

Doctors have introduced a great deal of confusion into this area. It would be sufficient to point out that a serious shortcoming has now been around in flight training for over 80 years: Emphasis is laid in flight training mainly on aircraft control, and not on orientation in space. As a result around 20 percent of flying accidents involve loss of spatial orientation.

The third layer of developing the personality entails strengthening sociopolitical consciousness, which starts with shaping the individual's Marxist-Leninist philosophy and ends with the psychological climate in the collective. Here again there are many things for psychologists to do. On one hand we have to develop individuality, boldness in combat and a sense of self-confirmation, while on the other hand we need strict discipline, compliance with moral restraints, consideration of the social suitability of risk and so on. Creation of the conditions for harmonious development of the personality and of social regulators of behavior is, from my point of view, the backbone of moral and psychological training.

[Question] What do you see as the quality criteria of such work?

[Answer] We need to consider that the result of the activity of a military pilot takes the form not of some material product but of a spiritual quality which falls within the category of combat readiness.

As we know, the flying profession involves risk. This generates a number of gray areas. The chief problem that falls within this area is that of subconscious anxiety, which we stubbornly pretend does not exist. I am certain that it can be solved only by professional psychologists. For now, however, because flying is not provided with adequate psychological support today, we find that pilots lose interest in flying long before physical aging of the body becomes a problem. Hence we observe neurotic and asthenic reactions in young pilots having their basis in the fear they experience.

It is with disappointing frequency that commanders with an administrative background fail to grasp the psychological difference between a mistake made by a pilot and the motivations of his actions, which may be "driven" equally by a higher spiritual need or instinctive fear welling up from the depths of the subconscious. Imagine how much cruel, demeaning insult and humility pilots have suffered during investigations of complex, sometimes dramatic situations that may be an accidental or a natural part of flying! This is why there is such great need today for creating a psychological service that might help us avoid many misunderstandings, including between ground personnel and flight crews.

[Question] Many of our readers wonder why it is so hard to introduce the recommendations of psychological scientists into the troops, and why it takes so long. For example, is it not about time to create a department within the combat training system that would take direct charge of introducing workable recommendations of specialists, and to make the corresponding officials bear personal responsibility for this work?

[Answer] Introduction of new, modern methods doubtlessly requires changes in the basic nature of administration, in labor organization and in training principles, and creation of the corresponding equipment. Let me cite a few facts to back up what I said.

Cardiovascular disease is a frequent cause of disqualification of experienced flying personnel today. Scientists have found the "culprit" of the disease—disturbance of lipid metabolism leading to atherosclerosis. Accurate biochemical diagnostic methods have now been developed, new vitamin and enzyme food additives have been created, and substitute foods for persons showing the initial signs of disturbed cholesterol metabolism have been recommended.

In order to introduce all of this into practice, we need higher biochemical control at medical centers (and this in turn would require the corresponding personnel, apparatus and space), we need to change the pilot's attitude toward his diet, we need to improve the means by which the ration is determined (not in terms of its size but in terms of scientifically grounded nutritional requirements), and we need to change the way the command feels about the individual flying load and about rest for persons in preventive treatment centers and sanatoriums for health reasons. We can lengthen the flying career of persons over 37 years old by 5-7 years right now simply by creating the appropriate working conditions and ensuring adequate rest, nutrition and medical control of lipid metabolism—all things that have been recommended by scientists.

The air force inventory is now being supplemented by highly maneuverable airplanes capable of flying long periods of time. Considering this, medical scientists have developed a special system of physical and psychological exercises carried out with trainers, bicycle ergometers and centrifuges, an automatic G-suit pressure control system working on the basis of a new principle of operation, and an automatic system creating excess pressure beneath the oxygen mask. These innovations are making it possible to preserve health and to endure the accelerations created by maneuvers carried out within the limits of an airplane's flight characteristics.

But the recommendations and inventions have not yet enjoyed wide introduction. Unfortunately aviation medicine does not possess its own production base, so that it could manufacture the needed instruments, while on the other hand the corresponding air force services are evidently too busy to satisfy the needs of doctors. It is not within that department's responsibilities, they say. And yet immediate restructuring of the viewpoints of aviation chiefs and change in their attitude toward the recommendations of scientists, toward aviation medicine in general, which must be treated not as just a system of therapeutic care and expert assessment but also as an inherent part of combat training, and consequently toward the combat readiness and fighting capabilities of aviation, is extremely necessary.

[Question] What sort of organizational measures should be undertaken in your opinion in order to shorten the path traveled by scientific recommendations from approval to implementation? It is no secret, after all, that many valuable developments are kept under wraps for decades.

[Answer] Aviation physicians have developed and tested many psychopharmacological drugs that restore performance and raise resistance to stress, and adapted them to the needs of flying. But the traditional (backward) attitude toward pills as something for sick people keeps us from introducing new drugs that can stabilize the condition of healthy people who have experienced a temporary decrease in performance.

Specialists in human factors analysis have developed and scientifically substantiated requirements on the volume and form of information presented on displays, on the light engineering parameters of information presented on night vision television monitors and signaling devices, and so on. But mildly speaking, specialists, and those in aviation industry in particular, have related coolly to these devices, inasmuch as they are concerned primarily with their own interests, and not with the working conditions of flight crews. Once again, the entire matter collides with interdepartmental barriers.

Today, in a time when the role of the human factor is valued so highly, technocracy continues to dominate the development of aviation. Moreover the client "grinds down" the demands of doctors, psychologists and experts in human factors analysis on the emery wheels of industrial dictate. How long will this go on? I think in this connection that aviation medicine and its requirements on crew work stations and working conditions should be represented by those who manage combat training, and not rear services.

Unfortunately it is commonly accepted in some circles that military science concerns itself only with problems of strategy, operational art and tactics, as well as troop automated control systems. Is this perhaps not why industry takes such an impermissibly long time to coordinated on the various tactical and technical specifications and technical assignments prepared by scientists in the Ministry of Defense, requiring these scientists to simplify their ideas out of consideration for scientific, technological and production factors? The ideologists of military tactics should obviously have a more powerful experimental and production base, so that tactical and technical specifications and technical assignments would have a material foundation, and only on the latter should we permit erection of the "building" which the client conceived of, with regard for the required reliability and effectiveness, and with regard for the human factor and the nature of combat as they apply to the particular article.

Specialists in aviation medicine have developed methods for precise diagnosis of the psychophysiological reserves of flying personnel. These methods make it possible to reduce the flying load in time, to schedule rest for an air warrior before it is too late, and thus to prevent transition of a questionable functional state into disease. It is now time to computerize this entire system at the level of the troop unit. But first of all we need to create the software for small computer centers that are to be established in almost all of the services except, of all places, in the medical service.

Thus we can isolate three basic causes for the delays in introducing the recommendations of scientists. First: Development is often carried out in the absence of contact with those who must implement the scientific plans, and without adequate consideration of the actual working and living conditions in the units. Second:

Aviation medicine lacks its own rear support and productive capacities with which to create experimental models of the products it needs. Third: Aviation medicine as a science is isolated from combat training—the main consumer of scientific results.

No matter how paradoxical this may sound, today's realities are as follows: The more substantial a scientific idea, the harder it is to implement it, because it is either ill-suited or ill-timed. This makes scientists less inclined to conduct pioneering research. And if the client is in no hurry to place his order, it becomes understandable why the rule that the person who dreams up an idea has to introduce it himself remains so viable. In the final analysis, everything depends on restructuring the methods by which orders are placed, on restructuring the consciousness of the client and the executor.

From the editor: Replying to the questions of our correspondent, Major General of Medical Service V. Ponomarenko himself posed several questions, to which the editor would like to receive specific answers from executives of the corresponding air force services and from the management of aviation industry.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1987

11004

Creating an Advantage in Aerial Combat Through Stratagem

91440066e Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 12, Dec 87 (Signed to press 3 Nov 87)
pp 12-13

[Article by Lt Col G. Drugoveyko, military pilot 1st class: "With Regard for Stratagem"]

[Text] Having sighted the "enemy," Major I. Povetkin's pair of fighters did everything it could to advertise its own presence as well. It became clear from the energetic offensive maneuver undertaken by the rivals that the plan worked: The dogfight was developing in keeping with the commander's plan. Conceding some advantages to the "enemy," Major I. Povetkin led his pair in a turn, telegraphing his intention to attain the rear hemisphere and use his weapons. The rival persistently conducted his pursuit. But when victory was already quite close, he suddenly found himself exposed to missile fire from an attack group that unexpectedly broke into combat area.

Did this situation evolve unexpectedly? To the "enemy," quite so. But to the subunit in which the pair led by Major Povetkin was given the job of performing the feinting movement, nothing unforeseen had occurred. This action had been calculated, and then tested and played out several times. The "enemy," in the meantime, behaved in accordance with the combat situation that evolved in the air, not suspecting that he was actually making a decision that had already been made for him long ago.

This story is one of many found in aerial combat. Given all of the diversity of the particulars, they have in common one thing that always stays the same: The "enemy" makes a decision on the basis of his evaluation of the situation prior to combat following strict laws of logic. This is precisely the kind of reaction that is foreseen in the rival's plan. It is on this that the subsequent success of the combat plan is based.

To understand this better, let us once again analyze what aerial combat is. There are precise definitions of it in the manuals. But manuals are often interpreted in a manner inconsistent with their content. There are those who believe that such documents deal with all problems pertaining to combat with exhaustive completeness. It must be clearly understood that a manual is a document that contains fundamental conclusions from the entire experience of military affairs. It must serve as the basis from which we seek a specific solution with regard for the principles and rules of tactical behavior in combat. But at the same time, a manual will not provide specific recommendations pertaining to every sudden twist of combat.

A person fights his foe with his own psychology and with his individual, real capability for understanding the situation correctly. A single manual covers an entire branch of aviation, while a pilot always fights in a specific airplane against a specific adversary. Therefore, interpreting the manual as the basic foundation, we cannot assume that we would find ready-made solutions in it for all cases of combat.

Then what is aerial combat? First of all it is a conflict between adversaries, which we interpret as relationships in which the interests of the people are opposite, and in which each of the sides participating in this collision of interests does everything possible not only to attain its goals but also to keep success beyond the reach of the rival. Were we to analyze aerial combat, we would find that conflict may take very many forms. For example available forces may be constantly lacking in relation to the volume and complexity of combat missions, there is a desire to commit as large a force as possible into combat, and there is the need to maintain a reserve for unexpected tasks. The fighting capabilities of aircraft systems may be lacking—a situation that is just as real as the desire to hit the enemy with all resources that may affect the results of the struggle, and so on.

But we are more interested in the kind of conflict which arises in the course of an intellectual collision between adversaries, and more precisely, in the course of decision making in aerial combat.

Obviously a commander makes a decision not on the basis of the real situation but on the basis of his estimation of it. The greatest chance for victory lies precisely in the completeness and accuracy with which the situation is estimated. Correct estimation is the central problem in a commander's activity. It is no accident that so much

attention is devoted to this aspect of professional training in the course of combat training. Nonetheless there is one aspect which often remains outside active attention and enquiry.

Its essence is as follows. If success in combat depends to a significant degree on the accuracy with which a situation is estimated, then while we strive to make this estimation as correct as possible in relation to the enemy, we must seek effective ways to maximally distort the estimation he makes with the same sort of persistency. The approach is obvious: We would need to mislead our adversary. But how do we do this, by what mechanism do we distort the real situation? Once again, everything is clear in the general case. We need to implement special measures to force the opposing side to make a mistake which we have programmed into its actions beforehand, and then we would need to capitalize on this mistake. What actually happens as a result is that we create a situation in which we ourselves control our adversary's actions. But in what specific ways does the possibility for such concealed influence manifest itself? The methods are numerous. Let us examine a few of them.

One of the ways of misleading an adversary is to portray our real forces participating in combat or in some particular episode of it in distorted form. There are two basic ways of doing this in real combat—creating the impression that our forces are much stronger or weaker in a particular region than they are in fact. This effect is achieved by using a specially organized combat formation, by selecting specific routes to be flown prior to engaging in combat (flying in a large group which then breaks up; operating in small groups that can quickly join together into a single formation), or other feinting measures. If we are able to persuade the enemy that our forces are stronger than they actually are, he would assign an unjustifiably large detail to fight in this location, which would create an advantage in the combat region of our principal interest. If we "hide" part of our forces, the enemy's detail would be insufficient, and this would create the possibility of his guaranteed annihilation. Sometimes this result is very important.

We could achieve a high impact by concealing our goal in some particular combat episode. This method of deceit is illustrated well by the experience of a certain exercise.

Lieutenant Colonel S. Solovyev's fighters were given the mission of annihilating "enemy" attack aircraft that had redeployed to an airfield located near the simulated front. Because the fighters had good combat characteristics, it would have been natural to carry out this mission in the air. But this logic was familiar to the "enemy" as well. Therefore a decision was made to do the illogical. Lieutenant Colonel S. Solovyev took steps to persuade his rival that he would follow the traditional principle for fighters—fighting in the air. For example his subordinates showed no interest in the area in which the attack aircraft were based. Concurrently radar surveillance was intensified in another area where calculations showed

that it would be advantageous to organize a fighter screen in the way of the "enemy's" airplanes. Moreover everything was done to demonstrate a high readiness to repel a raid by the attack group. When some targets appeared in the air, Lieutenant Colonel Solovyev launched a group of fighters against them to create the appearance that he had mistaken them for the attack airplanes.

The "enemy" did not know that Officer S. Solovyev had focused all of his effort on preparations to annihilate the attack airplanes on the ground, before their take-off as a group. The work went on concurrently in two directions: While the plans for attacking the airfield were being drawn up, an appearance was created that preparations were being made for aerial combat. Concurrently every action taken by the "enemy" was monitored extremely closely. A special forecasting group staffed by officers having the knack of reading the signs of situations evolving in the air and quickly combining them into a single whole was created. The "enemy" knew none of this. He was making ready to meet opposition in the air.

Lieutenant Colonel Solovyev displayed special proficiency in determining the moment of his group's take-off. He selected a time when his "rival" would be starting his take-off for an attack on ground troops. The officer predicted that this would happen on the basis of an analysis of the general situation in the sector of the simulated front in which his group was operating.

The fighters appeared over the "enemy" airfield precisely when the latter was taxiing to take-off positions. Areas of the airfield suitable for take-off (not only the landing strip) were "put out of action" first of all. Then all forces were concentrated on the airplanes that were on the taxiways at this time. The victory was complete. Incidentally it also had a significant effect on the success of the motorized riflemen, who were able to enter into combat on the ground with practically no opposition from the air.

Thus, creating an incorrect impression of his own immediately forthcoming actions in his rival's mind, Lieutenant Colonel S. Solovyev effectively handled his mission.

The logic of this method may be represented by the following formula:

$$T_t \rightarrow T_d \rightarrow D_a = D_w.$$

That is, the true target (T_t) is given the appearance of a decoy (T_d), reacting to which, the adversary makes a decision based precisely on this decoy. His decision (D_a) would not correspond to the situation in this case; it would be wrong (D_w), and it would result in large losses.

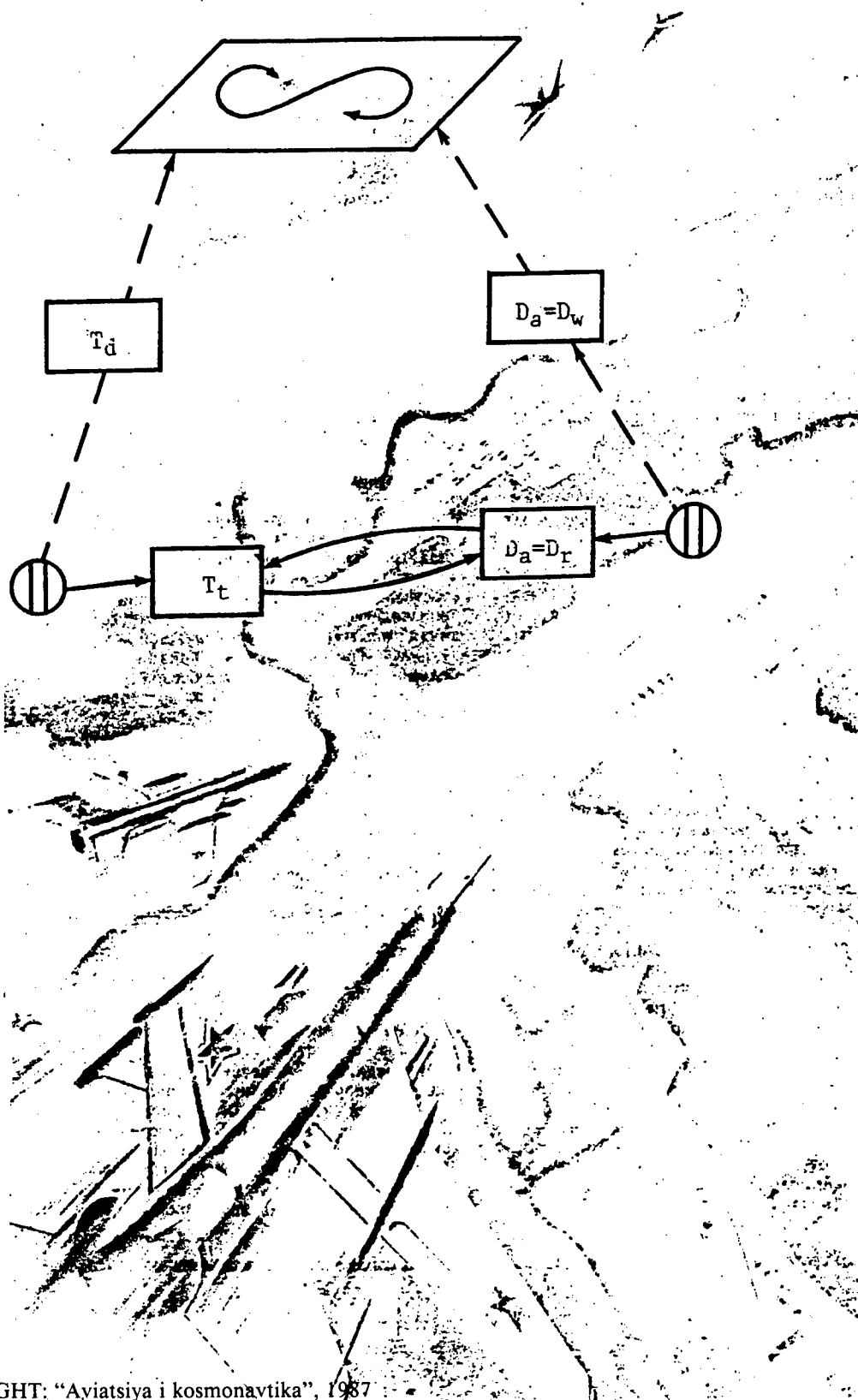
There are many ways to mislead the enemy. For example he could be conditioned to a certain tactic, which is then suddenly changed; combat may be initiated by known

tactics which are then taken into an unexpected direction; the "rules of combat" may be violated; we may exercise double control over the enemy, where we lead the enemy to believe that he has guessed our stratagem but is unaware that our plan had foreseen a second, deeper-lying, "principal" stratagem, and so on.

But not all commanders utilize stratagem in the course of exercises. Some make constant use of the same "traps" and make simple decisions. Such decisions appear to be extremely reliable, but in reality they are not very effective: Acting in accordance with them, an air warrior would rarely attain results greater than those that could be predicted from the characteristics of the equipment employed. But when concealed moves are employed, a possibility arises for attaining a victory that is more substantial than that foreseen by the "arithmetic" of combat characteristics. In this case, however, one must artfully employ the "algebra" of risk. Risk is something we talk about a great deal without as a rule going beyond the bounds of its moral or simply emotional bounds. And yet, professional risk is something that can be determined precisely: A pilot consciously utilizes a logic of behavior in combat that does not follow any of the known rules, with the hope of attaining a significant success. But at the same time he is aware that if the enemy finds out his plan, the consequences would be more serious than if the manner of behavior had been "normal," determined by weighted consideration of all factors of the situation.

The air warrior and the aviation commander are always oriented morally and socially on the maximum result. And sometimes the situation itself dictates the need for significantly raising the return that aviation equipment is capable of providing in combat (for example when engaging in combat with a numerically superior adversary). Without stratagem it would be difficult to count on stably high accomplishments in combat activity. In turn, stratagem is characterized by its own professional "technique" which must be understood, developed and constantly improved, so that the principle of "winning not by numbers but by ability" would take on real content, so that it could be reinforced by dependably mastered habits, and so that it would transform into the fighting potential of the individual warrior and of the entire aviation collective.

What can we include among the factors susceptible to conscious distortion? Practically all elements making up the content of a decision for combat can be manipulated in such a way that they appear to the enemy in false form. Incidentally we must also remember that the enemy possesses all of the possibilities for concealing his true intentions as well. Therefore in the course of combat training, and in exercises especially, it would not be excessive for a senior chief evaluating a commander's decision to analyze that decision both in terms of the effectiveness of the stratagem employed, and in relation to its vulnerability to the enemy's countermeasures.



Air Force Personnel Propose Resource, Labor Saving Inventions

91440066f Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 87 (Signed to press 3 Nov 87)
pp 16-19

[Article: "Economizing"]

[Text] "Intensifying economization. Persistently working for sensible and economical expenditure of all forms of resources, reducing their losses...." Such is the way the party words one of the general tasks of Soviet society. It is reflected in the Basic Directions of the USSR's Economic and Social Development in 1986-1990 and in the Period to the Year 2000. This requirement also pertains fully to military personnel. There are possibilities in the army for intensifying economization, and for widely introducing new generations of equipment and fundamentally new production processes that would ensure further growth of the effectiveness with which assets and materials are expended. Air force innovators are called upon to make a significant contribution to this task.

"Computer Tester," by Ye. Prokofyev

Searching for faults in integrated microcircuits is a hard, laborious job. The specialist must take voltmeter readings, monitor pulse amplitude and duration on an oscillograph screen and tune the instruments. Not only does this additional monitoring apparatus clutter up his work station, but most importantly, surplus information distracts his attention from his search for the faults.

V. Markovich and V. Grominskiy, innovators in the air forces of the Red Banner Turkestan Military District, created an original logical tester. Using it, it is easy to monitor passage of a pulse through a microcircuit by observing the tester's display, on which the numbers "0" or "1" appear in accordance with the logical state of the particular component of the circuit. The device is distinguished by simplicity of design and small size. It consists of five triodes (KT315D and KT361G), five 2W resistors and an AL304G segmented semiconductor indicator. When used on operating equipment it not only raises the excellence and quality of the work but also reduces the labor-intensiveness of repairing the units by 12 norm-hours. The instrument was demonstrated at the Central Exhibition-Fair of the Scientific-Technical Creativity of Youth—the NTTM-87, and it was given a high evaluation by specialists. It has been recommended for wide introduction.

Originality of technical concept, simplicity of design, small size (diameter 30 mm, length 200 mm) and easy operation also distinguish another innovation—a tester

used to tune computer units (authored by V. Konnik). The instrument, which is made out of AL 102A light diodes (Figure 1), helps specialists detect faults in the circuit of a computer unit.

When the metallic tip of the tester is rested on a logic element of the circuit in question, transmission of a false signal is indicated by light diodes D1, D2. If there is no signal, then only D1 lights up. Buttons KH1, KH2 are used to clear the voltages and to prepare the circuits for signal reception. The instrument can also be used during repair and adjustment of computers. In this case labor productivity increases by 15-20 percent.

About 2,200 rubles is the economic impact from introducing another development created by aviators—a semiautomatic capacitor checker (authored by A. Vetrov, N. Romanov, A. Zhuravlev). This device automatically connects capacitors to an R589 alternating current bridge with a digital readout and indicates the deviation of its capacitance from prescribed limiting values. This innovation can be used to determine the upper and lower limiting values of capacitor capacitance within a range from 1 picofarad to 9.9 microfarads, plus or minus 1.5 percent, and to identify capacitors to be discarded owing to capacitance readings that are greater or less than the permissible upper and lower limits. These functions are carried out in the course of testing the state of the capacitors by an automatically determined measuring cycle.

The capacitors are connected by a special device accommodating 20 capacitors simultaneously on its working surface. Without going deep into the technical details, we can note that the principle of operation of the semiautomatic checker is based on comparing the capacitance of the capacitors in a binary-decimal code with the upper and lower limits set in the checking unit. If the measured capacitances surpass the upper limit or fall below prescribed values, the capacitor checking process is interrupted, and a discard signal indicating that capacitance is too high or too low appears.

"For Glued-and-Welded Structures," by Maj S. Lymar

Glued-and-welded joints are widely employed in modern aircraft building. They compete successfully with riveted structures in strength characteristics, ease of manufacture and economic indicators. But after lengthy use in a corrosive environment, such as that created by condensate on a pressurized fuselage, by static and cyclic loads and by temperature differences, some strength characteristics of glued-and-welded structures decline significantly. This happens, as research has shown, mainly due to change in the adhesive forces at the glue-metal interface, penetration of a corrosive medium into the lap of the joint, and intensive development of corrosion processes in the resulting gap.

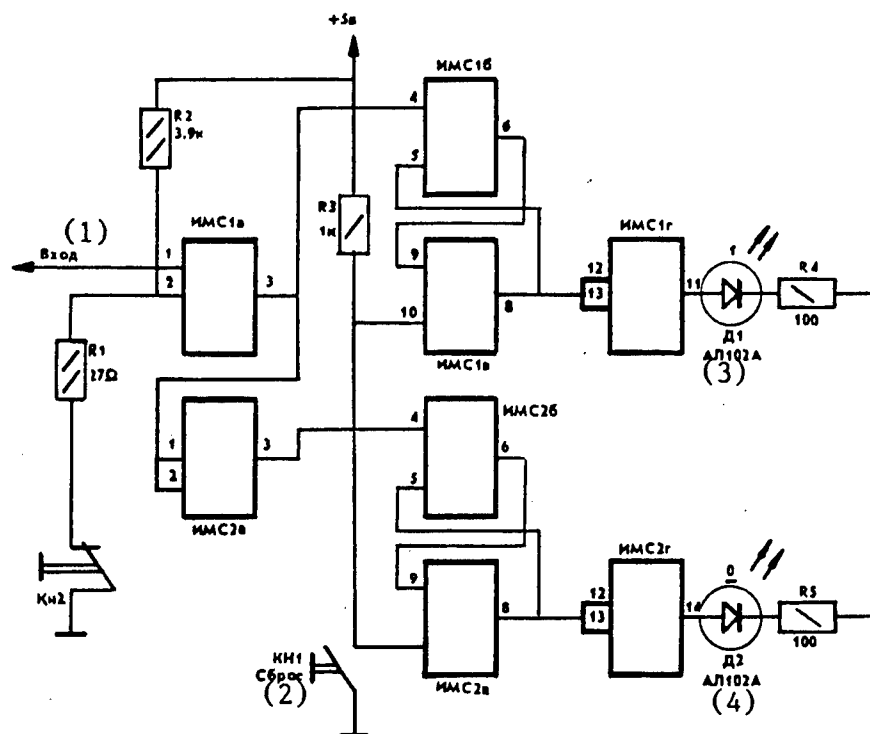


Рис. 1. Схема пробника для наладки ЭВМ.

Figure 1. Diagram of the Computer Trouble-Shooting Tester

Key:

1. Input
2. Clear
3. D1, AL 102A
4. D2, AL 102A

New ways of improving the operating properties of glued-and-welded joints developed by air force innovators were demonstrated in the Transportation Pavilion of the Exhibition of the Achievements of the USSR National Economy. They increase the static strength of joints by 20-25 percent, fatigue strength in air by a factor of 1.3-1.5, and corrosion resistance by a factor of 10-12. These methods are based on dynamic pressure treatment of the surfaces of the elements of glued-and-welded joints, chromic acid anodizing or chemical oxidation of the joints after spot welding, and on forcing VK-39, a new unified water-resistant adhesive, into the lap opening in place of K-4S, KLN-1 and VK-1MS adhesives.

A portable fuel tank drain system purging stand was displayed in the same pavilion. It precludes the need for delivering compressed air into fuel tanks at pressures greater than 0.1 kg/cm² (0.01 MPa) in the course of the purging process, and consequently it excludes their deformation and rupture. The stand is small, and its weight is low (up to 20 kg). It can also be used to test the airtightness of fuel tanks and torsion box tanks of all types of airplanes in aircraft repair enterprises and in operating subunits.

Tens of thousands of rubles is the annual economic impact from introducing a special paint and varnish removing emulsion. This development was also displayed in an exposition inside the Transportation Pavilion. It was given a high assessment by specialists. Besides being highly effective, the new emulsion possesses qualities such as nontoxicity and fire resistance. With its use, laborious processes harmful to human health such as rinsing and cleaning parts can be maximally mechanized, fire danger can be reduced, and labor excellence and productivity can be raised.

The innovation was recognized and approved as an invention, and it was awarded an author's certificate.

"Hand-Held Microcomputer Calculates Flying Time,"
by Sr Lt M. Antonov and Sr Lt A. Piven

Specialists of the air force engineer service must often calculate the flying time of an airplane and the operating times of aircraft engines and other machine units.

As a rule this is done orally or with pencil and paper, which naturally does not exclude mistakes. The MK-54 microcomputer can provide effective assistance to personnel of the air force engineer service. Specialists can use the following program to add times together:

```
00↑ 01. 1 02. + 03.П7 04.КИП7 05.ХУ
06.П3 07.ИП7 08. — 09.П8 10.КИП3
11.ИП3 12.ИП1 13.+14.П1 15.ИП2 16.ИП8
17.+18.П2 19.ИП9 20.—21.П6 22.Фх<0
23.30 24.ИП1 25.ИП2 26.—27.С/П 28.БП
29.00 30.ИП1 31.1 32.+33.П1 34.ИП6
35.П2 36.БП 37.24
```

Instructions: 1. F, PRG, input program, F, AVT.

2. Input 0.6 into register P9. The microcomputer is ready for calculations.

3. Input variable initial data, separating hours from minutes (or minutes from seconds) with the "." button.

4. Initiate first calculations by the program by pressing the V/O and S/P buttons.

For subsequent calculations, press only the S/P button.

Example:

2.45; V/O; S/P—2.45 (2 hours 45 minutes) is displayed on the indicator.

0.55; S/P—3.4 (3 hours 40 minutes) is displayed on the indicator.

1.25; S/P—5.05 (5 hours 5 minutes) is displayed on the indicator.

Before beginning the next stage of calculations, clear registers P1 and P2 by pressing the "0", "P1" and "P2" buttons.

"Mechanizing Safety Wire Application," by Col A. Isayev

Plug connections, coupling nuts, pipeline nipple joints and connecting pipes are made secure by applying safety wire, but this is slow work. It is done by hand because there are no industrially produced devices by which to mechanize this work.

A portable safety wire twisting device was introduced at air force aircraft repair enterprises headed by officers N. Burmin and V. Gribovskiy. It makes it possible to significantly mechanize twisting of safety wire, to improve the quality of twisting and to double or triple labor productivity.

The device consists of a chuck holding jaws and a shaft 1, a handle with a starting button installed 2, a housing containing an electric motor and reduction gear 3, a rotating reversing switch 4, a power cord 5 and a protective housing 6 (Figure 2). The specialist starts the motor by pressing the button operating the microswitch. He manipulates the handle to squeeze the device's jaws together to pull, twist and snip off safety wire. The direction in which the chuck rotates is selected depending on the structure of the unit to be secured, and it is set by aligning the marks on the housing, which is done by

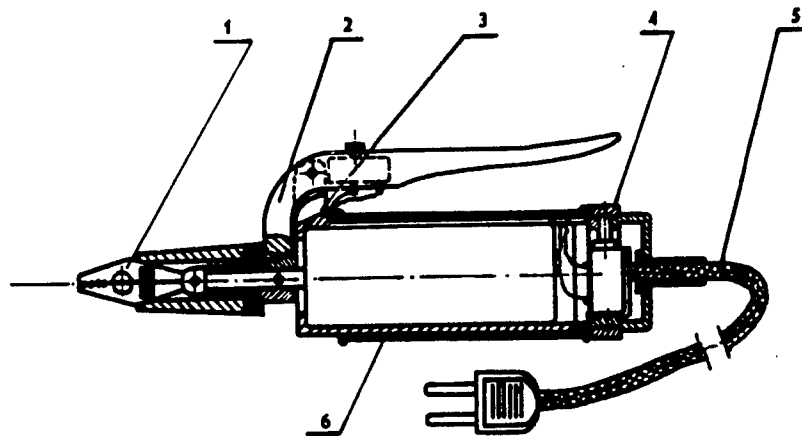


Figure 2. Safety Wire Twisting Device

rotating the switch to its "left" or "right" position. Because the reduction gear has a high transfer ratio, the chuck stops rotating instantaneously, thus ensuring that the safety wire would be twisted with high quality.

The device is powered by a 27 V direct current network. Consumed power is 0.15 W. The chuck rotates at 100 rpm.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1987

11004

Economist Explains Principles of Economic Reform

91440066g Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 12, Dec 87 (Signed to press 3 Nov 87)
pp 18-19

[Article by Col N. Karasev, candidate of economic sciences: "Radical Reform of the Economy's Management"]

[Text] If we are to extricate our economy out of the complex situation in which it found itself at the turn of the 1970s for reasons stated at the 27th CPSU Congress and in the January and June (1987) Central Committee plenums, we must carry out deep and truly revolutionary transformations. "The objective of the radical economic reform that has been initiated in the country," emphasized CPSU Central Committee General Secretary Comrade M. S. Gorbachev in a report to a joint solemn meeting of the CPSU Central Committee, the USSR Supreme Soviet and the RSFSR Supreme Soviet dedicated to the 70th anniversary of the Great October Socialist Revolution, "is to ensure, within the next two or three years, a transition from an excessively centralized command system of control to a democratic one based predominantly on economic methods and on an optimum combination of centralism and self-management. It presupposes dramatic expansion of the independence of associations and enterprises, their conversion to full cost accounting and self-financing, and furnishing the labor collectives with all of the rights they need for this."

But the mechanism of deceleration is still making itself felt. It has not yet been replaced by the mechanism of acceleration. We are often compelled to compensate for its absence in the old way, by other than economic methods, by administrative pressure. This is why creation of an integral, effective, flexible system for managing the economy has become a priority task. The main ways of solving this problem were thoroughly analyzed in the June (1987) CPSU Central Committee Plenum.

The party expresses the meaning and orientation of the radical reform of management by the formula "more socialism, more democracy." The main theoretical and political problem here is how to create, on a socialist basis, stimuli of economic, scientific, technical and

social progress that are more powerful than those encountered in capitalism, and how to reconcile planned management with the interests of the individual and the collective in the most effective way.

A diversity of the forms of expressing socialist ownership can rightfully be called the first principle. After all, the key to creating effective stimuli for raising production effectiveness is to place the man of labor in a position of real proprietor at his work station, in the collective and in society as a whole. But what is it really mean to transform a laborer into a real and active proprietor of social property? It means, first of all, providing collectives and individual workers with broad possibilities for disposing of public wealth, and raising their responsibility for the effectiveness of its use. And this objectively requires the use of various forms of cooperative and private labor, in addition to state-controlled labor.

In recent years the party and government have adopted the corresponding decisions. But their practical implementation has produced a far from uniform reaction. The discussion often centers not on, for example, how to utilize the new possibilities faster and better, but rather on how proper these forms of economic activity generally are in the present stage of socialism. Some people have interpreted cooperative and private labor as something akin to the resurrection of private enterprise.

The July plenum of the party central committee spoke decisively against such conclusions. In the report given then by CPSU Central Committee General Secretary Comrade M. S. Gorbachev and in statements made by participants of the plenum, it was noted that our own experience and the accomplishments of other socialist countries show that competent utilization of the most diverse forms of expressing socialist ownership within the socialist framework is useful and necessary. This is the way that the urgent needs of the people are satisfied to the fullest extent, and it is a way to displace "shady" economics and all kinds of abuses—that is, it is a way to promote a real process of improvement of socioeconomic relations.

The second principle of the radical reform of the economy's management is organic unity of the plan and the marketplace. According to the scientific definition of socialism, commodity and monetary relations are an organic element of socialism's economic system. Competent utilization of these relations by way of prices and financial and credit levers, planned establishment of control over the marketplace and its management with regard for its laws, and reinforcement and enhancement of the authority of the ruble are helping to create an effective anti-spending mechanism and to reinforce socialism in a meaningful way.

In the economic mechanism presently undergoing formation, the problem of imparting organic unity to the plan and the marketplace is being solved by effecting a transition to a qualitatively new planning procedure.

Directive quotas established in any centralized fashion are to be totally rejected. Instead, the enterprises will receive control figures, stable long-term economic standards and state orders.

The control figures are to orient the collectives as to their place in the country's economy indicatively rather than directive, and they are to provide the collectives unique "food for thought" concerning what has to be done when and how. To put it another way, control figures reflect the social need for products manufactured by the enterprise and the minimum levels of production effectiveness. They must not constrain the efforts of the labor collective to draw up its plan, leaving it plenty of room to make its own decisions and select its own partners for business contracts. And what now becomes the most important criterion by which the activities of the enterprises are evaluated and labor collectives receive material stimulation is fulfillment of orders and contracts.

Economic standards determine the mutual relations between enterprises and the budget and the procedures by which wage and economic stimulation funds are to be formed. They include prices that encourage enterprises to satisfy the proportions that are specified in the strategic plan for development of the entire national economy, a scaled wage system, interest on loans, depreciation norms, tax scales and so on. Economic standards are the principal instruments of planning work, the main levers of influence by planning organs upon the enterprises, encouraging them to act in the interests of society and to attain the targets of the plan.

State orders guarantee satisfaction of priority social needs. They are issued to the enterprise by a higher organ. In order to materially interest the collective in completing a state order promptly and with high quality, an extremely favorable economic "infrastructure" is provided concurrently—state allocations for scientific research and experimental design work, priorities in material and equipment supply, more advantageous economic standards and so on. Aerospace products will doubtlessly have an important place in the list of state orders.

Working on the basis of control figures, economic standards and state orders, enterprises will now be able to independently develop and approve their own plans and sign contracts. It is of course harder to utilize commodity and financial relations in the system of control in unity with the advantages of national economic planning than it is to simply issue commands and directives. But this problem has to be solved.

Conversion to full cost accounting on the basis of self-financing is the third principle of radical reform of the economy's management. From this day forward, development of enterprises in production and social respects will be directly and even rigidly dependent on activity results, on the money earned by the labor collective.

A new economic category is now being practically introduced—cost accounting income. It is becoming the principal source of money for wages and material incentives, for the production, science and equipment development fund and for the social development fund. And this means that if labor collectives wish to increase their profit or income, they will have to manage their business economically, they will have to raise labor productivity and product quality, and they will have to make thrifty use of all resources.

Full cost accounting is already a reality in many labor collectives. This year enterprises of three machine building ministries, of light industry, of the Ministry of Petroleum Refining and Petrochemical Industry and of the Ministry of Maritime Fleet, and some associations of the Ministry of Civil Aviation are working under the new conditions. In 1988-1989 all sectors of our economy will convert to self-financing.

The fourth principle of the reform is self-management of labor collectives. Self-management is interpreted in the USSR Law on the State Enterprise (Association) as an indivisible unity of its three aspects. Self-management foresees active participation of collectives in making and implementing all decisions, election of executives from the brigade leader up to the general director and, finally, preserving and strengthening one-man command in enterprise administration on a democratic basis.

At the enterprises, labor collectives are creating councils to express their will and interests. The councils are endowed with broad powers for active influence upon all aspects of the life of the enterprise. They maintain surveillance over fulfillment of the decisions of general meetings, they entertain accountability reports from the administration concerning progress in fulfilling plans and contract obligations, and together with elected organs of the party, trade union and Komsomol organizations they approve the terms of socialist competition, summarize its results and solve the problems of improving management of the enterprise and its organizational structure. Thus the socialist system of organs of popular rule is supplemented by a highly important element in the sphere of production.

Election of executives means that labor collectives are allowed to have a director, shop chief or brigade leader whom they trust. At the same time the principle of elections creates a strong foundation upon which to amplify the authority of the executive. It does not weaken this authority in any way; on the contrary it strengthens the principle of one-man command. This is understandable, because after all, the executive now receives the right to manage the affairs of the collective from the collective itself.

The fifth principle is rivalry, competitiveness in assignment of state orders and in selling scientific developments and manufactured products. The party rests its policy on the need for intensifying real rivalry between

enterprises and organizations, including between state and cooperative enterprises, and on the best possible satisfaction of the needs of the population, the national economy and the country's defense. The winners of this competition should enjoy a tangible economic benefit.

In accordance with the Law on the State Enterprise (Association) the state employs competitive design and production and it utilizes financial and loan leverage and prices to promote all-out development of economic competition between enterprises, limiting their monopolies on producing certain type of products.

It is important for scientific research and other organizations developing and producing aviation and space equipment to turn attention to the idea suggested by the party that competition is also necessary in the scientific and technical sphere.

It was often suggested in the past that the existence of parallel scientific research, planning and design organizations leads to dispersal of effort, to redundancy and to irrational expenditures. The June (1987) CPSU Central Committee Plenum does not agree with this point of view. In particular it was stated in Comrade M. S. Gorbachev's report that experience persuades us that when certain organizations hold a monopoly, they seriously hinder scientific-technical progress, which creates by far larger losses for the society. But this does not at all mean that we need to create parallel structures in all areas. However, this approach would be useful in solving a number of important scientific and technical problems.

The conception of restructuring management forwarded by the party has the objective of reorienting economic growth from intermediate to final, socially meaningful results, to fuller satisfaction of the socioeconomic and defensive needs of the Soviet state.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1987

11004

Border District Aviators Serve Alert Duty
91440066h Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 12, Dec 87 (Signed to press 3 Nov 87)
pp 20-21

[Article by Maj Gen Avn N. Vasilevskiy, Military Council member and chief of the Political Department of the Red Banner Transcaucasian Military District's Air Forces: "In Accordance with the Laws of the Border"]

[Text] The air forces of the Red Banner Transcaucasian Military District play an important role in the system by which the security of our motherland's southern borders is ensured. This is why among the many missions of military aviators, alert conduct of combat duty and a constant readiness of the units and subunits to foil a surprise attack by any aggressor and provocative actions by means of aircraft, watercraft and ground equipment

have been and remain paramount. All of the life and combat training of the personnel and all party-political work is consequently subordinated to the rigid laws of the border.

The experience of carrying out combat missions to protect the air borders of the fatherland persuasively shows that in a border district, every sortie flown by the crews of airplanes and helicopters on alert duty may become a combat sortie, requiring aviators to display endurance, ability, the will to win and proficiency in attaining victory. An example of this can be found in the actions of communists G. Yeliseyev and V. Kulyapin, valiant pilots of the Transcaucasus Military District who once stopped violators of the USSR's air border. Both officers earned high state awards in peacetime, and Hero of the Soviet Union Captain G. Yeliseyev's name was added permanently to the personnel roster of the squadron in which he had been deputy commander.

Stories of the glory of squadron commander Lieutenant Colonel Yu. Tsyrlunichenko, squadron deputy commander for political affairs Major S. Pavlov, flight commander Captain V. Lozov, helicopter pilots Major A. Povchun and captains V. Kornev and A. Matsko, and aviation specialists senior lieutenants I. Tveridnev and A. Stepanov, who carried out complex and important missions in exemplary fashion in the course of alert duty and in daily service and study, have been making the rounds in the troops of our district.

The heroic deeds and selfless military labor of the personnel of alert flights and crews are based on deep ideological conviction, boundless devotion to the Communist Party and the people, faithfulness to duty and a deep desire to be at the leading edge. "As long as the danger of war persists, as long as social revenge remains the core of the strategy and militaristic programs of the West," noted CPSU Central Committee General Secretary Comrade M. S. Gorbachev in his report to a joint solemn meeting of the CPSU Central Committee, the USSR Supreme Soviet and the RSFSR dedicated to the 70th anniversary of the Great October Socialist Revolution, "we will continue to do everything necessary to maintain defensive might at a level which would preclude imperialism's military superiority over socialism."

And naturally the question as to how to achieve a further increase in the alertness of the personnel and in the combat readiness of alert shifts and military collectives in general is one of the most urgent today. This is emphasized by our party's Central Committee and the CPSU Central Committee Politburo, which point to the fundamental importance of decisively increasing the combat readiness and discipline of the armed forces, competently managing the troops and ensuring their constant capability for cutting off any transgressions of the sovereignty of the Soviet state.

The Military Council and Political Department of the air forces of the Transcaucasus Military District and the political organs and party organizations of the units and subunits are evaluating the state of affairs incisively, from the positions of these requirements, and in light of the requirements of the 27th CPSU Congress and the January and June (1987) Central Committee plenums. They are studying the specific things they have to do to indoctrinate aviators in the spirit of high alertness and to activate the human factor in the struggle to strengthen the combat readiness of alert forces and resources and to improve preparation of soldiers for manning a combat watch.

While it is not my objective to cover all sides of the problem, I would like to at least share some thoughts evoked both by positive experience and by shortcomings in party-political support to alert duty.

Life in the shack by the parking apron reserved for alert forces and resources of this particular air regiment was going on as usual. The airplanes had been prepared for immediate take-off, and the airfield equipment had been carefully checked out. All aviators free of patrol duty and internal service convened in the Lenin Room for a discussion titled "Being in Constant Combat Readiness" conducted by military pilot 1st class Major V. Dzhabua. Using persuasive examples and facts to demonstrate the complex, explosive nature of the present international situation and the aggressiveness of the aspirations of imperialism, the officer emphasized that today every Soviet citizen, and every soldier especially, should recognize in his mind and in his heart his personal responsibility for the destiny of the motherland and of socialism. Here near the border, this feeling is doubly important.

Recalling the essence and content of the pledges made by the personnel and aircraft specialists of the alert flight, Major V. Dzhabua shared his experience in organizing alert duty and in the conduct of combat operations by alert crews of squadrons in the limited contingent of Soviet troops in Afghanistan. His stories were not second-hand: This pilot-internationalist, this recipient of the Order of the Red Star had flown over 200 combat sorties in the skies of Afghanistan.

On that same day the higher staff checked the combat readiness of the regiment's alert forces. A pair of aircraft piloted by Major A. Kotov and Major V. Dzhabua was launched against practice targets and carried out its assignment in excellent fashion. Captain V. Kornovich, Lieutenant V. Gorokhov, aircraft mechanics I. Abramov and V. Vosolykh and others who supported the sortie did so well within the time standards.

Without exaggerating the significance of the discussion held earlier that day to the success, I suggest that the vibrant words of the communist pilot, which he uttered from the bottom of his heart, combined with other organizational and political indoctrination measures and

with the personal example set by the commanders, went a long way to promote concentration of the spiritual and physical strengths of the soldiers into a single force at the needed moment, the swift take-off and the accurate attack on the simulated enemy.

Adequate attention is devoted to instilling a keen sense of responsibility for the motherland's security and for serving alert duty watchfully in the personnel in the unit in which officers S. Pavlenko and A. Todorov serve. Lenin's commandments to Soviet soldiers and the principles and conclusions of the 27th CPSU Congress and party documents on the importance of reinforcing the country's defense capabilities and tightening discipline to attaining the strategic goals planned by the party are always emphasized in lessons conducted here within the political training system and in mass agitation work.

Improving party-political work, communist executives and party organizers of the units in which officers V. Shestakov and G. Torbov serve work persistently and thoroughly to improve material and airfield technical support and the personal conditions of alert forces. Military order and constant concern for the people are having the favorable effect of raising the alertness of the soldiers and the combat readiness of flights on alert duty, command post crews, aircraft control stations and radiotechnical resources.

But at the same time the Military Council and Political Department of the district's air forces believe that organizational and political work aimed at increasing alertness and ensuring high quality fulfillment of alert duty missions does not fully satisfy present requirements in terms of its content and its influence on the personnel.

The political organs and party organizations of some units and subunits have been unable to transmit the meaning and significance of directives of the CPSU Central Committee, the USSR minister of defense and the commander-in-chief of the air forces deeply and persuasively to every commander, political worker, pilot and aircraft specialist. As a result certain aviators who do not understand their role and place in the overall system for protecting the motherland's air borders gain the impression that alert duty is a routine measure. The people get accustomed to such service and commanders, political workers and party organizations are not bothered much by that. The following incident comes to mind.

In the course of preparations to assume alert duty, the headquarters of a certain regiment put one of its squadrons on alert. Flight commander Captain A. Kuzin did not get to the airfield on time. Major A. Kondratyev, the subunit's chief of staff, who lives in the same building and even shares the same driveway, did not do anything to notify his subordinate. Both officers were subjected to

disciplinary punishment for carelessness. But the party organization displayed incomprehensible leniency. The regiment's party committee also remained a casual observer in this situation.

An unconcerned attitude toward alert duty also manifests itself in the simplified approach taken to aviator training. At the beginning of the year the Military Council noted that a number of the units were devoting inadequate attention to studying the methods of combat to be used when striking priority objectives, surmounting enemy air defenses and performing combat missions at night. It was found that these issues were not being covered in lessons carried out within the political training system or in mass agitation work either, because the group leaders and other propagandists lacked the deep knowledge of the subjects that was required.

Communists of the headquarters and political department of the district's air forces perceived this criticism as a condemnation of their own shortcomings. We shifted the main load of organizational and political work directly to the units and subunits. By making a joint effort with the staffs and political organs of the units, we were able to rectify many things. But positive trends and changes for the better are not yet a solution to the problem. It is the end results that we need to emphasize. What is being done today in this regard?

We are trying to do everything we can to upgrade the role and significance of the political organs and party organizations as the sources of ideas and as active pursuers of a clear, single line directed at increasing the responsibility of executives and raising party influence upon all processes associated with alert duty and with preparation of aviators for it. We are restructuring the psychology and the work style of the political workers, and chiefly at the regimental level, in such a way that they, and not just the squadron deputy commanders for political affairs, would act as the driving force in planning and organizing ideological work and political indoctrination in the alert shifts. Decisive measures are being taken against understatement of the influence of political training on development of the soldiers' ideological conviction, a firm civic position, a responsible attitude toward military duty and a feeling for the leading edge. The political organs and party organizations were given the task of gaining an objective idea of the qualities of every communist executive, officer and warrant officer, of making a principled evaluation of their contribution to raising alertness and combat readiness, and providing the corresponding conclusions and proposals. Personal participation of commanders, political workers, engineers and technicians in ideological indoctrination was required as well.

One of the most important directions in party-political work to which we are now devoting our most persistent attention is that of mobilizing all personnel, from the pilot down to the mechanic, to deeply study the combat equipment and weapons and to use them faultlessly. The

preparedness and the real capability of units, subunits and alert forces for successfully fulfilling their combat training missions are predetermined to a considerable extent by how well the aviators know their own capabilities and the strong and weak sides of the equipment and tactics of the probable enemy, and by their ability to work together with the command post, with ground control intercept stations, with air defense units and with combined-arms commanders to create advantageous conditions for interception of airborne targets or for attack on ground objectives.

"...To master modern equipment and the modern methods of warfare...." To V. I. Lenin, this was one of the decisive prerequisites of the victories of the revolutionary army. The importance of Lenin's appeal to our days is well understood in the air regiment in which Lieutenant Colonel A. Todorov heads the party committee. The personnel are mastering a weapon system new to them. The intensity and quality of the training process, growth of the aerial, fire and tactical skills of the personnel, improvement of known combat tactics and development of new ones are topics of constant concern on the part of commanders, political workers and party organizations. It is no accident that the regiment is among the best air force units of our district in terms of the principal indicators describing the alertness and combat readiness of alert forces and resources.

But unfortunately others do not always learn from the experience and example of the leaders. Thus because of planning errors and weak control over flight training, some aviators in the collective in which Officer S. Shatravka serves experienced periods of time in which they did not perform required combat training missions in the appropriate weather conditions. Consequently these pilots could not be cleared for alert duty. This meant that officers who had not let their flying skills grow rusty had to carry the additional load. The omissions also had an effect on planning and on the rhythmicity of the training process.

In order that this kind of thing would not happen again, the commander of the district air forces and the Military Council require all executives and political organs to take full account of those things and complexities which alert duty introduce into the life of aviation collectives in the organization and conduct of combat training and party-political work. What this means primarily is to decisively eliminate any laxity and simplifications in the training and indoctrination of aviators, and especially pilots. And this requires placing greater demands on work with personnel. We must be certain that people with working and moral qualities making it possible for them to ensure the inviolability of the state border and USSR airspace in any situation would be serving alert duty at every instant and in every hour in the missile carrier's cockpit, at radar station screens, at ground control intercept stations and at other posts. It is from these positions that political organs and party organizations working jointly with commanders and personnel

organs are now approaching the selection, training and indoctrination of candidates for positions involving leadership, alert duty and its support, and determining the composition of alert shifts.

Rejection—perhaps partial for the moment but increasingly more decisive—of office-centered, bureaucratic methods of leadership and of perpetual meetings, and concentration of the efforts of political organs and party organizations on rendering practical assistance to commanders and political workers in their efforts to raise the alertness and combat readiness of personnel in the units and subunits are having a positive effect on the state of affairs. For example problems concerned with tightening military discipline, including the discipline of alert duty, and with enhancing the mobilizing and indoctrinating role of socialist competition in tasks and standards are now being solved more persistently and objectively. Also important is the fact that aviators performing combat missions have many opportunities to see commanders and chiefs of the highest rank in the alert flight, at the command post and at other facilities, they can talk with them, and they can personally voice their remarks and proposals.

Under the guidance of the district's command and political directorate the departmental barriers that are keeping us from establishing close interaction of air units and subunits with border troops, seamen and air defense troops are being decisively dismantled. The Military Council and Political Department of the air forces of the Transcaucasus Military District attach great significance to coordinating their work not only in regard to exchanging current information on the situation in the border sector within their responsibility and organizing clear coordination of alert forces, but also in conducting joint exercises and training on a tactical background close in nature and content to a real combat situation, and in organizing experience exchange between flight crews, specialists of the command post, of ground control intercept stations and of air force engineer and other services, political workers and active party members. We are all equally responsible before the party and people for dependably protecting our borders and for a clean sky over our heads, and we must work in behalf of this together, understanding and trusting each other.

The border.... It is the farthest limit of our land, and it is also the forward edge for many aviators, border troops, seamen, and soldiers in other arms and services who are alertly standing together in a single formation guarding the peaceful labor of the Soviet people and the great accomplishments of October. And every pilot, navigator and aviation specialist of air force units in the Red Banner Transcaucasus Military District invariably finds the border an emotional experience when he assumes alert duty, and he serves in accordance with the border's strict laws.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1987

11004

Discussion of Antyufeyev Article Summarized
91440066i Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 87 (Signed to press 3 Nov 87) pp 22-23

[Article by Maj Gen Avn Yu. Kulikov, air force chief of the flight safety service: "A Measure of Personal Responsibility (A Summary of the Discussion of Lieutenant Colonel V. Antyufeyev's Article 'The Sky Does Not Forgive Mistakes')"]

[Text] In his article "The Sky Does Not Forgive Mistakes" (AVIATSIYA I KOSMONAVTIKA, No 1, 1987), squadron commander Lieutenant Colonel V. Antyufeyev shared his thoughts responsibly and with deep concern about how best to prevent flying accidents and near-accidents, he indicated the specific things that sometimes keep us from attaining high end results in combat training, and he pointed out what we need to do to fully ensure the quality and reliability of flying. He also touched upon other important issues affecting flight safety.

Although the author limited his discussion to the affairs and concerns of his own squadron, the problems he raised turn out to be typical of other aviation collectives as well. Interesting, substantial articles in which readers developed the author's thoughts and stated their own ideas about ways to ensure flight safety were published throughout the year in different issues of this journal under the rubric "Flight Safety: Experience, Analysis, Problems." Summarizing the results of the discussion, I would like to express my pleasure that it was concrete, substantial and useful.

Whenever I visit the best units, analyze the results the personnel have achieved in combat training and correlate these results with the work style of the commanders, political workers, staff officers and other aviators, I persuade myself that success is attained by those who possess a developed feeling of responsibility for flight safety, and who are able to persuade, teach and demand their subordinates to comply with flying laws faultlessly. We say of such people: "They are working where they belong." Their work experience is studied, and then it is brought to the awareness of all personnel. And it was quite correct for military pilot first class Lieutenant Colonel V. Gorlov, Major V. Surov and others to turn special attention to this in their contributions to the journal.

"Sometimes the successes of one commander or another are explained by luck. He does his work in the same way as others, people might say, there is nothing special about him. But this is the way things appear only at first glance. As a rule such a commander is distinguished by analytical thinking and by the ability to penetrate into

the essence of phenomena and facts, to make the right conclusions from them and to work concretely, objectively, with an eye on the future," writes V. Gorlov.

We know that the strength in the commander's principle "do as I do" lies in its openness, in the simplicity of its perception. The good example of the commander affirms his high and unquestionable authority in the eyes of his subordinates. In the many years that I have known military pilot 1st class Colonel N. Loktev, this is precisely the kind of person he has been. Nikolay Mikhaylovich has commanded a regiment in different geographical and climatic conditions. And wherever he has served, he has worked in accordance with state and party principles. This is why he has now been promoted to a higher position.

But unfortunately flying experience also reveals something else. Failures in flying work are often the product of a faulty work style on the part of commanders themselves. Some of them forget that persuading, teaching and demanding are but facets of the same interrelated process of training and indoctrination. A commander who weakens his attention to one of these facets invariably creates an atmosphere of indifference, indiscriminant forgiveness, and connivance which subsequently has a deleterious effect on the training and indoctrination of aviators and on flight safety.

For example Lieutenant Colonel V. Bulavkin would not bestir himself to work meticulously with the personnel, and he understated the importance of monitoring the flying proficiency of his crews and satisfying flight safety requirements. Inertia, a lack of initiative and serious flaws in administration gradually took root in the regiment.

And as a consequence two fighters came dangerously close in the air. The cause of the incident was unsatisfactory organization and management of the flying. The order of exercises in the combat training course was violated. Personnel did not prepare as they should have for training in group aerial combat. Management of the crews during combat was weak.

Analysis of the accident showed that the regiment commander was personally to blame for much of what happened. Lieutenant Colonel Bulavkin was unaware of the training level of his pilots, and therefore he permitted aviators who had not undergone the complete program of training for group aerial combat to plan the exercise. Although he had made similar mistakes previously, he never did make the appropriate conclusions from analyzing them.

The same kind of faulty work style was also typical of Lieutenant Colonel V. Vdovkin, the regiment deputy commander for political affairs. The officer would not take the trouble to deeply study the flight training of the aviators or to conduct purposeful political indoctrination work with the regiment's executives. Bulavkin and

Vdovkin were demoted. Life shows how important it is for officials to act not formally but with an awareness of their personal responsibility for everything that goes on in the unit entrusted to them, and especially in the fight against accidents.

Most of the responses to the article "The Sky Does Not Forgive Mistakes" published in the journal were typified by a concerned tone, by high interest in flight safety problems, by intolerance of indifference and self-satisfaction and by a creative search for ways to raise the effectiveness and quality of aerial, fire and tactical skills. Unfortunately, inspector-pilots, who are supposed to play an important role in ensuring flight safety, remained out of the discussion. It is their right to offer critical assessments of the state of affairs in the regiments and to help them find ways to organize efficient flying and to reveal, prevent and correct shortcomings.

It stands to reason that an inspector has more work experience than some regiment commanders. And sometimes because he carries out directive and executive functions, he must make decisions on the most diverse problems that arise in training practice. I think that these are things which should have been explained to readers. But none of the articles did.

Here is something else I would like to turn attention to. New instructions on the procedures for classifying, investigating and reporting on near-accidents in the air and organizing prevention of flying accidents in air force units will reach the air units at the beginning of the new training year. Commanders, staffs, political organs and party and Komsomol organizations are obligated to study and unfailingly fulfill the requirements of these instructions.

Only those who make competent use of the rights granted to them and personally set an example of professional competency, responsibility, self-control, discipline, a conscientious attitude toward one's responsibilities and strict compliance with flying laws are able to successfully solve the important and complex problems facing executives of air collectives. Imagine for example what sort of attitude a young pilot might have toward his work if experienced air warriors take "liberties" in the sky right before their eyes. Some of these young pilots might conclude: "They can do it, so why can't I?" And so they violate flying laws as well. Such phenomena are extremely harmful.

It stands to reason that a commander's art does not come about spontaneously; it must be taught to officers, especially at the subunit and regiment level. Take for example the problem of compiling planning tables. One would think that this would not require any great wisdom. But certain difficulties do arise in some squadrons. Moreover consider that not only successful fulfillment of the combat training plan but also flight safety will depend on how correctly and methodologically competently this document is drawn up.

We cannot but agree with Lieutenant Colonel V. Antyufeyev, who argues that squadron commanders should be provided a possibility for managing the flying by themselves more frequently. "I am certain," he writes, "that many of us would start looking at the planning table in a different way. We would then start compiling it not for some faceless executive but for ourselves." I think that this problem requires a positive solution. Who bears personal responsibility for accident-free flying more than the squadron commander?

We also need to talk with all urgency about another flaw in the style of some young commanders who try to avoid desk work, to rid themselves of difficult preventive work. Thus some officers prefer to avoid deeply analyzing flying accidents and near-accidents, publicizing and practically introducing progressive experience and organizing socialist competition in detail, transferring all of these concerns completely to the shoulders of lower commanders. And when at some point it becomes clear that such an officer does not know how to do much of anything, the question as to what he could possibly teach subordinated personnel naturally arises.

Some commanders show a preference for training and indoctrinating aviators assembled into large groups, relying mostly on conferences, meetings, rallies and seminars. It stands to reason that these are important forms of prevention of all kinds of mistakes made in flying, but they are not the sole forms. Also important is the manner in which they are utilized: to make real improvements or just for the sake of form. The unfortunate thing is that the discussion in such functions usually focuses on things everyone has already known for a long time. Naturally no one is interested in the discussion, and no one benefits.

As a rule, chiefs lack the time for individual work with people. And if they do talk with any of the aviators, they usually do so officially, formally. Young aviators have a great need for personal communication with their elders, and chiefly in regard to their career development. Good advice, intimate discussion and benevolence are especially important in this area.

Why am I spending so much time on the role of commanders in accident-free flying? Because in my opinion this important problem was not examined adequately in the course of the discussion of the article "The Sky Does Not Forgive Mistakes." And yet this is the main reserve for success in the restructuring effort now proceeding in the air units and subunits in the struggle for accident-free flying.

Increasing the demands placed on commanders and developing their independence in every possible way is an insistent will of the times. Party committees and primary party organizations must assume a principled position in this matter. They could accelerate restructuring of the psychology and thinking of some commanders

in regard to flight safety. We need to deal more strictly with those communist executives who try to carry out new tasks by obsolete methods.

We know that successful completion of flying assignments depends in many ways on the individual preparedness of the pilot, his discipline, his knowledge and his ability to quickly orient himself in a complicated situation and make the right decisions when time is extremely lacking. The statistics show that many flying accidents and near-accidents are at the fault of the air warriors themselves. There are many reasons for this. Most of them were discussed in the responses to the article. The discipline of aviators was given a hard look in the articles "Not for the Sake of Flying in a 'Bird Cage'" by Major B. Kononenko, "Observing Work Discipline" by Senior Lieutenant M. Vladimirov, "The Right to Fly" by lieutenant colonels of medical service Ye. Berezhnoy and S. Motsar, "Without Foregoing One's Principles" by Major A. Bondarenko, "Is the Risk Justified?" by Major K. Burnyy and "The Price of Carelessness" by Captain Yu. Zhukovskiy. The authors differ both in career experience and in the positions they occupy, but nonetheless they all played a part in the one thing common to all of them—flying. Concern for the state of affairs compelled them to write, to speak out on urgent problems in order that others might refrain from violating the strict laws of flying.

Yes, tightening discipline is an important process by which we can achieve fundamental improvement in the quality of the flying shifts. This is an open door, so to speak: Enter, please, and get to work. Who is supposed to do what in this area is also clear, since everything is written down in the manuals and regulations, and in the job descriptions of every official. These things include organizing the training process efficiently, having every serviceman fulfill the requirements of the guidelines regulating flight work in their entirety, and making meticulous personal preparations for every flight—that is, all of the things which, taken together, define the problem of accident-free flying. Togetherness is also required in the approach to tightening military, executive and work discipline.

Everyone doubtlessly understands the significance of discipline to flight safety, but frankly speaking far from everyone is achieving tangible results in this area. What is wrong? There is the old Eastern saying that no matter how often you repeat the word "sherbet," your mouth will never taste sweet. And so it is in my opinion in this case. It is not enough to just talk in behalf of discipline—we also need to act. And what is required most of all is individual work with people, greater demands upon them. Strict, just and consistent demands, without the slightest concessions and condescensions.

It must be said that everything the leading air units and subunits have managed to achieve in tightening order and organization is the result of collective effort. Success of this kind is possible where commanders can sense

active, effective support from political workers, administrative officers and officers of the party and Komsomol organizations—assistance not just in words but in actions.

Life requires aviators to always be ready to enter into combat at any moment. Not for an inspection or for an examination at a training ground, but for real combat. This has to be deeply understood if the personal responsibility of each person for success in training, for victory, is to be raised. And it is even more important to know how to objectively evaluate one's own skills, knowledge and experience. Self-criticism in this matter is a guarantee that the individual would not take the wrong road, that he would maintain the prescribed course.

Discussing the article "The Sky Does Not Forgive Mistakes," many aviators suggested valuable ideas and proposals which, being particles of progressive experience, will invariably catch the interest of aviators and serve as a good foundation for further struggle for flight safety.

I would like to emphasize in conclusion that purposeful training and indoctrination of military aviators in the spirit of respect for flying laws would produce the desired results if execution of the corresponding orders, directives and instructions is monitored properly, if preventive work is conducted extensively in the units and subunits, and if their commanders make an effort to objectively analyze the causes of flying accidents and near-accidents so that they would not happen again. It is precisely in such military collectives that order and organization in the fulfillment of training plans and programs and socialist pledges are ensured, and combat readiness increases persistently.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1987

11004

Experiments Conducted by Soviet-Syrian Crew in Mir Complex

91440066j Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 87 (Signed to press 3 Nov 87) pp 28-30

[Article by G. Glabay: "USSR-Syria: Flight to the Mir Complex"; conclusion; continued from No 10, 11]

[Text]

"Docking" of Scientific Ideas and Technical Possibilities

Expressions such as "A spacecraft was launched," "The cosmonauts tested the spacecraft's airtightness" and "The apparatus was subjected to a trial run" have already become customary. No matter how paradoxical this may seem, in recent times some of our readers have come to think that taking off into space is nothing more

than a Sunday stroll, on returning from which you are greeted with flowers and the people's love. Frankly they do not understand the enormous amount of work that many scientific and production collectives, designers, engineers, specialists of various profiles and cosmonauts have to do. It is not until you go inside space vehicles and see how they are equipped that you come to understand how sophisticated today's technology is and how deep the knowledge of cosmonauts and specialists supporting space flights must be.

A crew of two or three persons must practically realize the engineering potential of many dozens of scientific research and design organizations, machine building enterprises and laboratories within the relatively short time of orbital flight.

This time as well, the Soviet-Syrian crew consisting of A. Viktorenko, A. Aleksandrov and M. Faris worked together with Yu. Romanenko and A. Laveykin during six days of flight aboard the Mir orbiting complex to complete a vast, diverse program of scientific research and experiments prepared by scientists and specialists of the USSR and Syria. The principal directions of this program were: studying earth resources, conducting geophysical and medical research, carrying out industrial experiments and performing remote sensing.

The cosmonauts began following a rigid schedule of joint work as early as in the evening of 24 July. Recall that on that day, at 0731 hours Moscow time, the Soyuz TM-3 spacecraft docked with the Mir scientific research complex. Having flown around the space complex and maneuvered in automatic mode in response to commands from earth, the spacecraft came in contact with the docking unit of the Kvant module, which had been freed prior to this by the automatic supply ship Progress-30. The automatic system operated brilliantly.

The space train consisting of Soyuz TM-2, Mir, Kvant and Soyuz TM-3, which was over 30 meters long and weighed a total of around 50 tons, and which accepted a citizen from another country aboard, became an international, Soviet-Syrian system.

The main event of that day was the Palmyra industrial experiment, named by its authors in honor of one of Syria's ancient cities. The experiment had to do with space materials technology, which has "taught" a great deal to terrestrial technology. Its purpose was to obtain multilevel three-dimensional structures formed out of a set of monocrystals that come together and fuse in weightlessness.

On earth, study and utilization of structure forming processes is being hindered by presence of gravity, which causes particles in a liquid to settle and inhibits aggregation (combination) mechanisms. Weightlessness precludes such motion.

The experiment was carried out with a specially designed apparatus, the main working elements of which are a pair of cylindrical containers fitted with pistons. Growth and aggregation of crystals begins after liquids stored in the initial state in different containers are mixed. This time the materials under analysis were hydroxyl apatite and gypsum. On the whole, the assortment of materials studied in the Palmyra experiment was rather large—seven pairs.

Hydroxyl apatite microcrystals are the reinforcing material of bone and dental tissue in living organisms. Efforts recently being carried out to manufacture dentures and to create protective surfaces over dental tissues have shown that rigid requirements must be imposed on the three-dimensional structure of this material.

The program for the second day included geophysical and bioengineering experiments and medical research. There were seven experiments in all.

The main objective of the experiment named after Syria's principal river, the Euphrates, was to carry out a photographic survey of Syria from space and to conduct visual and instrumental observations in behalf of different sectors of the national economy. Faris called the Euphrates experiment the most important one to his country's national economy.

Faris was aided in "observing" Syria by the KATE-140 and MKS-M systems installed aboard the Mir complex, while on the ground his compatriots made terrestrial and aircraft measurements along the satellite's track. The complex flew over Syria three times during the expedition (on the second, fourth and sixth days). The acquired materials will make it possible for Syria to create a unique fund of space information.

Each year Syria's population grows by approximately 400,000, and as we know, almost half of the country's territory is occupied by deserts and semideserts. Many areas are arid. Materials brought back by the expedition will be an aid in the study of water-bearing areas.

Many engineering and economic tasks involving investigation of natural resources and environmental monitoring will now be carried out more successfully. Information from space will make it possible to take a new look at agricultural land in the Euphrates basin, at the geological structure of the Arabian-African fault and the Syrian desert, at the timber resources of the country's northwestern regions, and at the condition of the Assad and Baas reservoirs, of Lake Khatuniyah and of the atmosphere above industrial cities and the eastern Mediterranean coast. Concurrently, remote sensing will make it possible to completely map the country's territory.

After the photographic materials (including those obtained by the main crew) were delivered to earth, Soviet specialists subjected them to primary processing in accordance with programs and procedures used in the

USSR. Syrian specialists analyzed the survey materials in detail and compared them to the results of experiments conducted along the satellite track.

When one experiment was completed, there was another to take its place. The Busra geophysical experiment was carried out on the second, third and fifth days of the flight. Its name is derived from a small Syrian town famous for its ancient theater.

The cosmonauts saw 17 sunrises and sunsets every day. The range of colors of the earth's atmosphere, which have always evoked various emotions in people, is rich at these moments. People have associated these colors both with pleasant and with tragic events and prophecies. Many years of observations from earth and development of cosmonautics have made it possible to analyze the complex physical processes and to acquire new knowledge of the properties of the upper atmosphere. It was revealed for example that the atmosphere is hot at altitudes of 200-400 km—just where the orbits of the Mir complex pass. The temperature exceeds a thousand degrees Kelvin. However, the common term "temperature" is defined in this case as the kinetic energy of neutral atoms in atmospheric plasma. Plasma, and not a vacuum. At these altitudes plasma consists of a mixture of neutral atoms, molecules, ions and free electrons differing in kinetic temperature.

One of the bright lines in the spectrum of the upper atmosphere—the red line of atomic oxygen—was found to be the most convenient indicator by which to measure the temperature of neutral atoms in the upper atmosphere. Scientists often refer to it as an indicator of the state of the ionosphere and the upper atmosphere. For example it was noted that the intensity of this line increases during magnetic storms. This is why the cosmonaut who carried out the Busra experiment adjusted, calibrated and aimed the instrument at the emitting portion of the upper atmosphere.

Use of a highly sensitive and highly automated instrument created by Syrian and Soviet specialists made it possible to measure the neutral temperature of the unlit (nighttime) portions of the orbit. This is important as a means of testing and refining various mathematical models that science now uses for geophysical forecasts.

Medical science is highly interested in gathering data on the state of cardiac activity and of body regulatory systems in different phases of space flight. Unique possibilities are offered by the situation where five cosmonauts working together in orbit have been under weightless conditions for different periods of time and where medical experiments are so widely represented. Among these experiments are "Cardiography" (recording cardiac activity), "Circulation" (monitoring circulation in the main circulatory system and in cerebral vessels), "Sports" (determining the functional state of the cardiovascular system and physical performance using a bicycle ergometer in the acute period of adaptation to

weightlessness), "Adaptation" (evaluating the adaptive possibilities of the circulatory system), "Ballisto-3" (studying the power of heart contractions and the working coordination of the right and left divisions of the heart on the basis of recordings of micromovements of the body associated with cardiac activity), "Questionnaire" (studying the nature and expressiveness of sensory and autonomic symptoms in weightlessness) and "Contrast" (evaluating various capabilities of the retina and determining its contrast threshold).

As we can see, of the seven medical studies carried out in those days, five were devoted to the cardiovascular system. Medicine is trying to gain the best understanding it can of what happens when the cardiovascular system encounters weightlessness. The fact that things are not completely clear yet in this area was revealed by the replacement of the flight engineer aboard the Mir complex. It is interesting that no deviations were revealed in cardiovascular activity during preflight examinations of A. Laveykin, but deviations were observed during his flight. And although this was not dangerous, medical specialists decided not to take any risks, and to analyze everything calmly on earth. Thus A. Laveykin had to leave his work station in orbit. And to return to earth with A. Viktorenko and M. Faris.

Medical control of the health of the cosmonauts generally proceeds in two directions. In the first, the performance of the cosmonauts and their own assessments of their health are evaluated daily. Important here are the tone of the discussions, the reactions of the cosmonauts and the evening responses to questions from medical specialists on a special form. The second direction entails special integrated analyses ("outpatient tests") on so-called medical days. They are conducted once every 2 weeks as a rule during long flights. All five members of the international crew were subjected to such integrated tests on the last day spent by the "Vityaz" crew aboard the complex.

Bioengineering experiments (on the third, fourth and sixth days of the flight) involving electrophoretic purification and separation of various biologically active substances were carried out with "Svetlana" and "Ruchey" devices. Several lots of interferon and an anti-influenza drug were purified in one of these devices. Active microorganisms producing nutrient antibiotics for stock raisers were isolated in the other. It should be noted incidentally that at the time when the experiment using the "Ruchey" device was being designed, flight engineer A. Aleksandrov made a contribution by proposing an improvement on the purified substance receptacle.

In all during the flight, the crew carried out 25 different biomedical experiments and analyses.

The experiment "Polarization" was carried out on 28 July in order to improve the methods and resources by which to raise the effectiveness of scientific research in space and to solve a number of navigation problems.

Development of science and technology has recently required acquisition of high-quality semiconductor materials. Space opens up wide possibilities for improving their structural properties. Besides the experiments mentioned above, the industrial program of the joint flight included two others—"Afamiya" and "Kasyun." They were both carried out in the "Crystallizer" device developed jointly by Soviet and Czechoslovak specialists.

Each material can be subjected to individual temperature and pressure conditions and mixing rate in this device. Twelve of the most diverse materials—from glass specimens to semiconductors—can be processed in the device's kiln simultaneously. And equipping the kiln unit with a microprocessor makes it possible for the device to work automatically in accordance with a predetermined program. Cosmonauts Yu. Romanenko and A. Laveykin gave a high evaluation to its operation.

The "Afamiya" experiment is being conducted with the purpose of obtaining monocrystals of gallium antimonide, one of the most valuable semiconductor materials required for example in compact semiconductor lasers. Improving their characteristics means progress in electronics, fiber-optic communication and the latest computers.

The purpose of the "Kasyun" experiment was to obtain light heat-resistant alloys capable of competing with Damascus steel, so well known for its properties (there is a specimen of it aboard the complex, by the way).

Study of so-called eutectic alloys with a directed structure is an interesting problem of materials technology in both the theoretical and practical aspects. A eutectic alloy of aluminum and nickel was chosen for the experiment. Two specimens of this alloy were fused in the "Crystallizer" device. After the specimens were compared with terrestrial analogues, new information was obtained on the hardening of metallic alloys in weightlessness.

In the morning of 29 July cosmonauts A. Viktorenko, A. Aleksandrov and M. Faris completed their research in the "Euphrates," "Afamiya" and "Svetlana" experiments. Preparations for the return trip to earth were started. Research materials obtained in the Soviet-Syrian program and during the flight by Yuriy Romanenko and Aleksandr Laveykin were stowed in the descent module of the Soyuz TM-2 spacecraft. Scientists and specialists still have some work to do with these materials.

The commander of the expedition, A. Viktorenko, summarized its work briefly and comprehensively. Accepting high state awards in the Kremlin on 10 August, he said: "The flight was successful, its program was fulfilled completely, and the space equipment worked without incident." One more page was written in the history of world cosmonautics.

The cosmonauts honorably continued the glorious traditions of almost 10 years of activity by international crews. Next year two more flights of this kind will be carried out with representatives from Bulgaria and France. Arrangements for a flight by an Afghan citizen are being made. This is an example of a specific instance of peaceful cooperation in space.

The Mir orbiting complex and its crew are continuing their flight.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1987

11004

Biomedical Research Conducted in Interkosmos Program

91440066k Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 12, Dec 87 (Signed to press 3 Nov 87)
pp 32-33

[Article by V. Degtyarenko: "Following the 'Interkosmos' Program"]

[Text] Fulfillment of the manned space flight program depends in many ways on the performance of the cosmonauts. And the latter depends to a significant degree on their health. Scientists of countries participating in the "Interkosmos" program have been conducting joint research in this direction, a new and extremely important sector of science—space biology and medicine—for 20 years.

During these years the program yielded numerous theoretical scientific studies and experimental data. Cooperation in joint scientific research is proceeding in three principal areas: "Space Physiology and Biology," "Space Psychology" and "Radiation Safety of Space Flights."

The most important problems of space physiology include research on the cosmic form of motion sickness and on metabolism, including water-salt metabolism, in the conditions of space flight, and investigation of the adaptive mechanisms of the human and animal body in the acute initial period of adaptation to weightlessness, and of the effect of flight on the state of the cardiovascular and pulmonary systems and oxygen metabolism.

Space motion sickness, which manifests itself as illusions of the body's position in space, dizziness and autonomic reactions, such as blood rushing to the head, usually develops in the initial period of adaptation to weightlessness in more than half of the cosmonauts. It is unique in that it is hard to determine the body's predisposition for space motion sickness on the basis of tests run on the ground. It often happens that a person who exhibits stability in ground tests contracts the illness in space.

Experience has shown that in most cases development of the symptoms of this disease (nausea, vomiting) was provoked by motor activity. But in a number of cases

cosmonauts associated the beginning of discomfort with visual stimuli, for example visual observation of the earth. These undesirable phenomena can be diminished by a number of pharmacological preparations created by Hungarian specialists.

Specialists of Bulgaria, Hungary and the USSR developed a unified procedure of optokinetic stimulation in order to study the effect of visual and vestibular perceptions on development of space motion sickness. This procedure is based on analyzing eye reactions to light signals (stimuli) from different directions in the central and peripheral visual fields. The "Oking" instrument created by Hungarian and Soviet specialists served these purposes aboard the station. Both the procedure and the instrument itself are undergoing testing in neurological clinics in Hungary and the Soviet Union as well.

Besides vestibular disorders, cosmonauts constantly experience the effects of noise and vibrations in orbiting spacecraft and stations. Specialists of the German Democratic Republic and the Soviet Union developed a system of apparatus ("Elba," "Noisemeter," "Personal Noise Dosimeter," "Vibrometer") and the experiments "Audio-2" and "Acoustic Situation" in order to study auditory sensitivity to different intensities of noise and vibrations in flight. The objective of these experiments was to make physiological processes controllable and to determine individual dosing of preventive drugs.

We know how important metabolism is to the body and what consequences its disturbance could lead to. Despite the successes that have been achieved in studying water and mineral metabolism in human space flight, the mechanism behind regulation of sodium, potassium, calcium and magnesium in the body remains insufficiently clear. Further research is also needed on the features of protein, carbohydrate, lipid and hormone metabolism.

The volume of biochemical research being conducted in space is expanding in order to permit fuller study of the patterns of adaptation of the human body to weightlessness. Czechoslovak and Soviet scientists developed instruments in the "Plasma" series, the first models of which made it possible for the crews of the second and third main expeditions of the orbiting station Salyut-7 (1983-1984) to carry out the "Metabolism" experiment and to collect, preserve and store the necessary biological materials aboard the station for subsequent biochemical analysis on earth.

The acquired data revealed a need for improving existing methods of combatting disturbances of water-salt metabolism, particularly by means of special additives to the food of the cosmonauts. The food ration is being reexamined and improved in this connection. New refrigerators and kitchen equipment which will permit cosmonauts to prepare home-cooked food during long flights not only from canned, freeze-dried, chilled and fresh-frozen foods, but also from fresh vegetables and meat are being developed.

Research on the locomotor-bearing apparatus in prolonged weightlessness, in which scientists of Bulgaria, Hungary, Cuba and the Soviet Union took part, showed that the sensitivity of muscles, tendons and the skin changes during flight. Prolonged absence of a gravitational load upon the muscles evokes motor disorders and atrophy of muscle tissue.

The results of experiments on animals carried out during flights of Kosmos series biosatellites made it possible to efficiently schedule dynamic and static loads. Moreover these results provided a possibility for substantiating some recommendations on selecting diagnostic procedures for evaluating the state of the locomotor-bearing apparatus in space flight and in the period of readaptation.

When the healthy body is subjected to extreme effects in air and space flight and in the case of various pathological states, an inconsistency often arises between the oxygen demand of the tissues and the actual oxygen availability, which can lead to disease. Study of the body's oxygen cycle is based on analyzing the dynamics of oxygen tension (pO₂) in all stages of penetration of oxygen from the atmosphere into the body (in pulmonary alveoli, in blood and especially in tissues).

Scientists of Czechoslovakia and the Soviet Union developed a method for studying the pO₂ in tissues and the "Oxymeter" instrument, which were used to study the oxygen cycle in the bodies of cosmonauts during flight aboard the orbiting station Salyut-6. Subsequent work in this direction by specialists of the USSR, Czechoslovakia and the GDR resulted in improvement of both the method and the instrument, which made it possible to expand the possibilities of functional diagnosis aimed at evaluating the general state of a cosmonaut in weightlessness. Data indicating that the pO₂ in human tissues decreases as a direct dependence on flight duration were obtained for the first time.

The methods and apparatus that were developed have enjoyed wide application in practical public health. Thus clinics are studying the oxygen cycle in tissues of cardiac ischemia and myocardial infarction patients, in the presence of various stomatological diseases, and in neurosurgery, oncology and pediatrics.

It is also interesting to note that the method for studying the oxygen cycle made it possible to evaluate more widely and deeply the condition of sports teams of Soviet and, later on, Bulgarian mountaineers who ascended Mt. Everest in 1982 and 1984.

Scientists of Bulgaria, the GDR, Hungary, Romania, Czechoslovakia and the Soviet Union have studied the influence of accelerations on the human body. It was discovered that the highest resistance to longitudinal "head-pelvis" accelerations (with a magnitude of up to 5 units) is found in persons 31-40 years old, while the least resistance is found in the 21-25 and 46-50 year old

groups. As far as transverse "chest-back" accelerations (with a magnitude of up to 8 units) are concerned, tolerance to them depending on age has not yet been established.

The obtained results are being used to improve the methods of selecting cosmonaut candidates. These results are making it possible to widen the range of highly qualified specialists that can participate in space flight, to include persons from 40 to 55 years old and persons with some health deviations. Polish and Soviet specialists established that water-salt additives in the food ration are a good means of protecting against accelerations after weightlessness.

Soviet biosatellites of the Kosmos series are making a noticeable contribution to solving the practical problems of medical support to manned space flight and to studying a number of problems in general biology and physiology. These satellites revealed a number of patterns in the body's reactions to the combined action of weightlessness and radiation. The possibility of using artificial gravity as one of the future means of keeping the functional state of the body optimum during space flight was established experimentally for the first time.

Among other factors affecting the performance of cosmonauts, the psychological factor is one of the important ones. Ensuring the psychological reliability of crewmembers during lengthy space flights and interpersonal interactions in a small group are the main concerns of space psychology.

A complex of methods directed at supporting psychophysical activity has been developed and is being practically utilized in the course of joint research by specialists from countries participating in the Interkosmos program. This complex of methods includes autogenic training and the procedures of point massage and self-massage.

Esthetic resources such as music, special television broadcasts and art reproductions are being used to optimize the mental state of crewmembers. Their effectiveness was confirmed by practical introduction of video and music programs as part of medical support to lengthy flights.

The methods of studying the mental state of cosmonauts are widely used on earth to organize the activities of power production system operators, to outfit the work stations of air traffic controllers and workers of island and polar weather stations, and to select sports teams.

Measurements of the radiation doses received by cosmonauts and of cosmic ray spectra have been taken regularly beginning with the first flights. Important among the studies on the problems of radiation safety are development and implementation of new methods and resources for recording cosmic radiation, study of the

radiation characteristics of cosmic radiation in near-earth space, and development of model descriptions making it possible to predict radiation exposure levels along the routes flown by space vehicles, especially when extravehicular activity is involved.

Participants of the Interkosmos program developed dosimetric and spectrometric apparatus by which to study the radiation characteristics of cosmic radiation, and they conducted an extensive amount of experimental research aboard Kosmos biosatellites, Interkosmos satellites and manned orbiting stations. Working together with specialists of the GDR, Hungary, Romania and Czechoslovakia, Soviet scientists also developed a number of all-union state standards supplementing the standards on radiation safety of space flights.

There are plans for utilizing experimental and mathematical methods of studying this problem to solve problems in public health, environmental protection and some other areas of the national economy.

No matter how impressive accomplishments in cosmonautics might be, even more daring plans and accomplishments still lie ahead. And today's lengthy space expeditions are laying the foundation for mankind's subsequent strides in exploring and exploiting space for peaceful purposes, in behalf of the progress of civilization.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1987

11004

West German Forces Labeled Offensive, Right-Wing

914400661 Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 87 (Signed to press 3 Nov 87)
pp 34-35

[Article by L. Chernousko based on foreign publications: "Shadow of the Swastika over the Bundeswehr"; first two paragraphs are AVIATSIYA I KOSMONAVTIKA introduction]

[Text] "We once read," write Captain V. Somov and Senior Lieutenant K. Bogatyrenko to the editor, "that Bonn propagandists refer to the Bundeswehr as a 'defensive army.' I would like to know what the real tasks of this army are, what its structure is, and especially that of the air force, and what sort of orientation characterizes troop combat training and ideological processing of the personnel. What are the place and role of the Bundeswehr in NATO, and what are the effects of neo-Nazism and revanchism on the FRG's military policy?"

An article replying to readers' questions is published below.

Contrary to the Potsdam Agreement

Following the defeat of German fascism, in which the Soviet Union played the decisive role, imperialist forces assumed the road of remilitarizing West Germany. At first this was done secretly, inasmuch as decisions of the Potsdam Conference of the victorious powers, which prohibited the rebirth of military power on the aggressor's territory, were still fresh in the people's memory. Later on, politicians on the Rhine turned to open formation of the "defensive army." This demagogical term was conceived exclusively to conceal the true nature of the Bundeswehr.

The history, structure and political tasks of the Bundeswehr leave no doubts that it is a direct successor of the Kaiser's army and the fascist Wehrmacht. Monopolistic capital, which bears the responsibility for unleashing the Second World War, provided significant assistance and material support to formation of the West German army.

The FRG's entry into the aggressive NATO bloc in 1954 promoted rapid rebirth of the this country's military power. The Bundeswehr has long played the primary role in the bloc after the U.S. Army, which is the main striking force of NATO in Central Europe. To confirm this it would be sufficient to look at some of the data. The FRG possesses half the ground troops, over 60 percent of the tanks, 55 percent of the artillery, half of the ground air defense resources and 30 percent of the warplanes of the bloc's armed forces in this region.

Bonn's ruling circles have not rejected revanchist territorial claims or, in the final analysis, plans for initiating an aggressive war against the socialist countries. Its dream is to utilize the military power of NATO as the tool for this.

Structure of the Armed Forces

The army of the FRG consists of ground troops, the air force and the navy, and it is manned both on the basis of universal compulsory military service and mercenaries (about 50 percent each). Its total strength is almost 500,000 men.

The ground forces make up the bulk of the Bundeswehr (345,000 men). There are a total of 12 divisions, which are combined into 3 army corps and which possess a total of 36 brigades, including 3 airborne. There are 15 Honest John missile battalions, 4 Lance battalions and 6 airlift regiments.

The air force, or the Luftwaffe (111,000 men), is the second strongest branch of the armed services. It consists organizationally of four air divisions—two air support and two air defense. In turn, the divisions consist of various types of squadrons. They are armed with up to 500 warplanes. They possess 70 tactical rocket launchers and 450 antiaircraft guns. Military airlift aviation consists of around 200 airplanes and helicopters.

Ever-larger numbers of the latest Tornado and Alpha-Jet airplanes are entering the air force inventory in accordance with the Bundeswehr's program for development until the year 1997. The Tornado is a multipurpose fighter-bomber. It weighs 26.3 tons, its maximum speed is 2,300 km/hr, its radius of operation is 1,300 km, and its service ceiling is 17.7 km. It is armed with two 27-mm guns, guided missiles and an MW-1 pod. In the minds of its designers it is intended for "isolation of a region of combat activities," for direct support to ground troops and for air defense missions. The pod can be filled with high-explosive, concrete-piercing, fragmentation and antitank bombs, as well as with antitank and fragmentation mines. The Tornado can also carry nuclear weapons.

The airplane's designers assert that the greatest kill area of one MW-1 pod is supposedly 500x2,300 m. But they themselves admit that the airplane's engine has a number of shortcomings, and that it requires further work. The electronic equipment is not highly reliable. The aircraft's possibilities for aerial combat are low.

The Alpha-Jet ground-attack airplane is characterized by the following figures: weight 7.3 tons, maximum speed 900 km/hr near the ground and 1,000 km/hr at an altitude of 10 km, a service ceiling of 15 km, and an effective range of 400-600 km. It is armed with a 30-mm (or 27-mm) gun (with an ammunition load of 150 rounds) or 7.62-mm (12.7-mm) machineguns and free-flight or guided rockets. This attack aircraft is intended for direct air support to ground troops. It can also be used for air reconnaissance and against enemy helicopters. The West German air force has 175 such airplanes in its inventory.

The BO-105P (PAH-1) antitank helicopter has a maximum speed of 240 km/hr, a service ceiling of 5.18 km and a range of 580 km. It is armed with a 20-mm gun or a 7.62-mm machinegun, six to eight antitank guided rockets and free-flight rockets. Its maximum load is 560 kg. It is limited in its operations at night and in poor visibility. It is vulnerable to all forms of antiaircraft weapons. There are plans for replacing it with a new helicopter beginning in 1995.

The Bundeswehr possesses air defense resources such as the Patriot and Roland surface-to-air missile systems, the Gepard self-propelled antiaircraft gun and American Pershing-1A shorter-range missile systems.

The leadership of the Bundeswehr sees the Luftwaffe as its "weapon of the first hour," which must be in constant readiness in peacetime to fulfill its missions without requiring mobilization measures. This recalls the conception of the fascist Wehrmacht, which began its blitzkrieg with massive use of aviation. Bonn's intention to produce strategic bombers and long-range missiles should be added to this. Thus contrary to international

agreements the FRG is gaining the possibility for creating its own offensive long-range arms capable of threatening the security not only of neighboring states but also ones far away from it.

The navy, or the Bundesmarine (39,000 men), possesses around 190 warships, 90 auxiliary vessels and over 180 warplanes.

The FRG—A Powder Keg

Describing the Bundeswehr, we should note that it is welded most tightly to the NATO armies, and especially the American army. And the armies of the USA, Great Britain, France, Belgium, the Netherlands and Canada have over 400,000 men on West German soil. Around 60 percent of them are American servicemen. All of these "guests" of the FRG possess substantial armament: over 560 warplanes (half of which are capable of carrying nuclear weapons) and more than 250 launchers for different types of missiles, to which American Pershing-2 medium-range missiles and cruise missiles have been added.

West Germany is densely populated by American bases and military facilities (over 200). It also possesses considerable amounts of nuclear ammunition (around 5,000 warheads with yields from 0.5 to 400 kilotons). It is important to emphasize that in the event of war, more than half of this ammunition is to be placed at the disposal of the Bundeswehr. This is why it professes antipopular Atlantic "solidarity" so tenaciously.

And if we add to this that enough American war gases to fill hundreds of thousands of units of chemical ammunition are stockpiled on West German soil, we can see why the FRG is validly referred to as a most dangerous powder keg in the center of our densely populated continent.

All of the country's territory is substantially prepared for combat operations by NATO forces. There are military roads, airfields and communication lines for this purpose. In the event of "increased tension" Washington is entitled to increase the number of its troops in West Germany by a factor of 2.5, and to transfer another 1,000 warplanes here from the USA. The Bundeswehr has the missions of providing military cover to American ground and air force facilities, providing support to them by keeping their airfields secure, and so on.

The ominous powder keg may also be filled with new forms of high-precision conventional weapons, the characteristics of which come close to those of low-yield nuclear ammunition, which Bonn plans to develop within the NATO framework under the "Rodgers Plan." Despite the protests of the West German population, the Pentagon plans to add binary ammunition to its arsenal of chemical weapons here. Recently the Americans delivered 300 neutron warheads for howitzers to their air base in Ramstein under deep secrecy. These warheads have

been placed at the disposal of not only the American army but also the Bundeswehr. Moreover the Pentagon is working on a cruise missile with a neutron warhead which is to be supplied to F-16 and Tornado airplanes.

Bonn also consented to participate in the American Star Wars program, and it is encouraging a more intensive effort on the "European Defense Initiative"—the EDI. Also, Bonn's plan to produce its own nuclear weapons can lead to quite ruinous consequences. Signs that this is happening can be seen in the plutonium plant in Vakkersdorf [transliteration], which is accumulating "reactor plutonium" that can be used to create nuclear ammunition.

Thus, traveling in the mainstream of the USA's adventurous course, West Germany's ruling circles are leading the country into a military dead end: The FRG can use its accumulated weapons only to annihilate itself, and not for protection.

War Rehearsals

Progressive forces have full grounds for believing that the Bundeswehr is an army of revanche and aggression. All of the troop combat training and ideological processing of the personnel are permeated by the ideas of pan-Germanism, militarism, revanchism, with seizure of lands belonging to socialist countries and with forced "unification" of Germany centered on the FRG. In the training of officers and enlisted men, preference is shown to emphatically offensive issues, which is in keeping with NATO's designs, and especially those of reactionary circles of the USA and the FRG. Servicemen are being prepared for conducting a future war both with atomic weapons and conventional arms. In the latter case considerable significance is attached to air support to the combat activities of ground troops. They are attempting to cover up the aggressive essence of such war preparations by fabrications as to an imagined threat from the East. They are also using this myth to justify provocative around-the-clock alert duty by American and West German aviation.

Fall maneuvers by NATO, which are conducted each year with the code name "Autumn Forge," and as a rule on West German territory, are an important test of the combat readiness of the Bundeswehr. The basic elements of imperialist war strategy are openly practiced in exercises. Moreover the air force plays an active role.

During some recent exercises, in the words of their organizers, "the entire spectrum of tactical missions of an air war in the Central European theater of military operations" was practiced. In those same exercises around 4,000 sorties were flown just by the West German air force alone. And the autumn saber rattling or, more simply, war rehearsal, is conducted mainly in direct proximity to the borders of East Germany and Czechoslovakia, 2 to 5 minutes flying time from the airspace of socialist countries.

Black Crosses—Sinister Designs

When documentary clips from West German motion picture and television chronicles and the pages of West German newspapers and journals show tanks and airplanes in large scale with black crosses on their sides, and marching columns of soldiers, it is difficult to escape the thought that what we see before us are units not of the modern Bundeswehr but of the fascist Wehrmacht. But external appearances are not the entire story. The CDU/CSU [Christian Democratic Union/Christian Social Union] coalition—parties representing monopolistic capital in the FRG—stood at the cradle of the Bundeswehr. They ordered the creation of their own armed forces, and the indoctrination of soldiers by former Nazi officers and generals. And these people brought the spirit of the fascist army to the barracks of the Bundeswehr, together with its "traditions" and aggressive designs.

The German Reich burned in the flames of World War II more than 42 years ago, and fascism and its savage ideology suffered an annihilatory defeat. But unvanquished revanchists and neo-Nazis are raising their heads and making territorial claims on a number of socialist countries. They became especially active after the conservative-liberal coalition consisting of the CDU/CSU and the Social Democratic Party of Germany came into power in Bonn. It was under its rule that the activities of militaristic unions and revanchist associations of fellow-countrymen flourished in the FRG as a luxuriant flower. Some of them are already serving as a school of militarism and terrorism for a certain faction of young people, future soldiers. Thus, the Hamburg "National Socialist Action Front," which is maintaining a list of communists and democrats, is preparing for a "night of long knives."

Revanchist and neo-Nazi organizations are exerting their pernicious influence upon the Bundeswehr as well. Soldiers are being indoctrinated in the spirit of hatred for socialist countries and for armies of the Warsaw fraternity. A distorted view of our country is being drummed into their heads, and they portray the destruction of fascism and liberation of the peoples of Europe from the brown plague as "Soviet expansion." Glorification of Hitler's Wehrmacht, and of the "combat heroism" of those who murdered and plundered, occupies a special place in the brainwashing of soldiers.

"Idols" of Hitler's Wehrmacht such as General-Field Marshal Rommel, Tank General Guderian, air force "aces" Molders and Galland, and the notorious Admiral Lyutens [transliteration] are honored in the "peace-loving" Bundeswehr. Barracks, ships and units have been named after them. "Relics" of the past—Nazi orders, the pennants of Wehrmacht units, and articles of the uniforms of those who sowed tyranny and violence on foreign soil—are displayed in the tradition rooms and nooks of barracks. And wherever you look you see crosses and eagles, and the spidery swastika.

There are a number of other attributes of kinship and continuity between Hitler's Wehrmacht and the West German Bundeswehr. Take for example the apparatus of psychological sabotage recently created on the Rhine, which broadcasts around the clock in "that direction" in Russian, Polish and Czech, and distribution of millions of leaflets.

Such is the Bundeswehr today, such is the face of the West German soldier.

The Soviet Union and our friends in the Warsaw Pact are consistently fighting to preserve peace, to halt the arms race being conducted by NATO countries and to eliminate the danger of a new world war. The present tense international situation requires Soviet soldiers, including military aviators, to be constantly combat ready, alert and prepared to annihilate any aggressor.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1987

11004

History of Aerial Combat in Second Period of Great Patriotic War

91440066m Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 12, Dec 87 (Signed to press 3 Nov 87)
pp 36-37

[Article by Lt Col Yu. Kislyakov, military pilot 1st class, and Col (Res) V. Babich, candidate of military sciences: "History of Aerial Combat"; continued from No 11]

[Text]

The Great Patriotic War (Second Period)

While the first period of the past war was generally characterized as strategic defense of the Soviet Armed Forces, the second (from 19 November 1942 to the end of 1943) was a fundamental turning point in the course of the war. Strategic air superiority was won in 1943, making it possible for ground troops, aviation and the navy to pursue their missions more effectively. Our fighters made a substantial contribution to this turning point. The fascist air forces were hit so hard that they were never able to recover.

The following methods of attaining air superiority are known: annihilating enemy airplanes at their airfields and in the air; destroying enterprises of aviation and fuel industry, and flight crew training centers; annihilating the enemy's air defense resources. Because the enemy's industrial enterprises on the Soviet-German front were located as a rule out of our aviation's range, and strikes on airfields were sporadic, the success of the struggle for air supremacy was decided chiefly in aerial combat.

This struggle was brutal and decisive. Soviet pilots attained air supremacy at a high cost. In 1943 our fighters suffered heavier losses than in any other years of the war.

The reason for that was that almost every sortie, the quantity of which had increased dramatically, ended in decisive combat. But the enemy lost three times more airplanes in 1943, which predetermined his overall impressive defeat in the air.

The quantitative side of the war for air supremacy can also be expressed by the fact that as of the beginning of 1944 our frontal aviation possessed 8,500 airplanes, while fascist aviation possessed 3,000. Our aviation industry made its impact here, giving the front around 35,000 airplanes of all types in 1943. Fascist German industry produced 25,300 airplanes.

What changes occurred in the tactics of Soviet fighters in the pivotal year of the war? The main one was that aerial combat became offensive. The material base created by new equipment and weapons made this possible. Yak-1, Yak-7, Yak-9 and La-5 airplanes made up 67.3 percent of the total numerical strength of fighter aviation. It was left to the pilots to make effective use of their second weapon—tactics. But here as well a turning point was required, and not simply in tactics but in all basic spheres of the combat activity of fighters, including psychological. Here is what K. Sukhov, a pilot of the 16th Guards Fighter Air Regiment, wrote: "We need a decisive turning point. We need to infuse confidence into the pilots, and we need to begin this chiefly with the regiment commanders who, fearing losses, send groups of 4, 8 or 12 airplanes out on all missions, and do not allow the leading pairs to show initiative. The group commanders, in turn, fearing that they may lose sight of the entire group, commit it to combat in tight combat formation, thus constraining its freedom of maneuver, and they do not control the group creatively, acting as nothing more than the group's guardian."

The pilot inserted several urgent and highly serious problems into these succinct expressions: the optimum composition of the groups, independence of pairs, freedom of maneuver in a group, combat control and creativity (the ability to make the right decision in a nonstandard situation). And inasmuch as the idea of a turning point captured the minds of the masses and the rank-and-file air warriors, it became a material force.

Of all things which fighters of 1943 left behind as a legacy, the most valuable was the experience of transition to new tactics under combat conditions in connection with reequipment of the air force. And in order to clearly define the changes that occurred in aerial combat, it would be suitable to examine the main phases of combat.

The first phase of combat is the hunting phase. One would think that no major changes would have occurred in this phase in comparison with the first period of the war, inasmuch as the pilot's eyes remained the principal hunting resource. It was difficult to subject the two mottos formulated by experience, "Seek from far away" and "Seek while remaining unnoticed" to fundamental improvement. But two factors had a direct effect on the success of long-range hunting: the greater possibilities of notification and guidance systems, and restructuring of the combat formation.

It was noted in one of the information bulletins to the troops that "the main difficulty encountered by fighters in their actions over the Kuban in 1943 was hunting for the enemy and meeting him." The experience of combat at Stalingrad was utilized. Observers equipped with radio sets were given a major role. On 9 April 1943 seven Yak-7 aircraft that were providing cover to troops engaged an enemy group in combat and knocked down three airplanes. Soon after that, a radio ground control intercept station communicated the approach of eight Me-109s from out of the sun. Our pilots did not see them, but owing to the prompt warning from the controller, they assumed an advantageous position, entered into combat and knocked down another four enemy airplanes. So it was that combined hunting—radar from the ground and visual from the air—was born.

The view of the airspace in the horizontal combat formations used in the first period of the war was limited. This is why enemy attacks were frequently a surprise. The higher thrust-to-weight ratio of the new airplanes made it possible to stack the combat formation vertically in the hunting phase (for example when patrolling). With the pairs dispersed in front and in altitude, the formation came to resemble steps of a staircase rising upward from the lead pair and to the side. This created more room in which to hunt targets. Concurrently it became more difficult for the enemy to detect the entire group. This combat formation did not constrain the maneuvers of the pilots, prevented aircraft collisions in the air and made it possible to devote more attention to all-around hunting.

Closing in—the second phase of combat—depended in many ways on the results of hunting. Earlier detection of the enemy left a time reserve for maneuvers by which to assume an advantageous position and close in. The requirements of covertness and swiftness remained traditional. Covertness kept the enemy unaware of preparations for an attack, and swiftness made it possible to reduce the range to the target faster. Sensible tactics (the pilot's professional skill) ensured satisfaction of the first requirement, and the new equipment and the extra power available prior to closing in made it possible to satisfy the latter.

It follows from descriptions of combat over the Kuban and at Kursk in 1943 that the closing-in phase was supplemented by yet another important element—planning the attack. Published in 1947, the book "Taktika

istrebitelnoy aviatsii" [Tactics of Fighter Aviation] noted that successful closing in by fighters requires identifying the airborne adversary; quickly and correctly estimating the situation in the air and planning the attack; competently planning one's maneuver and then carrying it out before reaching the fire position. All kinds of variants of closing in began to be developed on the ground with regard for the vulnerable points on enemy airplanes, the aspect of encounter (detection) and concealment opportunities—the position of the sun, clouds, visibility etc. Thus pilots began to look at closing in not as simply surmounting the distance to the enemy, but rather as a "thoughtfully planned maneuver which sets the stage for the attack and determines its result."

One day after crossing the front line and receiving information from a ground control station, a squadron of Yaks led by Major Orlov discovered a group of nine J-87s. The enemy bombers were on a collision course at higher altitude, beneath the clouds. Estimating the situation, the commander planned the group's actions in the following manner: A reserve flight was to cut off the retreat of the Junkers' into the clouds, and a covering group was to divide the group of nine into parts, while the attack group was to simultaneously attack the disorganized enemy combat formation from the front in two directions.

After our first group penetrated into the tight formation of bombers, the Junkers' attempted to conceal themselves in the clouds, but opening themselves to attack from the reserve flight above them, they lost two airplanes. The rest started descending in disorganized fashion, whereupon they were struck by the commander's flight. Five of the Junkers' remained. The raid was foiled with great losses to the enemy. The outcome of the battle was decided by three planned attacks—one a feint and two real attacks in succession.

Attack is the third, decisive phase of combat, which begins the moment a fighter assumes its fire position and ends with aimed fire. The main requirements on attack are surprise and accuracy. The element of surprise was realized in aerial combat in 1943 over the Kuban: Seventy-five percent of the fascist airplanes were knocked down in the first attack. This figure also characterizes accuracy, as does the fact that 835 enemy airplanes were annihilated in the air. There is one other factor promoting the effectiveness of an attack—greater firepower: Because of the guns installed in the new fighters, the power of a salvo 1 second in duration doubled.

Attaining surprise is one of the most important divisions of the science of combat. Surprise is attained when aimed fire is achieved prior to the enemy's detecting the attacker. Aerial combat over the Kuban transformed into aerial engagements in which 50-80 airplanes participated on each side. Massing is the enemy of surprise, and therefore the success of the first attack was ensured by the actions of a covering or a reserve force. When

combat was initiated in accordance with the plan, these groups "worked" in behalf of the attack group, setting the stage for its commitment to combat. The attack group often possessed "heavy" weapons: The group included airplanes carrying large-caliber 37-mm guns or rockets. If the enemy was able to notice the attacker in time or if combat was initiated on collision courses, then the fighters maneuvered in an effort to assume an advantageous position for attack. This phase is now referred to as "close combat."

Maneuvers were divided into offensive and defensive. The faster rate of climb of La and Yak aircraft made it possible to knock the trump card out of the hands of the fascist fighters—the vertical maneuver. In the language of combat, the transition from horizontal to vertical meant rejection of defense in favor of offense. The "staircase" ["etazherka"]—the combat formation consisting of airplanes stacked in altitude, which appeared over the Kuban—was organized in such a way that each tier was staggered away from the next by as many hundreds of meters as an airplane climbed vertically (to maintain fire coordination).

The enemy's equipment was renewed in 1943 as well. Modified Messerschmitts—the Me-109f and the Me-109g—and the Focke-Wulf-190 fighter with four 20-mm guns and two machineguns appeared. Improvement of the fascist airplanes had its effect on the means of combat. Inasmuch as the FW-190 carried a heavier load of weapons and armor, it lost some of its rate of climb and maneuverability. Maneuver was sacrificed to fire. However, when used in coordination with modified Messerschmitts and Fokkers, which had not lost their former maneuverability, they presented a serious threat.

Responsibilities in the mixed combat formation were distributed as follows: The Focke-Wulfs flew low (1,500-2,500 m) while the Messerschmitts flew high (3,500-4,000 m). The FW-190s closed in first in an effort to make a surprise attack in the horizontal plane. In this case they would not avoid frontal encounters, counting on their fire power. The objective was to disperse our fighters by penetrating into their formation and creating conditions allowing Me-109g aircraft to attack from above (this aircraft dove better). FW-190 pairs separated for action to create a time gap in the fire coordination between the crews. On approaching our fighters, the leader attracted their attention by executing a half-roll, while the follower climbed and slid to the side, where he waited. If the leader was able to "provoke pursuit," the attack was made by the follower from above and behind, with the support of the leader.

Our Yaks, which were somewhat inferior in firepower, executed a banking turn with a smaller radius, overtook the Fokker and climbed faster. And the La-5, which appeared from the front, fought well from below (its operating altitude range was up to 3,500 m); moreover its wide "forehead"—the air-cooled engine—protected the pilot from the front. The rule followed by our pilots

when organizing a mixed combat formation was that swift aircraft fly above, and maneuverable aircraft fly below. Despite the advantage in horizontal maneuver, entering into combat during a banking turn was not recommended (there was a loss of aggressiveness). There was no sense in chasing a diving Me-109g; it was better to remain above it. In the meantime aircraft flying lower in the "staircase" took account of the fact that the Me-190g suffered considerable sag, and it was difficult for the pilot to change his diving direction.

If a heavy FW-190 began a maneuver, it did not attain its maximum angle of velocity right away, and therefore there was no room for hesitation, since it could mean exposing oneself to intense fire. When a Fokker was attacked from behind, it was approached from a small aspect, since the view from its cockpit was limited by the aircraft's armored back. When it evaded its attacker with a half-roll, it exposed unprotected places—the fuel tanks, but it took a knack to catch the right moment. Fascist pilots evaded fire from a Yak following behind at short range by executing a sliding maneuver.

The Me-109f—another modification of the Messerschmitt—could operate in an altitude range of 5,000-7,000 m. Therefore our pilots had to assimilate the methods of high-altitude combat (at high altitude the airplane became more inert). One weakness of the Me-109f was considered in this case—its tendency to "dig down" as it turned with a small radius. One other tendency clearly revealed itself—expansion of the boundaries of combat on the vertical and horizontal axes as the altitude and speed characteristics of the airplanes grew and as the spatial scope of maneuvers increased.

The engagements over the Kuban were followed by the Battle of Kursk, which was typified by an increase in both the number of airplanes engaging in combat and the quantity of battles proceeding simultaneously. Hero of the Soviet Union Marshal of Aviation S. Rudenko, commander of the 16th Air Army, describes the situation in the air as follows: "...bombers with black crosses were flying simultaneously from the north and from the south. We launched our fighters immediately. Four regiments of XVI Corps—two from the 1st Guards Division and two from the 283d Division, and one each from the other formations entered into combat. A total of 280 pilots from our air army and the 2d Air Army, as well as 106 air defense fighters took part in the effort to repel the raid. Heavy fighting at the approaches to the city did not let up the entire day. ...Our army's fighters annihilated over 40 airplanes."

The results of just the one day—2 June—graphically show why the number and effectiveness of aerial battles grew so dramatically in 1943.

(To Be Concluded)

COPYRIGHT: "Aviatsiya i kosmonavtika", 1987

11004

Service Vehicle Drivers Support Night Flying
91440066n Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 12, Dec 87 (Signed to press 3 Nov 87)
pp 40-41

[Article by Lt A. Kocherov: "Night Take-Offs"]

[Text] Darkness descended over the land like a tight lid. But the airfield knows no rest at night. The roar of jet engines could be heard on the ground and in the sky, and airplane lights could be seen.

The intensity of the night flying shift was growing. Fighter-bombers took off swiftly at predetermined intervals, their afterburners creating a bright orange wake behind them.

Everyone had his job to do in the flying. The aircraft specialists and service vehicle drivers worked diligently. The smooth rhythm of the flying shift depended in many ways on them as well. Senior Lieutenant V. Bernikov attentively monitored the work of his subordinates, and tried to keep tabs on everything involving support to the night flying.

The subunit devotes serious attention to preparing the personnel prior to their departure for the airfield, and to improving the occupational skills of the specialists. Organization of lessons and training exercises is approached with great responsibility here. Unutilized reserves are sought persistently, shortcomings inhibiting forward progress are revealed and a decisive effort is made to eliminate formalism and other negative phenomena having an unfavorable effect on the indoctrination and training of drivers in the interests of raising the quality of service provided to the flying shifts. The demands laid on the end results have become stricter as well.

Today, no one in the subunit is shy about speaking for all to hear on stagnation, on shortcomings in organizing socialist competition and on the role of the human factor in restructuring. This is pleasant to observe also because those times when competition was organized to the extreme, when competition essentially involved not people but sheets of paper carefully posted on one display or another, have not yet been eroded from the memory. Of course, there was very little benefit from such sham rivalry. Not only could people not get interested in it, but on the contrary such competition generated indifference and formalism in something that should be lively and creative.

The shortcomings are now being surmounted, competition is being filled with new content, and it is having a favorable effect on growth of the occupational proficiency of drivers, which is having an effect on the quality of flight service. I think that life is coming back to rivalry

chiefly because Senior Lieutenant Bernikov has managed to orient his subordinates not on grades as such but on real growth of skills, on searching for new paths and solutions promoting growth of proficiency and stability of good end results.

All of this effort is based on the human factor, the role of which has grown immeasurably in today's conditions. While in former times publicizing the experience of the competition leaders was basically limited to publishing combat leaflets, pictorial newspapers and other visual agitation materials, now these are only the beginning. In the minds of Senior Lieutenant V. Bernikov and War-rant Officer Yu. Bondarchuk, competition is effective when the experience of the best drivers who provide outstanding service to night flying shifts is brought to the awareness of all of the subunit's personnel. This they see as the right way to go. After all, restructuring is the product of the little daily things. And it is very important for every particle of experience born of the creativity of the soldiers to be invariably noted and adopted as a tool in the fulfillment of combat training missions.

This is precisely the kind of approach to the work which the party Central Committee wants us to take. "We will attentively and critically comprehend the experience of renewal," states the well known appeal of the CPSU Central Committee to the Soviet people, "treasure every particle of progressive experience, and take it up and develop it." And the new approaches to organizing socialist competition confirm that the more attentively we monitor each other's work, the more unutilized possibilities and reserves we expose.

Preparing the drivers to service a night flying shift and organizing competition between them, the command and the party and Komsomol active members must consider many things. It is no secret that it is harder for a driver to coordinate with specialists of the air force engineer service during night flying. And after all, it is upon their mutual understanding and their close contact that the quality with which airplanes are prepared for take-off depends. This includes filling them with quality fuel and compressed gases quickly and efficiently. There must be no mistakes made by anyone.

Once after flying was finished a young driver who was towing an airplane back to its shelter stepped on the accelerator instead of the brake. There was a cracking sound: The stabilizer hit the gate of the shelter. As a result the warplane ended up in the air regiment's technical maintenance unit. Replacing the complex unit meant painstaking work.

Let us be objective: We cannot lay the blame entirely on the young driver. This was only the third night flying shift in which he had participated, and naturally he did not possess adequate experience to work under such conditions. And of course, he was tired after the flying, and this had an effect as well. Moreover towing an

airplane and backing it into a shelter is not all that simple an operation. It requires firm habits, great caution and good coordination with the missile carrier's technical maintenance team.

The objective difficulties of night work are sometimes compounded by subjective ones. Strange as it may seem, they are created by specialists of the air force engineer service. Sometimes it happens that technicians and mechanics toss the plug connections of aircraft power cables on the concrete and store ground equipment haphazardly within the aircraft maintenance zone with no regard for the consequences. Inefficient positioning of ground support equipment that personnel of the air force engineer service use when preparing an airplane for take-off makes the work of drivers significantly more complicated. Moreover some specialists fail to keep them informed as to how long power has to be supplied to the airplanes. In such cases the airfield jet engine starters run idle for long periods of time, which is a considerable waste of engine life. Sometimes a driver turns off the power supply system prematurely, before specialists of the air force engineer service are able to finish all of the required inspections. And once again the finger is pointed at the drivers.

For the sake of objectivity it should be said that vehicle drivers do make mistakes as well, especially during night flying. Sometimes this happens out of ignorance of the consequences to which incorrect actions when preparing airplanes for take-off could lead. Thus if the controls of an airfield jet engine starter are manipulated improperly, significant errors could be introduced into the missile carrier's onboard digital computer. This in turn makes it more difficult for the pilot to complete his flying assignment. Specialists of the group maintaining the aiming and navigation system once stated valid complaints concerning drivers guilty of interrupting power supply to an airplane. This kind of thing usually happened during night flying.

The subunit did a great deal of work to prevent such irregularities. Senior Lieutenant V. Bernikov and Warrant Officer Yu. Bondarchuk explained to the drivers the need for complying strictly with work discipline, and they organized additional training in working with the control panel of an airfield jet engine starter. Concurrently, strict control was established over the personnel's compliance with the requirements of the guidelines on operating and servicing special motorized equipment. All of this was beneficial. The drivers began working more thoughtfully and attentively, and they were no longer reluctant to coordinate one more time with the technician or other specialist preparing the missile carrier for take-off. Senior Lieutenant V. Bernikov also became more demanding of his subordinates and intensified his supervision of their work.

The subunit began devoting more attention to psychological preparation of the personnel. After all, much depends on the mood of the specialists as they begin

their work. Keeping up with the intense rhythm of night flying is not easy. Even an experienced driver can make a mistake when performing a certain operation if the load laid on his shoulders is increased significantly. And this sometimes happens. While not all of the problems have yet been solved, the work of the specialists is beginning to be more organized, and concern is being shown for organizing proper rest and food services for the military aviators before flying. All of this is affecting the quality of their work.

Visits by the traveling agitation group occur frequently during night flying. Radio broadcasts, which occur not less than twice during a flying shift, publicize the experience of the best specialists and describe the initial results of the shift. Political officers A. Dudnik and N. Yermolayev try to utilize the possibilities of technical propaganda resources fully, they carefully plan their broadcasts, and they encourage the editors of combat leaflets, agitators and active party and Komsomol members to participate in them, which significantly raises the effectiveness of their measures.

In the course of restructuring, executive officers have started to rely more competently on outstanding workers and on the leaders of the socialist competition. The best soldiers have been assigned to drivers weak in professional respects. They transmit to the novices the secrets of their proficiency, and they teach them to distribute their attention correctly during a night flying shift, to orient themselves correctly and to maintain a proper feel for the dynamics of the flying. Thus sergeants V. Chernyshev, A. Shmittel and other experienced drivers took charge over the fulfillment of the most important operations by young soldiers.

The work of specialists in air force rear services is not easy during night flying. Working in close coordination with pilots and technicians, they make a substantial contribution to raising the combat readiness of the subunits and to ensuring flight safety. The experience of the best collectives shows that we need to constantly and purposefully prepare soldiers to act efficiently and without mistakes in the course of night flying shifts. Only under such conditions will the motor vehicle drivers be able to prepare the warplanes with high quality and make their contribution to raising the combat readiness of flight crews and flight safety.

COPYRIGHT: "Aviatsiya i kosmonavtika", 1987

11004

Speed, Altitude, ECM Identified as Breakthrough Assisting Factors

914400660 Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 12, Dec 87 (Signed to press 3 Nov 87)
pp 43-44

[Article by V. Dubrov based on foreign publications: "Resources and Methods for Penetrating Air Defenses"; conclusion; continued from No 10]

[Text] The methods of penetrating air defenses are being developed on the basis of previously created tactical models with regard to the priority of actions by support and attack forces, tested in local wars: breaking through a grouping of anti-aircraft weapons with fire in a selected sector, launching the attack group to the target through the created breach, and carrying out a massed bombing attack in minimum time.

Citing available experience, foreign military specialists feel that after a breach is created, it is not possible to completely exclude opposition by anti-aircraft weapons during the time that the attack group flies to its target. Therefore bombers committed to a breach cannot count on encountering training ground conditions—individual protective measures are needed. As was noted previously, portions of the route that stray beyond the corridor of suppressed air defenses, wide envelopment maneuvers and excessive straggling of the combat formation in depth are avoided in breakthrough tactics. Three basic methods remain: maneuver in speed and altitude, and neutralization of air defense fire weapons by jamming them with ECM stations carried by the aircraft.

Maneuver in speed is the most effective against anti-aircraft artillery—an obsolete weapon that has proven itself to be rather formidable against airborne targets in local wars. Foreign specialists calculated that increasing flying speed from 600 to 950 km/hr halves the quantity of anti-aircraft artillery shells reaching the vulnerable areas of aircraft. High speed also ensures tactical surprise. It was noted in the West German journal *WEHRKUNDE* that at a speed of 900 km/hr an airplane flies 1 kilometer in 4 seconds—that is, it passes through the effective zone of anti-aircraft weapons defending a particular facility very quickly. Even modern radar detection resources, which need a certain limited amount of time to calculate the initial fire data, do not have enough time to act. At the same time it has been practically demonstrated that a further increase in speed does not significantly reduce the time of observation of an airplane by ground radar.

American pilots in Vietnam flying F-111A fighter-bombers rejected the supersonic charge as a means of reaching the target, even though these aircraft were specially adapted for this purpose. The fact is that as speed increased the minimum safe flying altitude grew, maneuverability decreased, and terrain following became impossible. Moreover an airplane flying at supersonic speed began to emit heat in all directions, and therefore it was locked on by infrared homing systems not only from the rear hemisphere but also from the front. The crew's performance also dropped dramatically due to the extreme tension. Foreign military specialists note that on the basis of acquired experience, supersonic flight near the ground was excluded from the requirements imposed on the future B-1B bomber.

Characteristically, all discussion pertaining to supersonic speed had to do only with actions at low altitude. But low-altitude breakthrough at near-sonic speed (corresponding to the best maneuverability) is believed to be the principal tactic used against air defenses. First of all, aircraft can fly undetected owing to the limited capability of ground radar for searching for low-flying targets. Second, such covertness ensures surprise, so that the attack can be carried out before air defense fire weapons are able to retaliate. Third, the accuracy of conventional weapons, which depends on the range from which they are launched (dropped), becomes acceptable. Fourth, opposition by fighter-interceptors lessens due to the decrease in area within which attacks are possible. And fifth, natural camouflage and concealment afforded by the ground makes it possible to preclude the use of ECM resources (creating interference becomes unnecessary, and in a number of cases undesirable).

According to the foreign press, reliability of flight at low altitude is being increased by creating onboard automatic control systems connected to airborne radar, by strengthening the structure of the load-bearing surfaces of airplanes that are subjected to perturbed air flows from the ground, by developing ammunition with braking anti-ricochet mechanisms (design work on a launching device that shoots bombs upward is under way), and by installing systems warning of a dangerous altitude and equipment facilitating piloting, aiming and course control during flight near the ground. Flight crews undergo a special program of low-altitude flying with combat applications, and the altitude at which fighter-bombers and attack aircraft fly to their targets in annual competitions is set at not more than 80 meters (the percentage of disasters occurring in training flights due to collisions with the ground does not decrease as a result).

The following statement in the journal *AEROSPACE DAILY* was somewhat surprising on this background: "The conception that tactical airplanes approaching targets at low altitude can avoid detection by enemy radar is becoming increasingly more problematic, and in the 1990s it may become totally unfounded." The journal based its conclusion on the experience of using early warning radar airplanes capable of searching for airborne targets near the ground at the far approaches to the objectives they cover. E-2A (C) Hawkeye AWACS airplanes took part in local wars in Vietnam and in the Near East. They supplied long-range information to ground air defense resources and fighter-interceptors. The latter acquired a significantly larger time reserve in which to prepare for combat in comparison with notification by ground radar stations.

Foreign experts feel that because more time is provided to the crews of air defense resources, the effect of surprise upon which the attacking side counts on decreases. Despite the fact that airplanes fly at low altitude, they can still be spotted by an AWACS airplane a great distance from their target. Avoidance of detection is no longer certain, and terrain following transforms

into an unproductive waste of energy. All of this puts low-altitude breakthrough tactics in doubt. But in the immediate future they will still be treated as the principal tactics, inasmuch as new methods that have undergone mathematical and field modeling do not yet exist.

The zone of troop air defenses adjacent to the front line is believed to be the most difficult and dangerous ground to be covered by bombers and fighter-bombers invading foreign territory. Foreign specialists feel that this is where the low-altitude antiaircraft systems of the ground troops are concentrated with overlapping sectors of fire. Many of these antiaircraft systems possess optical search and guidance systems, and therefore they do not emit radiation and are not susceptible to detection by Wild Weasel aircraft. Modeling shows that it is impossible to evade the kill zones of mobile antiaircraft systems in the horizontal plane because even airborne radar cannot suggest an exact solution to the pilot. And an airplane that uses the tested method of breaking through on a straight course so that it spends minimum time within the zone of antiaircraft fire and within conditions permitting early warning of an air attack is becoming increasingly more vulnerable.

However, foreign military specialists believe that the height to which the shield of troop air defenses extends is not great. The range of surface-to-air missile systems such as the Stinger is 3-5 kilometers, while that of low-altitude Roland, Rapier and Chaparral missile systems is 6 kilometers. Consequently if the target is far beyond the front line, airplanes fly above this air defense shield—they maneuver in the vertical plane.

The high-altitude breakthrough is modeled with regard for the features of intercepting airborne targets. This process is identical in many ways in relation to both fighters and surface-to-air missile systems: It consists of the stages of detection and identification, automatic tracking and weapon use. An airplane flying on a straight course at high altitude itself creates the conditions for its own destruction by long-range missiles equipped with semiactive radar homing heads. Nonetheless the airplane's vulnerability can be decreased by increasing the speed to supersonic and by releasing intense interference.

Fuel consumption at supersonic speed is slightly higher than at low altitude, but on the other hand there are no vibrations, which have a negative effect upon the crew, and the time available to the crew of an antiaircraft system to intercept the target decreases. This is compensated somewhat by early detection of a high-flying airplane. However, the arguments in favor of the new breakthrough variant are still insufficient: This method is inferior to the low-altitude variant in terms of survivability. In this connection foreign military specialists are laying their main emphasis on making the airplane less noticeable—decreasing its effective reflecting surface. For example the journal DEFENSE ELECTRONICS asserts that the effective reflecting surface of a B-1B

“deep intrusion” airplane is more than 100 times less than that of a B-52 strategic bomber. Thus hopes are being laid on combined maneuver in altitude and speed, in combination with radar concealment of the airplane.

Air defense fire weapons that detect and track airborne targets by radar can be neutralized by two methods—zonal interference and interference created by the combat formation of the attack group.

The purpose of creating interference in patrol zones over friendly territory is to “blind” detection radar on the forward edge within the composition of troop air defenses. The journal FLIGHT notes that these functions can be performed by a tactical ECM aircraft. An improved variant of a well known fighter-bomber, the EF-111A, is equipped with the ALQ-99E electronic suppression system, which is carried in the fuselage and in a pod mounted on the tail fin. Outside the range of air defense resources it can fly for 3.5 hours without refueling and provide cover to attack aircraft by creating interference over enemy territory to a depth of 65 km.

Interference is created by the combat formation of an attack group en route to the target and when making the attack. An ECM airplane flying together with bombers (their role may be played by an attack modification of the F-111) creates active interference and conceals the group. In this case radar observers on the ground see a large moving spot within which it is impossible to distinguish individual airplanes and track them. When a specific target is to be attacked the ECM aircraft leaves the combat formation and operates outside the range of the target's air defenses in the same way as when creating interference over friendly territory. What we have as a result is a secondary breakthrough—this time of air defenses covering the target.

A specialized ECM airplane is also being created out of the European Tornado attack aircraft (it is code-named the GR.1). In the course of field modeling (a flight experiment) using analogues of air defense resources, according to the journal AEROSPACE DAILY the neutralization effect was decreased by adjusting the amplification of the indicator's glow, by changing the mu-factor of the intermediate frequency, by bombarding the lateral lobe, by reducing the time constant, by adjusting sensitivity, by retuning the pulse repetition frequency and by noise suppression. The most difficult conditions for distinguishing a target on the background noise of a screen were created when the attack airplanes were on a line between the radar station and the ECM airplane, which was operating outside the range of air defenses. However, the corridor of effective noise was narrow. It could be widened only by increasing the power of high frequency emissions from the ECM airplane. But this was impossible due to the prohibitively large weight and size of the apparatus.

The variant in which the target's air defenses were jammed during action within enemy territory (in the case where the ECM airplane left the combat formation) was also found to be vulnerable. Air defense radar operators first reduced the brightness of the image, and then they were able to distinguish the jamming aircraft on the noise background by adjusting sensitivity and the gain of the intermediate frequency, after which "enemy" fighters could be launched to intercept it. This procedure was tested out in the course of a breakthrough of troop air defenses in a combat zone. In this case survivability of the airplanes was ensured by combining neutralization with fire suppression of electronic resources by means of radar-seeking missiles. In the meantime the bombers used their own ECM equipment to create disorienting (reflection-pulse) interference, as a result of which a false situation was created on detection and guidance radar screens in the air defense systems.

As we can see from the descriptions of methods and tactics, a breakthrough requires special precision and synchrony in the actions of different branches of aviation. And as foreign specialists note, the more complex the situation is, the more probable mistakes leading to the loss of airplanes may be. This is why it is important to neutralize the situation by combining several functions in a single airplane, as is done for example in the Wild Weasel. Thus in the minds of its developers, the experimental B-1B bomber will penetrate air defenses on its own, without the assistance of supporting forces and resources. Its independent flight is supported by the ALQ-161 defensive ECM system with controllable emission power. A radiotechnical reconnaissance subsystem that determines the coordinates of a radiation source and emits directed interference in response to its signals in real time operates in conjunction with the former. This subsystem continually searches for new signals while tracking those detected previously. Representatives of the company that manufactures the ALQ-161 believe that it would permit an aircraft to surmount existing and even future air defense resources.

But in the opinion of foreign specialists not all anti-aircraft systems "fear" the might of electronics. Thus the F-111A fighter bomber, "the latest word in technology," which had been advertised so widely prior to being sent to Vietnam, was knocked down in its first combat sortie by a conventional anti-aircraft artillery shell; the same thing happened to many other American supersonic attack aircraft. Jamming had no effect on gun crews. This factor was precisely what motivated development of the simplest kinds of ground weapons for use against airplanes in the air, forgotten since the times of World War II.

The air forces of the NATO countries are presently conducting a feverish search for new resources with which to support the attack operations of strategic and tactical aviation. Constant improvement of air defenses is forcing military specialists to update breakthrough tactics and to develop more effective methods and

procedures of reconnaissance, neutralization and fire suppression of air defense resources, so that attack forces could make their barbaric bombing runs on foreign territory.

COPYRIGHT: "Aviatsiya i kosmonavtika",

11004

Index of Articles Published in 1987

91440066p Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 12, Dec 87 (Signed to press 3 Nov 87)
pp 46-47

[Text]

Official Materials. Lead Articles

Ukase of the USSR Supreme Soviet Presidium Confering Honorary Titles "Honored Military Pilot USSR" and "Honored Military Navigator USSR" on Pilots and Navigators of USSR Armed Forces Aviation (10)

Need for Reorientation in Personnel Policy Stressed (L. Batekhin) (3)

Restructuring of Socialist Competition is Continuing (L. Batekhin) (11)

Greater Discipline, Training for Flight Controllers Urged (P. Belonozhko) (6)

Commander's Initiative and Creativity (A. Borsuk) (5)

Teachers, Students Exhorted to Participate in Restructuring (A. Goryainov) (9)

Air Force CIC Urges Full Implementation of Perestroyka (A. Yefimov) (2)

Restructuring Effort Proceeds in Air Force (A. Yefimov) (8)

Performance of the Air Force Rear Services Summarized (A. Zakrevskiy) (12)

Socialist Competition in Military Transport Aviation (A. Maslov) (1)

Improvement in Elements of Combat Potential Traced (I. Sviridov) (7)

Soviet Space Initiatives, Cooperation Outlined (G. Titov) (4)

Cosmonautics History Reviewed (G. Titov) (10)

On the 70th Anniversary of Great October

Pilot Rams Intruder, Dies a Hero (Ye. Besschetnov) (11)

- Return to Action (V. Bolodurin) (11)
- The Main Direction (10)
- Pilot-Internationalist (V. Goloveshkin) (10)
- Continuity (Ye. Gryaznov) (7)
- Over Three Poles (A. Dmitrichenkov) (6)
- Record Flight (A. Dmitrichenkov) (7)
- Outstanding Air Transport Commander Profiled (A. Dmitrichenkov) (11)
- A Symbol of Valor and Glory (V. Yeremeyev) (8)
- Helicopter Gunship Pilot Takes Crippling Fire in Afghanistan (V. Zhitenev) (2)
- FAC Sees Action in Afghanistan (V. Zdanyuk) (1)
- Unfading Pages of History (4)
- Officers' Personal Efforts Rewarded (P. Klebanyuk) (3)
- At the Leader's Call (A. Kopeykin) (1)
- Brighter Than a Legend (G. Kuvitanov) (10)
- Gold Stars of a Fighter (V. Lebedev) (11)
- Wind in the Face (A. Lukashov) (6)
- "Only October Brought Recognition" (V. Lyndin) (9)
- Red Military Pilots (Yu. Mantsurov, M. Mindrin) (5)
- "Katyushas" Under Their Wings (V. Paramonov) (8)
- They Were Brought Together by the First Satellite (B. Pokrovskiy) (9)
- Heroism of Aircraft Builders (A. Ponomarev) (7)
- Flight of the "Strana Sovetov" (A. Ponomarev) (8)
- Service, Achievements of Top Helicopter Captain Described (A. Popov) (4)
- "Keep in Step with the Revolution!" (11)
- With Concern for Air Force Cadres (Ye. Sergeyev) (2)
- Great October and V. I. Lenin (Ye. Sergeyev) (11)
- A Time of Trial (K. Sukhov) (8)
- "This Is the Best Friend in Combat..." (N. Sysoyev) (8)
- Aircraft Maintenance Chief Earns Praise (A. Tarabrin) (5)
- Traveling the Course of Acceleration (A. Uzhegov) (11)
- Powerful Tool of People's Sovereignty (A. Fedurin) (10)
- DOSAAF History, Present Directions Discussed (S. Kharlamov) (3)
- Roads of Fire of our Fathers (I. Yudin) (5)
- Political and Military Indoctrination**
- Squadron Deputy Commander for Political Affairs Flies Helicopter in Afghanistan (N. Antonov) (2)
- Objective Monitoring Helps (I. Baranov) (6)
- Helicopter Pilot Sees Combat in Afghanistan (Ye. Besschetnov) (2)
- Career, Feat of Soviet Fighter Pilot Killed in Action in Afghanistan (Ye. Besschetnov) (4)
- Service Record of Decorated Helicopter Pilot Reviewed (Ye. Besschetnov) (6)
- Pilot Dies a Hero in Afghanistan (Ye. Besschetnov) (9)
- On the Basis of Firm Military Order (A. Borisov) (11)
- Imperishable and Permanent Memory (S. Vachayev, V. Bezborodov) (5)
- The Bitter Taste of Sweet Glory (N. Voloshanovskiy) (5)
- Responding to the Human Factor (9)
- A Time of Accomplishments (7)
- The Army Community (S. Gaveto) (5)
- Career of Test Pilot Yamshchikova (P. Guskov) (3)
- Successes in Training Young Helicopter Officers Described (A. Demin) (4)
- Soviet Helicopter Maintenance Officer in Afghanistan (V. Dolgishev) (1)
- Searching for Effective Forms (V. Donets) (12)
- And Actions Will Tell If Words Are True (I. Drobinka) (8)
- Air Force Personnel Discuss Pilot Professional Development (G. Drugoveyko) (6)
- In a Position of Practical Return on Effort (V. Yereimin) (2)

- Fear of Retribution Stifles Initiative (A. Zhilin) (5)
- "Someone Else's" Subordinate (S. Zhuravlev) (7)
- Indoctrination by Drill (V. Irikayev) (2)
- Economist Explains the Principles of Economic Reform (N. Karasev) (12)
- Helicopters in Combat in Afghanistan (G. Karpenko) (2)
- Oversight Strengthened (1)
- Experience—Not for the Reports (V. Korshunov) (7)
- Stories of the Air War in Afghanistan (V. Kot) (8)
- Service Vehicle Drivers Support Night Flying (A. Kochev) (12)
- Stray from the Beaten Path (V. Krenev) (3)
- Veterans (V. Kuznetsov) (12)
- Time to Learn from Success (A. Labkovskiy) (4)
- Air Force Assists in Chernobyl Disaster (V. Larin) (5)
- Maturing, Development of Helicopter Personnel in Afghanistan Viewed (D. Lyamochkin) (7)
- Such a Brilliant Life (G. Mazurov) (12)
- Restructuring Problems in Air Force Ideological Work Examined (V. Makayev) (6)
- Celebrating a Glorious Jubilee (A. Mozgovoy) (8)
- Air Force Komsomol Sets Personal Example (5)
- New Approaches Are Needed (G. Nachmetdinov) (11)
- Support to Amateur Light Aviation Urged (Ye. Pavlov) (9)
- Excellent Exercise Results Based on Good Preparation (B. Poluektov) (9)
- Instilling Responsibility (V. Popov) (7)
- Measuring up to Heroism (5)
- Helicopter Pilot Performs Heroic Deeds in Afghanistan (V. Rudenko) (1)
- In Sympathy with the Restructuring (4)
- Air Controller Relates Afghanistan Experience (S. Sorokin) (8)
- Greater Security, Discipline in Guard Detail Described (N. Starunov) (6)
- Fighter Base Ground Logistic Support Personnel Seek Improved Job Performance (P. Stepanov) (2)
- Individually with Each (V. Susloparov) (1)
- With Innovativeness in Contact (V. Timofeyev) (1)
- Talking Directly to People (V. Fedotov) (9)
- What Should a Seminar Be Like? (P. Fedorov) (10)
- A Propagandist's Vocation (I. Filatov) (5)
- Soviet Aviators for Afghan Children (I. Filippov) (9)
- Air Force Peoples Control Groups Need Improvement (Yu. Fotinov) (8)
- Restructuring Effort Improves Air Force Engineer Service (V. Frolov) (9)
- Dependable Reserve (S. Kharlamov) (8)
- Competition of Helicopter Gunship Crews Described (N. Tsvetov) (3)
- More Thorough Training, Follow-Up for Young Pilots Pressed (N. Tsvetov) (7)
- Performance Backslide by Fighter-Bomber Regiment (N. Chava) (2)
- Greater Efficiency, Independence Urged in Aircraft Servicing (V. Shishkin) (7)
- A School of Ideological Growth (5)
- Problems of Breaking in Newly-Commissioned Officers Discussed (V. Yusov, P. Korchemnyy) (2)
- Military-Historical and Military-Political Articles**
- A Life Devoted to Aviation (V. Vladimirov) (2)
- Civil Aviation Restructuring Its Work (A. Volkov) (8)
- U.S. Air Force Accused of Brainwashing Personnel (V. Goryainov) (1)
- NASA "Commercialization of Space" Claimed Ploy to Benefit SDI (Ye. Yermakov) (2)
- U.S. Military Efforts in Pacific Basin Viewed (S. Zenin) (6)
- In the Curved Mirror of Anticommunism (S. Zenin, I. Makhlov, V. Ovsyannikov) (8)

Militarization of U.S. "Second Economy" (N. Karasev) (4)

Soviet Air-to-Air Tactics in Civil Spanish War: In the Skies over Spain (Yu. Kislyakov, V. Babich) (1)

1930's Soviet Pilots Gain Combat Experience in China, Mongolia (Yu. Kislyakov, V. Babich) (2)

Development of Soviet Aerial Combat in 1930s (Conclusion) (Yu. Kislyakov, V. Babich) (3)

History of Aerial Combat in First Period of Great Patriotic War (Yu. Kislyakov) (11)

History of Aerial Combat in Second Period of Great Patriotic War (Yu. Kislyakov, V. Babich) (12)

Named for Lenin (I. Kravtsov) (7)

Takeoff at Dawn (S. Lisitskiy) (5)

Fearless Red Army Military Pilots (S. Lisitskiy) (10-11)

Warsaw Pact Military Doctrine, Force Reductions (B. Lytov) (10)

First Metal Propeller (A. Milekhin) (1)

Internationalist Volunteers (V. Muravyev) (4)

Flying Army Commander (O. Nazarov, V. Sokolov) (11-12)

Technical Plans, Problems of Star Wars Examined (A. Nelikhov) (6)

Behind the Screen of the Anti-Soviet Myth (V. Ovsyanikov) (5)

Pilot. Pedagogue. Scientist (A. Papchinskiy) (6)

Famed Division Commander (V. Pinchuk) (2)

Clarion Alarm Call of Hiroshima (V. Roshchupkin) (2)

Vigilance Is Our Weapon (F. Seyranyan) (10)

Great October and the Bankruptcy of Its Falsifiers (Yu. Silchenko) (11)

U.S. Military-Industrial Complex (V. Staropolov) (9)

The Truth and Lies About the Defenders of the Afghan Revolution (V. Timofeyev) (7)

Strengthened Resolve Needed to Counter Imperialist Threat (I. Filatov) (3)

West German Forces Labeled Offensive, Right-Wing (L. Chernousko) (12)

Wings of the People (L. Shishov) (4)

For High Combat Readiness

Problems of Learning Formation Flying (V. Aleynov) (2)

What Is the Source of the Mistrust? (A. Arestov) (11)

Party Committee... On the Sidelines (G. Benov) (1)

Border District Aviators Serve Alert Duty (N. Vasilevskiy) (12)

Factors in Decision to Land Damaged Aircraft (F. Ganiyev) (10)

Flight Safety Service Inspector's Work (V. Grishchenkov) (10)

Origin of Aerial Tactics Explored (G. Drugoveyko) (5)

Creating an Advantage in Aerial Combat Through Stratagem (G. Drugoveyko) (12)

Greater Attention Urged for Pilot Psychological Training (A. Zhilin) (6)

Air-Ground Coordination Problems (V. Zhitenev) (10)

Alert Forces Deal with Airspace Intrusions (V. Kashirov, I. Grishalevich, V. Korneyev) (9)

Obstacles to Introducing Psychological Findings Identified (12)

More Realistic Pilot Training Under Mountain Conditions Urged (B. Kuzenyatkin) (7)

Better Coordination of Ground, Air Fighter Control Sought (I. Kuzmenko) (6)

Bomber Crews Need Challenging Training (N. Kuprikov) (8)

Improving Air Force Navigator Training in Bomber Squadron (M. Makeyev) (1)

Increased Demands on Navigator Detailed (P. Makshakov) (3)

Political Chief Restructures Regiment's Political Work (S. Manyukov) (11)

Young Party Organization Secretary Revives Squadron (S. Manyukov) (12)

Tactical Possibilities Determined by Mathematics (G. Molokanov) (8)

Procedure for Analyzing Tactical Elements and Alternatives Explained (G. Molokanov) (9)

Improving Methods of Grading Tactical Flight Training (I. Petrakov) (10)

Greater Concern for Psychological Motivation in Flying Urged (V. Ponomarenko) (4)

Airfield Maintenance Commander Demands Truthful Reporting (V. Prudnik) (4)

Flight Operations Radar, Radio Navigation and Communications Support Services (1)

Aerobatics Still an Essential Element of All Flight Training (A. Silantiev) (9)

The Basis of Success in Combat (A. Smiltniyeks) (11)

Benefits of Well Organized Tactical Flying Exercise (A. Tareyev) (11)

Greater Creative Thinking, Planning in Air Tactical Exercises Urged (N. Tkach) (4)

Not a Day Without Aerobatics (V. Shcherbina) (11)

Reliance on Initiative (A. Shchurskiy) (3)

The Pilot and the Computer

Programming Loops for Microcalculators (A. Andreyev, V. Rubin) (3)

PMK Subroutines (A. Andreyev, V. Rubin) (5)

Oblique Loop with a PMK (Yu. Baykov) (7)

Calculating a Flight Route (V. Barmichev) (5)

Preventing Loss of Control on VTOL Aircraft Landing Approach (V. Vasenkov, V. Tarasenko) (1)

A Template for the PMK (A. Vishnyakov) (4)

Computing Combat Maneuvering with Programmable Electronic Calculator (V. Dovbnya, V. Teryayev) (2)

Solving Intercept Problem with Programmable Calculator (A. Kaynov) (1)

Visual Orientation with a PMK (A. Kaynov) (4)

Quick Estimation of Tactical Radius (V. Korolkov) (8)

Calculating Air Firing Corrections (K. Kostenyuk) (4)

Velocity Navigation Triangle (Yu. Mordukhovich) (5)

Danger of Premature Opening of Brake Parachute Described (G. Rayevskiy) (6)

Air Force Engineer Support to Combat Training and Problems of Air Force Rear Services

Problem Training Method Improves Student Participation (V. Bobyr) (5)

Planning Effectiveness (V. Voronin) (8)

Air Force Personnel Propose Resource, Labor Saving Inventions (12)

A Victory Accessible to All (V. Dolgishev) (6)

Strategy of Exploration (V. Dolgishev) (10)

Steps for Prevention, Detection of Turboprop Engine Overheating (V. Zavyalov) (3)

Not Resting on Laurels (I. Kalinichenko) (10)

Faulty Startup Procedure Damages Turboprop Engine (V. Karpenko, Yu. Kuzmin) (2)

High Quality for Adjustments (P. Karpenko, Yu. Kuzmin) (6)

Through the Mind and Heart (V. Lebedev) (5)

Flight-Line Training Drills for Aircraft Servicing and Maintenance Personnel (V. Mayorov) (1)

Effectiveness of Special Maintenance Inspections Related (V. Mayorov) (4)

From Forecasting to Prevention (V. Mayorov) (6)

Fewer Words, More Deeds (A. Titarenko) (9)

Utility of Turn and Bank Indicator Stressed (Yu. Uraleov) (2)

Constant Vigilance in Helicopter Maintenance Urged (V. Shmatov) (4)

Maintenance Procedures at Mountain Helicopter Pads Described (G. Shnyppkin) (6)

Flight Safety

Fighter-Bomber Squadron Commander Discusses Flight Safety (V. Antyufeyev) (1)

Greater Concern for Flight Safety Urged in Military Air Transport (7)

Follow-Up Article Discusses Better Preflight Medical Exams (Ye. Berezhnov, S. Motsar) (6)

Pilot Self-Assessment Essential to Flight Safety (A. Bondarenko) (7)

Emergency and Survival Training of Pilots Stressed (Yu. Bondarenko) (3)

Fine Line Drawn Between Justified and Unjustified Risk (K. Burnyy) (9)

Observe Technological Discipline (M. Fladimirov) (6)

Squadron Flight Safety Campaign Emphasized (V. Gorlov) (3)

Squadron Describes Ways to Keep Aircraft Maintenance Quality High (Yu. Zhukovskiy) (11)

Review of Safety Procedures in Thunder Clouds (A. Zavodchenkov) (6)

Stress on Preventive Work in Flight Safety (P. Kirsanov) (10)

Peculiarities of Weather in Mountainous Areas (V. Klepikov) (2)

Pilots Violate Flight Safety Rules and Procedures (B. Kononenko) (2)

Discussion of Antyufeyev Article Summarized (Yu. Kulikov) (12)

Exercise Described for Crews of Long-Range Flights (S. Melnik, A. Shakula, A. Semenov) (6)

Flight Safety Tips for Technical Maintenance Personnel (A. Mikhaylov) (10)

Landing, Ground Visibility Relationship Analyzed (V. Nesteruk) (3)

Caring Instructors Develop Good Pilots (5)

Primary Party Organizations Contribute to Flight Safety (12)

"Algebra" of Records and "Arithmetic" of Mistakes (A. Sinevich, V. Trusov, V. Mayorov) (5)

Qualities Required of Flight Control Groups Discussed (V. Surov) (8)

Greater Emphasis Urged for Use of In-Flight Recording Equipment (V. Shishkin) (4)

From the Life of the VUZes

Flight Safety Improved Through Analysis of Maneuvers (K. Boyko, D. Khachkovskiy) (9)

Irate Parents Protest Offspring's Dismissal from Air Force School (A. Zhilin) (1)

Who Is to Light the Torch? (A. Karpov) (12)

Kurgan Military-Political (V. Knyazev) (5)

Better Physical Training in Field Flight Programs Recommended (V. Koltunov, V. Ivanov) (4)

Adaptation to an Aircraft's Changing Parameters (N. Litvinchuk, V. Kozlov) (11)

Lomonosov Military Aviation Technical School (R. Nagornyy) (9)

Reference Points in Flight Training (A. Plotnikov, A. Safronov) (3)

Roster, Acceptance Conditions of Air Forces Military Schools (3)

Cosmonautics and the National Economy

Development of Satellite Communications Systems Described (N. Bondarev) (7)

Two Sketches of Korolev (G. Vetrov) (1)

Using Satellites for Geodetic Measurements (G. Glabay) (2)

New Crew, Equipment for Mir Spacecraft System (G. Glabay) (4)

Herald of the Space Era (V. Gorkov) (10)

Biomedical Research Conducted in Interkosmos Program (V. Degtyarenko) (12)

Path to the First Launch (G. Durov, N. Narovlyanskiy) (10)

The First Group Space Flight (S. Yegupov) (8)

At the Start of the Path (A. Zakharov) (10)

Energiya Booster Rocket Ground Support Complex Described (V. Karashtin) (10)

Cosmonaut Describes Mir Space Station (L. Kizim) (1)

Kizim Describes Mir Space Station EVA (L. Kizim) (2)

The Outer Planets (L. Ksanfomaliti) (6-7)

First Space Engineer (V. Lyndin) (8)

Dynasty of the Soyuzes (I. Minyuk) (11)

Essays Explore Past, Future of Space Exploration (I. Minyuk, G. Vetrov) (9)

Radio Contributes to Space Exploration (B. Pokrovskiy) (5)

Report on Activities of USSR Cosmonautics Federation (B. Pokrovskiy) (7)

Kvant Astrophysical Module Described (I. Pochkayev, V. Ulyanov, B. Naumov) (9)

History of Interkosmos Space Research Program Detailed (M. Rimsha) (3)

History, Projects of Interkosmos Program Described (M. Rimsha) (4)

"Proton" Creator (V. Rodikov) (5)

Space Scout (G. Smirnov) (10)

USSR-Syria: Flight to Mir Complex (G. Glabay) (10)

Soviet-Syrian Crews Prepare for Flight to Mir Space Station (G. Glabay, D. Churkin) (11)

Experiments Conducted by Soviet-Syrian Crew in Mir Complex (G. Glabay) (12)

List of 1986 Soviet Space Launches Given (4)

Mir Station Crew Overcomes Mechanical Difficulties (V. Ulyanov) (8)

Behest of the Times (V. Yakunin) (1)

Science in the Service of the Motherland. Your Health

Magnetoabrasive Machining Introduced into Aircraft Repair (V. Velikanov, V. Kovalev) (8)

The Creativity of Youth (Yu. Georgiyev) (4)

Aviation Industry Reports Progress (A. Gerashchenko) (8)

Careful: Fungi! (V. Gorkov) (6)

Introducing Innovation Faster (P. Yemelyanov) (12)

Cavitation Can Cause Engine Shut-Down (P. Karpenko, Yu. Kuzmin) (9)

Born by Creativity (6)

Computers at the Service of Health (Ye. Spirin) (10)

Consideration of Human Factors Recommended in Cockpit Design (Yu. Yakimov) (7)

Years. People. Heroism

Seven Against Twenty-Five (N. Antonov) (3)

"White Lightning" in the Attack (F. Gnezdilov) (5)

An Internationalist Fighter (V. Goloveshkin) (6)

By Strafing Attack (I. Gusev) (4)

An Air Duel (S. Davtyan) (6)

Hitting Targets on the Roads (A. Mikhaylov) (2)

Pre-World War II Midair Ramming Described (V. Paramonov) (4)

Divers in the Sky (A. Pyastolov) (11)

How War Experience Was Born (G. Smirnov) (9)

Son of the Regiment (M. Stuchinskiy) (7)

He Did Not Burn in the Flames (Ye. Tolmachev) (1)

The Combat Routes of Navigator Kozlenko (Ye. Tolmachev) (8)

Petr Shavurin's Two Rammings (L. Tyulnikov) (1)

Eternally in Memory (B. Ulyanov) (4)

Resources of Risk (N. Fedorov) (7)

Captain Ivaykin's Combat Sorties (V. Khromin) (3)

A Matter for All the People (V. Cherepanov) (3)

Flight and Psychology. On the Topic of Morale

Different Development of Young Officers Described (V. Ivanov) (3)

Having Mental Flight Image Improves Flying Skills (N. Kryukov, A. Vorona) (10)

Psychological Interaction of Pilot, Controller Discussed (V. Smirnov) (3)

Emphasis Placed on Psychological Training of Ground Controllers (V. Smirnov) (4)

Grounded Pilot Longs for Reinstatement (A. Shtaltovnyy, A. Dmitrichenkov) (9)

Abroad

Artificial Intelligence Systems Support Aerial Combat (O. Baluev, I. Makarov) (8)

Air Defense Penetration Aids (V. Dubrov) (10)

Speed, Altitude, ECM Identified as Breakthrough Assisting Factors (V. Dubrov) (12)

Real and Imaginary Independence (Ye. Yermakov) (8)

Bulgarian Space Research Institute (9)
On SDI, a Madman and a Trillion (I. Kuznetsov) (7)
Western Portable Antiaircraft Missile Systems (V. Mikhaylov, R. Ivanov) (9)
SDI Faces Insurmountable Obstacles (M. Sergeyev, O. Frantsev) (11)
China's Space Program Described (V. Sirotin) (3)

Criticism and Bibliography

Emergence of Russia's Air Force (B. Aleksandrov) (2)
Contemporaries Tell the Story (G. Glabay) (6)
Manual on Space Medicine Reviewed (N. Gurovskiy) (7)
New Book on Applying "Human Factor" in the Military (1)
Space and Books (N. Kirdoda) (8)
Book Discusses Development of Air Reconnaissance (N. Korchevoy) (11)
Review of Book on SDI (I. Kuznetsov) (3)
Cosmic Prospects and "Star" Craze (N. Merkulov) (4)
"Space Russia" (Ye. Mikhailchenkova) (3)
For Those Who Will Read in Order to Build (A. Podgornyy) (6)

New Book on Rooting Out Religion, Superstitions in Military Personnel (2)

Columbus of the Universe (V. Rodikov) (6)
Voenizdat for the Aviation Reader (S. Smirnov) (6)
Heroic Journey (I. Khomenko) (1)
An Instructor's Arsenal of Methods (V. Yusov) (5)

COPYRIGHT: "Aviatsiya i kosmonavtika", 1987
11004

Articles Not Translated From AVIATSIYA I KOSMONAVTIKA, No 12, December 1987
91440066z Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 12, Dec 87

Searching for Effective Forms (pp 4-5) (V. Donets)
Flying Army Commander (Continued) (pp 14-16) (O. Nazarov, V. Sokolov)
An Officer's Youth (pp 24-25) (V. Bezborodov)
Who Is to Light the Torch? (pp 26-27) (A. Karpov)
Veterans (pp 30-31) (V. Kuznetsov)
Such a Brilliant Life (pp 38-39) (G. Mazurov)
Introducing Innovations Faster (pp 42-43) (P. Yemelyanov)

COPYRIGHT: "Aviatsiya i kosmonavtika", 1987
11004

END