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# USSR Report

MILITARY AFFAIRS

AVIATION AND COSMONAUTICS

No. 3, March 1984

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20 June 1984

USSR REPORT  
MILITARY AFFAIRS

AVIATION AND COSMONAUTICS

No. 3, March 1984

Except where indicated otherwise in the table of contents the following is a complete translation of the Russian-language monthly journal AVIATSIYA I KOSMONAVTIKA published in Moscow.

CONTENTS

Konstantin Ustinovich Chernenko (p 3)  
(Not translated)

Summary Report on Plenum of the Central Committee of the Communist Party of the Soviet Union (p 4) (not translated)

Speech by CPSU Central Committee General Secretary Comrade K. U. Chernenko (pp 4-7) (not translated)

Speech by CPSU Central Committee Politburo Member and Chairman of the USSR Council of Ministers Comrade N. A. Tikhonov (pp 6-7) (not translated)

Remarks by CPSU Central Committee Politburo Member and CPSU Central Committee Secretary Comrade M. S. Gorbachev (p 7) (not translated)

Proclamation by the CPSU Central Committee, Presidium of the USSR Supreme Soviet, and USSR Council of Ministers to the Communist Party and the Soviet People (p 8) (not translated)

Officers Discuss Ways to Improve Air Force Unit Performance (pp 11-13)  
(A. Shestakov and A. Mikhaylov) ..... 1

Improved Political Indoctrination at Air Force Schools Urged (pp 14-16)  
(L. Batekhin) ..... 8

Problems With Low-Level Intercepts Analyzed (p 17) (A. Zhilin) .....	15
Promoting Active Komsomol Innovation Effort (pp 18-19) (N. Chebotarev) .....	17
Titov Reminisces About Gagarin (pp 20-21) (G. Titov) .....	22
Preventing Rotor Lugging on Hot-Climate, Mountain-Terrain Missions (p 22) (S. Borodkin) .....	28
Reasons for Failed Bombing Run Analyzed (p 23) (Yu. Andronov) .....	31
The Very First.... (pp 24-25) (Not translated)	
Confidence (pp 26-27) (S. Kovalenko) (not translated)	
Lock of Gray (p 28-29) (A. Lapshin) (not translated)	
Efficiency Improvements at Aircraft Overhaul Plant Described (pp 30-31) (N. Zheludkov and A. Rykunov) .....	34
Reader Responses to Article on Breaking in Newly-Commissioned Officers (pp 30-31) .....	37
Signal Battalion Commander Discusses Ways to Improve Training and In- doctrination (pp 32-33) (A. Doronin) .....	40
Bookshelf (p 33) (Not translated)	
Rescuing the Chelyuskin Expedition (pp 34-35) (O. Nazarov) (not translated)	
Colonel Elected Deputy to Local Soviet (pp 36-37) (M. Savin) .....	44
Way to Estimate Pilot Attention Distribution Capability Described (p 37) (V. Sokolov and B. Frantsen) .....	48
Squadron Readies For Tactical Air Exercise (p 38) (V. Makarov) .....	51
Recollections on Career of Aircraft Designer Il'yushin (pp 39-41) (V. Lebedev) .....	54

Bookshelf (p 41) (Not translated)	
Components of Political Officer's Success Described (pp 42-43) (N. Antonov) .....	61
Gagarin's Widow Reminisces About His Career (pp 44-45) .....	67
To the Trailblazer of Space (p 45) (V. Goncharuk) (not translated)	
Helicopter's Future Battlefield Combat Role Considered (pp 46-47) (M. Fesenko) .....	71

## OFFICERS DISCUSS WAYS TO IMPROVE AIR FORCE UNIT PERFORMANCE

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 3, Mar 84 (signed to press 2 Feb 84) pp 11-13

[Article by Military Pilot 1st Class Col A. Shestakov, aviation regiment commander, and Military Navigator 1st Class Lt Col A. Mikhaylov: "On the Road Toward Combat Expertise"]

[Text] Teaching troops that which is essential in war -- this fundamental principle of organization of combat and political training of Soviet military personnel is assuming particular significance and urgency in a situation where U.S. imperialist circles and their imperialist NATO partners are making every effort to whip up a war psychosis, are escalating the arms race, and have virtually placed the world on the edge of a nuclear catastrophe.

We aviators have been entrusted with first-class combat equipment and formidable weapons for the purpose of protecting peace on earth. The men of our regiment are clearly aware of their enormous responsibility to the party and Soviet people for reliable defense of socialist achievements. Pilots and navigators, engineers and technicians, as well as support subunit specialists are focusing all their efforts on expert mastery of equipment and weapons, on their efficient employment in any and all conditions, and on strengthening discipline and increasing vigilance and combat readiness. Properly organized and arranged training facilities and methodological training foundation, continuous and effective party-political support, and efficient operations by headquarters staff, technical-engineer and rear services are most important conditions for accomplishing the combat training tasks assigned to personnel. The formula equipment-aerodynamics-tactics encompasses principal and indivisible components of air proficiency and clearly defines the sequence of professional training. It is a task of exceptional importance to equip the combat pilot with thorough knowledge of his weapons and equipment, the aerodynamics of the aircraft he flies, to teach him to do an excellent job of flying in all conditions, day and night, skillfully to employ tactical devices and modes of delivering strikes, skillfully to penetrate "hostile" air defenses, efficiently to work in teamwork and coordination with ground troops, and to bomb, strafe and fire missiles with accuracy and precision in the face of active countermeasures.

Last year our unit's aviators achieved definite successes. As experience has shown, training facilities established in conformity with today's demands were

an important contributing factor. As we know, facilities constantly need renovation and upgrading. It is also very important to project the future utility of facilities and capability to make changes in instructional aids and materials which are dictated by new tasks.

The following question was raised at a meeting of the unit methods council: how can we have existing display stands, equipment models and simulators be maximally simple, take up less room in the training building, and at the same time produce more benefit and utility? In the preparation of instructional aids one can proceed either in the direction of basic engineering, as they say, that is, one can use them to demonstrate in detail the majority of the processes taking place in equipment units and assemblies, or one can provide graphic demonstration only of those components knowledge of which is essential to aircrews in performing specific in-flight tasks.

The advantages of the former lie primarily in the fact that it enables one to study aircraft equipment thoroughly and in detail. Not only preparation of instructional aids, however, but perception of the instruction material as well become considerably more complicated thereby. Another problem is unavoidable here -- placement of explanatory text and notations on electronic display stands. As experience indicates, abundant use of these does not simplify but complicates visual perception of information. Therefore the regimental methods council decided to replace textual or letter designations with symbols. This has made it possible to achieve more graphic presentation. As a result aviation personnel more rapidly memorize the locations of the equipment being studied and more easily grasp the essence of the aerodynamic processes and interaction of systems and units. Display stands are at the same time used as training simulators in order to improve the job skills of flight personnel. Aircrews use these simulators to reinforce skills in working with cockpit equipment and practice emergency procedures. Many display stands, such as those in the tactical training and air traffic control classrooms, for example, are fashioned according to the principle of electronic games.

The flight training, navigator training, and moral-psychological training classrooms were virtually rebuilt, as was the performance monitoring classroom, which enables specialists, commanders and pilots not only to determine instances of deviations from flight configuration but also to predict efficient performance by aircrews and aircraft equipment. Performance monitoring record materials are analyzed quickly with the aid of an electronic computer and the Luch-74 system.

In order to enable flight personnel, engineers and technicians to study aircraft systems thoroughly and in detail, the command authorities, party committee and methods council decided to set up engineering training classrooms in all occupational specialties. Thus a uniform training complex was established, with a unified concept and subject-matter linkage.

As we know, success in any endeavor depends primarily on its organization and support, available manpower and resources. The following term is employed in industrial production: effect of utilization of limited resources. In the final analysis its significance boils down to achieving maximum effectiveness of

designated program implementation with the least expenditures of labor resources. The regimental command and party committee, having discussed in advance the extent and nature of forthcoming activities, proposed a rough plan and set up an initiative team consisting of experienced pilots, navigators, engineers, and technicians. In addition, a special team focused on executing technical schemes while producing an attractive appearance. It successfully accomplished its task. Reequipping of the training facilities was completed precisely on schedule. Firm follow-through on the part of personnel as well as good organization and unrelenting party-political work helped achieve success.

In connection with an increased danger of war, which has become sharply aggravated through the fault of the Reagan Administration, we have reviewed our requirements on moral-psychological training of aircrews and evaluation of their actual level of preparation. We have resolutely eliminated unoriginal training missions, have waged an aggressive campaign against the slightest manifestations of unnecessary situation simplification and have reduced to a minimum departures from reality in flight training activities and at tactical air exercises. Good results are achieved with combining of training missions filled with instructive tactical solutions. When preparing for flight operations, each aircrew independently formulates a solution in conformity with its degree of proficiency and the assigned mission, simulates several solution variants, and verifies them on game simulators with maneuvering and combat employment.

More stringent demands on combat training and flight operations safety have enabled us to reveal serious deficiencies in training methods proper. The principal deficiency lay in the fact that certain subunit commanders proved unprepared to function in these conditions. It was decided to hold supplementary theory classes on a specially prepared training program and to reinforce acquired knowledge on commander training flights. The results of these measures were thoroughly discussed by the methods council, after which we held a tactical flying conference. New instructional methods aids were prepared on the basis of recommendations, for teaching aircrews in light of present-day demands on the conduct of combat operations. Flight personnel became convinced that following thorough preparation and innovative simulation of scheduled missions, one can successfully accomplish tactical missions of any complexity. As a result there has been an appreciable increase in aircrew initiative and interest in innovative quest. Marksmanship competitions have also fostered this. Crews were first graded on theoretical problem solving, and subsequently for results of combat employment. At the present time marksman performance standards are constantly being met by many other crews in addition to confirmed marksman crews.

A well organized training process has made it possible substantially to improve the job skills of flight personnel, engineers and technicians. For example, the average mark on flying technique and tactical performance has risen to 4.6-4.7. Thanks to efficient utilization of training-methods facilities, combat training performance marks for crews in the second and third year of training have reached a steady 4.6. These figures have been confirmed by the results of tactical air exercises in which subunit flight personnel have participated. Regular classes and drills in engineer training classrooms have made it possible to surpass performance standards in readying aircraft for training sorties.

The high demands placed on quality of flight personnel air, weapon, and tactical training proficiency also presuppose strict responsibility for flight operations safety. This means that there should not be even the slightest elements of unnecessary situation simplification in combat training. The better aviation personnel know the equipment, aerodynamics, and tactics, the greater their proficiency in flight performance in a difficult weather and tactical situation, the greater flight safety will be. At the same time, as experience indicates, a regular, systematic preventive effort is essential. By this we mean continuous analysis of crew performance in the air, utilizing flight recorder data, the holding of conferences on safety procedures, monthly reports by subunit leader personnel, work with individual aircraft commanders, and informing personnel on instances of errors and mistakes by crews and ground maintenance specialists.

Checking crew readiness for flight activities also merits serious attention in this connection. Previously a commander would usually ask a question, which as a rule would be answered by the person who best knew the answer. Practical experience has rejected this method. Now every crew member reports on his actions in response to the scenario, proceeding from his job duties and interaction with other crew members. We shall frankly state that at first some crews were grounded due to inadequate knowledge. At the present time such instances are extremely rare and are viewed as a highly unusual occurrence.

Everyone is familiar with the role played by post-mission debriefing and critique in the process of flight personnel training and indoctrination. We can state with confidence that the result of a forthcoming flight depends in large measure on the degree of methodological competence to which the preceding training sortie was analyzed. This is an innovative activity, and every commander introduces something of his own, connected with the specific features of performance of flight assignments in the subunit or regiment. We reached the conclusion that post-flight critique and analysis should be conducted in the form of an informative exchange among flight personnel. Each crew independently analyzes faulty actions and subsequently announces results to all flight personnel. A mark is determined according to the following principle: correct -- the critique hit all points correctly; incorrect -- amendments are immediately made. At the post-flight critique the regimental commander addresses only main items pertaining to organization of flight operations and summarizes performance for each detachment.

Chain-of-command measures, purposeful party-political work, and a lively exchange create a positive psychological attitude in flight personnel promoting successful performance of combat training missions and form strong confidence in the reliability and excellent combat capabilities of their aircraft, and generate the endeavor to surpass the potential adversary in professional expertise and moral staunchness. Political rallies are held for this purpose, and the regimental colors are brought out prior to departure for a tactical air exercise. Officer-leaders, party activists and combat veterans of the Great Patriotic War appear on local radio.

The unit party committee, headed by Military Navigator 1st Class Maj V. Minin, devotes constant attention to strengthening and building upon fighting

traditions. For example, in the period of preparation for exercises in coordination with other branches of the Armed Forces, the party committee organizes get-togethers with representatives of the branches of service. The comrades-in-arms exchange know-how and relate to one another the specific features of tactical procedures, the fire and maneuver capabilities of their equipment. Personal contacts and exchange of advanced know-how foster mutual understanding. Get-togethers with famed pilots, engineers and technicians at the combat glory museum leave a deep imprint in the memory of young aviation personnel, call upon them to accomplish new labor and combat feats for the glory of the homeland, and inspire them to further successes in combat and political training.

The party committee is doing a great deal of work to implement the guidelines of the 26th CPSU Congress and the demands of the June and December (1983) CPSU Central Committee plenums, and USSR Minister of Defense MSU D. F. Ustinov, member of the CPSU Central Committee Politburo, on increasing combat readiness, improving military skills, and indoctrinating military personnel in a spirit of total dedication to the Communist Party and Soviet people, readiness and willingness to carry out to the end their internationalist and constitutional duty to defend the achievements of socialism.

In order successfully to accomplish these tasks, it is necessary effectively to utilize amassed experience and know-how, constantly to increase the activeness of party and Komsomol organizations, to boost their militance, integrity, rigorously and consistently to carry out adopted decisions. At first everything did not go smoothly with us. In the subunit party organizations there were cases of squelching of criticism, and nonspecific items were placed on the agenda at meetings. The party committee thoroughly scrutinized the activities of subunit party organizations and began working more closely with their secretaries. At meetings party members now speak frankly, make meaningful suggestions and, regardless of positions held, boldly criticize those who make mistakes, averting the slightest deviations from Leninist standards of party affairs. As a result the frankness and firmness, criticism and self-criticism have taken on a genuinely businesslike, aggressive character. Mutual demandingness on the part of Communists has increased, and the moral microclimate has improved.

For example, the work style of headquarters party buro secretary Maj V. Lyaskovskiy is distinguished by an innovative approach to handling each matter, as well as by firmness and integrity. As a result of purposeful work by the party committee and subunit party organizations, Communists have taken a more responsible attitude. Now personnel perform all tasks always with a high quality of performance. In the past training year personnel received the highest mark in political training. Mass sports activities also received the highest mark at the Armed Forces inspection review. Constant concern about improving living conditions and well-organized, beneficial leisure-time activities help officers, warrant officers, and all personnel in their performance of duty.

Selection of candidates for promotion to command slots is of considerable importance in achieving a high degree of combat readiness and properly organizing subunits. Command authorities handle this most critical matter in close contact with the party committee and subunit party organizations. Many years of

practical experience have demonstrated the advisability of preliminary testing of candidates for promotion in volunteer activist work. This work best shows their ability to organize people, to mobilize them for accomplishing assigned tasks. As a rule those who have been put to such a test have adjusted more rapidly to their new position and have gained the professional respect of their men. And the very fact of promotion of a party activist who has already learned the ability to work with a group is perceived by personnel as right and proper.

Advance preparation of candidates produces positive effect. They become involved in preparing flying methods materials and visual aids, they perform promotion-slot duties on a trial basis, and they take part in commander flight activities, where they go through an instructor program. Each is assigned an experienced instructor from regimental leader personnel. And although this undertaking requires attention and considerable effort, this approach is proving to be extremely effective. For example, military pilots and navigators 1st class Maj V. Voronkov and Capts V. Pospelov, G. Ashikhmen, D. Maslyakov, and N. Matushevich, who have gone through this training, were able rapidly to bring their subunits among the ranks of leading performers.

Practical experience indicates that if a commander ceases to heed the voice of the military community and endeavors to resolve all matters on his own, he inevitably experiences setbacks and sometimes makes serious mistakes as well. Capt V. Milyutin was once appointed detachment commander. An aircraft commander, he did an excellent job of flying and successfully performed flight assignments. Prior to his promotion to a higher position many party members warned that this officer was inclined to take liberties in his conduct and in relations with his comrades. Unfortunately this warning was ignored. And from the very outset Milyutin took an oppositional posture toward the collective. The subunit took ill, as they say. Combat training performance results appreciably declined, and discipline violations became more frequent. Milyutin's arrogance, dishonesty, excessive pridefulness, and cavalier attitude toward his duties caused a great deal of problems for the squadron and regimental command authorities. Ultimately the inevitable happened. Captain Milyutin was guilty of a gross violation of discipline, was grounded, and was transferred to another unit and demoted. This was a valuable lesson for all the regiment's leader personnel.

As we know, combat readiness is inconceivable without well organized engineer and technician support. A large contribution to malfunctionless operation of aircraft is made by the team of engineers and technicians headed by Engr-Maj V. Mel'sitov. A demanding superior, a thoughtful educator, and an outstanding specialist, he intelligently organizes the training and indoctrination process and skillfully relies on the party organization. An innovative, businesslike atmosphere has been created in the outfit, and proper interrelations and procedures are maintained, as specified by regulations. Now all technical subunits perform their job with better quality.

Before a tactical air exercise the aviation engineer service was put to the test. It was necessary to make the aircraft ready in an exceptionally short period of time. The command authorities and party organization mobilized the men for

shock-work labor. Work was conducted around the clock on a sliding schedule prepared in the technical maintenance unit. The aircraft were ready on schedule. Not a single aircraft was pulled out of service during the crews' participation in the tactical air exercise, which was held far from their home field. Capt Tech Serv A. Demin, regimental technical maintenance unit party buro secretary Sr Lt Tech Serv. A. Korotkiy, Engr-Sr Lt V. Yerukayev, and others distinguished themselves with an excellent job.

The commander in chief of the Air Forces decorated Engr-Maj O. Shevtsov and Engr-Capt T. Yukhimenko for exemplary performance of duty and excellent maintenance and servicing of equipment. In the last three years 6 men in this regiment have been awarded the "For Service to the Homeland in the USSR Armed Forces" medal, 10 have been awarded the Medal for Meritorious Service, and 6 officers have received early rank promotions.

Three months of the new training year have passed. The pace of socialist competition, under the slogan "Be alert, constantly prepared to defend the achievements of socialism!" is picking up. We are competing with a brother regiment. Our men are filled with resolve honorably to live up to the confidence placed in us by the Communist Party and fully to meet socialist pledges in competition for further increasing vigilance and combat readiness.

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## IMPROVED POLITICAL INDOCTRINATION AT AIR FORCE SCHOOLS URGED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 3, Mar 84 (signed to press 2 Feb 84) pp 14-16

[Article, published under the heading "Implementing the Decisions of the 26th CPSU Congress," by Col Gen Avn Leonid Lukich Batekhin, military council member, chief of Air Forces Political Directorate: "Boosting Effectiveness of Party Influence at Air-Force Higher Educational Institutions"]

[Text] The officer corps is the foundation, the backbone of the USSR Armed Forces. The Communist Party and Soviet Government attach great importance to its continuous strengthening. The party considers tireless concern with preparing army and navy command, political and engineer-technician cadres who are totally dedicated to the cause of communism, cadres enlisted from the finest representatives of the Soviet people, to be an important program task. Military educational institutions play a determining role in accomplishing this task.

Today's military specialist of any field of specialization must have the ability to work effectively in a rapidly-flowing stream of political and scientific information, must continuously boost his level of professional qualifications, and possess an acute sense of the new. We are focused precisely on this by the decisions of the 26th CPSU Congress, the June and December (1983) Central Committee Plenums, and the CPSU Central Committee and USSR Council of Ministers decree entitled "On Further Development of the Higher School and Improving the Quality of Training of Specialists."

In recent years a number of measures have been undertaken at Air Forces higher service schools and academies, which have made it possible appreciably to improve the quality of ideological-political and psychological training of officer cadres and to ensure conformity between the training and indoctrination process and the present level of development of military affairs. The present stage of societal and scientific-technological development, however, advances before military educational institutions many new and critically important tasks proceeding from an international situation which has become extraordinarily more complex. Today, in conditions of increasing danger of war through the fault of aggressive imperialist circles and all-out "psychological warfare" unleashed by our ideological adversaries with the aim of undermining our moral-political underpinnings, there is a more acute need than ever before to intensify

Communist indoctrination of officer cadres and to enhance the role of the higher school precisely as a workshop in which to forge out party political warriors and ardent Soviet patriots.

At the end of last year, at a methods conference for command and administrative personnel at Air Forces military educational institutions, the Air Forces Political Directorate analyzed in detail the current status from this position and synthesized work experience at military educational institutions in the area of organization and conduct of the teaching and indoctrination process, on boosting the level of ideological-political indoctrination and professional training of enrolled personnel and staff members, on strengthening military discipline, and on further improving leadership style and methods in light of the CPSU Central Committee and USSR Council of Ministers decree entitled "On Further Development of the Higher School and Improving the Quality of Training of Specialists."

This decree indicates specific ways to improve the quality of professional specialization training, to increase the effectiveness of Communist indoctrination of cadres, and to raise the level of teaching the sociopolitical and specialized disciplines. Its principal points turn to the future and focus on enhancing the role of higher educational institutions in our country's affairs and increasing their responsibility for Communist indoctrination of the younger generation.

We believe that selection of the present time as the moment to intensify analysis of the state of party-political work at higher educational institutions, almost five years after issuance of the CPSU Central Committee and USSR Council of Ministers decree on the higher school is most timely. The path we have traveled in the intervening years has enriched us with experience in training ideologically conditioned officer cadres who are dedicated to the party and has shown the advantages and drawbacks of new plans and programs. We have verified our ability, as it were, to foresee the requirements which practical realities impose on military cadres at each new stage. Participation by new graduates of Air Forces schools and academies in exercises and maneuvers and in mastering the newest aircraft equipment and control systems has become an important test of combat maturity for young officers. At the same time considerable reserve potential was revealed in the area of further increasing party influence at Air Forces higher educational institutions, refining and reinforcing the most effective forms and methods of party-political work, which have produced good practical results.

In view of the importance of these problems, in the last academic year the Air Forces Political Directorate deeply and thoroughly studied progress in implementing the CPSU Central Committee and USSR Council of Ministers decree on the higher school at several pilot and engineering schools, as well as at political school, navigator school, and technical school. The conclusions were discussed at meetings of military educational institution party activists, leader personnel conferences, and in political agencies, and therefore one is fully justified in considering them collectively devised and adequately substantiated.

One should acknowledge as of primary importance and indisputable the fact that the aviation officer cadres training system has undergone further development in the years since this decree was issued. This has been expressed primarily in the fact that the specific guidelines and criteria of service school graduate job proficiency have come much closer to the demands of contemporary warfare. There has been a substantial rise in the level of party-mindedness of teaching. A more expedient correlation has been established between courses in theory and practical subjects.

Increased attention at many Air Forces higher educational institutions toward the process of forming and shaping the character and personality of the enrolled student and officer cadet as a leader and indoctrinator of subordinates, as an aggressive champion of party policy and bearer of party ideas has become fundamental in implementing the requirements of the CPSU Central Committee and USSR Council of Ministers decree on the higher school. Today we consider precisely further improvement of training-indoctrination and party-political work aimed at developing in graduates of Air Forces academies and schools skills in teaching and indoctrinating others to be a guarantee of further successful accomplishment of the large and critically important tasks facing the Air Forces.

Positive experience has been amassed at the Air Force Engineering Academy imeni N. Ye. Zhukovskiy. Carrying out the party's demands, the academy administration, political department, and party organizations are exerting effective influence on all aspects of teaching and indoctrination of enrolled personnel as future comprehensively prepared engineers. This is achieved by means of close interaction among all party components of faculty and student bodies, by the growing militance of party organizations and by increase in the personal responsibility of each and every Communist for carrying out his party and job-related duty.

Occupying the center of attention of the academy administration, political department, faculties and departments, and party organizations are matters pertaining to developing a scientific ideological outlook in enrolled personnel, matters pertaining to their Communist indoctrination, and developing in them strong political awareness, a feeling of class hatred toward the enemies of socialism, and the ability to expose anti-Communist notions and the fabrications of bourgeois ideologues.

The political department shows particular concern for improving the work of the social sciences departments and their party organizations. Matters pertaining to teaching history of the CPSU, Marxist-Leninist philosophy, political economy, scientific communism, and party-political work in the Soviet Armed Forces have repeatedly been the object of special study and detailed discussion at meetings of the academy council and in party organizations.

In this past academic year, for example, the political department analyzed the performance of the department of Marxist-Leninist philosophy and scientific communism, headed by Doctor of Philosophical Sciences and Professor Maj Gen Avn V. Khalipov. The Communists in this department display constant concern with the ideological-theoretical and methodological preparation of students graduating from the academy. The directional thrust of a number of scientific research projects and publications of this department also helps increase their knowledge.

While noting positive points, the officers of the political department at the same time revealed errors of omission as well. It was acknowledged necessary to increase attention by party members toward organization of independent study of primary sources by enrolled personnel, as well as to teach them in a more practical and substantive manner the ability to expose the fabrications of bourgeois ideologues. It was recommended that this department and other social sciences departments strengthen their contacts with the specialized departments and give them practical assistance in ensuring a high level of party-mindedness of instruction.

At the academy they also concerned themselves with equipping students with knowledge of and skills in party-political work. In their lectures instructors endeavor thoroughly to present the fundamentals of party organizational development, the forms and methods of a comprehensive approach to indoctrination, ways to transform party organizations into a center of daily ideological-political activity, and show the role and place of the engineer-Communist in the life of the military outfit. Students acquire certain skills in teaching and indoctrination at seminar classes. Taking part in such classes, they prepare reports, papers, and learn propagandist skills. They also perform individual assignments: they prepare sample party-political work schedules for maintenance day and during conduct of preventive and routine maintenance on aircraft equipment in the technical maintenance unit, and they specify party-political measures directed toward support of alert duty missions by aviation engineer service specialists. They also become acquainted with experience in preparing technical evenings, technical quizzes, and with methods of analyzing disciplinary practices. All this unquestionably helps develop in students the requisite skills in the conduct of political-indoctrination work with subordinates.

Student practical training assignments in line units help reinforce the theoretical knowledge acquired at the academy. In line units they have the greatest opportunity to expand their knowledge of how training and indoctrination of aviation personnel is conducted. The political department in turn continuously studies and analyzes everything done by students as future leader-engineers and indoctrinators in line units. Such study helps steadily improve training-indoctrination and party-political work at the academy and helps improve the entire academic process.

Implementing the CPSU Central Committee and USSR Council of Ministers decree on the higher school, the academy authorities and political department devote unrelenting attention to ensure that every instructor broadens his political and cultural knowledgeability, serves as an example of excellent Communist moral fiber and displays an example of an innovative attitude toward labor, moral purity and nobility. Among the academy's leading scientists, officers and general officers who are distinguished by these qualities, we should like to mention USSR Academy of Sciences Corresponding Member A. Krasovskiy, Doctors of Technical Sciences and Professors N. Kazakov, Ye. Rummyantsev, A. Tarasenkov, M. Nisht, and V. Tikhonov, and Doctor of Historical Sciences Professor V. Bruz. It is characteristic that in the course of their classes they always devote attention to imparting to their students knowledge of the administrative and indoctrinational functions of the aviation engineer.

A great deal of positive experience in this regard has also been amassed in political agencies at other Air Forces higher educational institutions. Synthesis and dissemination of diversified experience and know-how is one of the effective ways of improving the activities of Air Forces academies and schools.

On the whole aviation higher educational institutions today are working more persistently and consistently as an important element which links the party's political strategy with the practical activities of the Air Forces as a branch of the Armed Forces and are making an important contribution toward integration of military aviation science and troop combat training.

One can consider what has been achieved, however, merely as a first stage in implementation of the CPSU Central Committee and USSR Council of Ministers decree on the higher school. The activities of higher schools, and particularly military higher schools, constitute primarily a political, class domain. We must pass on to each new generation of officers first and foremost our ideology, our revolutionary and fighting traditions, our social organizational structure, and we must entrust to them the fate of our advanced societal system. In this regard our higher educational institutions, which are a binding link between generations within the officer corps, determine the future of the Air Forces, and particularly the power of their principal weapon -- indomitable moral-political spirit on the part of the winged defenders of the homeland.

A matter of concern to the Air Forces Political Directorate in this connection is the fact that a certain segment of our young officers -- yesterday's military educational institution graduates -- displays such negative traits as lack of discipline, negligence in performing job-related duties, dishonesty, lack of respect for their elders, and lack of attention toward their comrades. This is a result of a serious failure on the part of leader personnel, political agencies, and party organizations at Air Forces higher educational institutions.

I believe that those political agencies are wrong which are endeavoring to utilize only line officers, without the participation of the instructor, the principal figure at the military educational institutions, to develop positive traits in students and officer cadets, to strengthen discipline and organization among enrolled personnel. But such facts are observed at the Balashov and at the Voronezh aviation schools. Many department specialists have been removed from indoctrination work. At engineering schools some departments make little effort to develop in students skills of technological discipline. At pilot schools matters pertaining to discipline in planning, organizing, and executing flight operations are unwarrantedly rarely addressed in work with pilot cadets. At a number of schools there is an obvious underrating of the teaching of the fundamentals of legal training -- a new, specially introduced subject.

It is a well-known fact that the instructor is the principal figure at the military higher educational institution. It is precisely the instructor who is called upon to provide students not only with thorough knowledge in their subjects but also to help them form correct ideological positions, political, moral-psychological, and job-related qualities. The Soviet military educator, regardless of the subject he teaches, stands on the front lines of the ideological front and is an active bearer of the party's ideas and policy. This is why

concern about the ideological-theoretical conditioning of faculty personnel and enhancement of their role in the political, military, and moral indoctrination of students is in our opinion a most important area in the activities of political agencies and party organizations at Air Forces higher educational institutions. Their attention should presently be focused on a high degree of organization, high level and effectiveness of Marxist-Leninist preparation of teaching cadres, thorough study by educators of the ideological and military-theoretical legacy of V. I. Lenin and the materials of the 26th CPSU Congress, the June and December (1983) CPSU Central Committee plenums, and the special CPSU Central Committee Plenum held in February of this year.

In the interests of enhancing the ideological directional thrust of the teaching and indoctrination process at Air Forces higher educational institutions, it is essential to strengthen the role and influence of the social sciences departments on ensuring party-mindedness in teaching military and special subjects.

It is regrettable that at some of our higher educational institutions proper order and procedure are not maintained, instruction time is squandered, and lack of oversight is observed. All this substantially diminishes the effect of ideological-indoctrination measures. The noted shortcomings, however, fail to be firmly censured by certain political agencies and party organizations.

Work with pilot-instructors should be substantially improved. These people make up more than half of the entire teaching faculty at a school for pilots. And greater attention should be directed toward them. The absolute majority of flight instructors are recent school graduates and officers activated from the reserves. And yet at many places party organizations are devoting unwarrantedly little attention to indoctrination of the pilot-instructor as a military educator. At the Chernigov Higher Military Pilot School imeni Lenin Komsomol, for example, party organizations have relaxed oversight over development of the flight instructor as an educator, psychologist, and methods specialist. At this school they very rarely examine morale in the flight training groups. Some pilot-instructors are not clear about the end objective of indoctrinational effect proper on the pilot cadets, are unable to introduce a spirit of party-mindedness into flight training, and are guilty of treating their students in a manner contrary to regulations.

We feel that political agencies and party organizations of military pilot schools should address these matters. There is plenty of reserve potential here for increasing the effectiveness of party-political work conducted with the participation of administrative personnel and faculty.

In forming and shaping the cadet as a military man, one should not underrate the role of the line officer: the course director, the platoon and company commander. Unfortunately some political agencies and party organizations at military educational institutions presently devote unwarrantedly little attention to work with this category of indoctrinator.

Instilling commander qualities and firm skills in political-indoctrination work in officer cadets is also an important problem. Most schools currently lack a specific system for resolving it, however. And although it exists in formal

terms (officer cadets carry out various measures), nevertheless a love for party-political work is not being instilled in everybody. It is appropriate to note that pilot schools are presently not devoting adequate attention to advance preparation of officer cadets who show promise of becoming political workers in the future. Political agencies, party and Komsomol organizations of pilot schools also play a major role in this important area.

The political countenance of future officers is determined in significant measure by the fact that many of them link their lives with the Leninist party while still in school. In the last 5 years more than half of our pilots and one out of every two navigators and aviation engineers of the total number of graduates have joined the party.

Selection into the party and indoctrination of young Communists at our military educational institutions is on the whole being accomplished as it should be. But there also exist shortcomings which demand close party attention. In particular, in a number of places a quantitatively large acceptance of officer cadets in the party is not always accompanied by concern with purity of candidate selection, and their indoctrination is allowed to drift. Local party members should draw the appropriate conclusions from this.

Political agencies play an exceptionally important role in accomplishing the critically important tasks facing Air Forces higher educational institutions. One of the important areas of their activity today consists in the necessity of mastering modern methods of scientific analysis of the diversified processes in the life and activities of military outfits, as well as methods of scientific organization of the ideological indoctrination process. "Our successes," CPSU Central Committee General Secretary Comrade Yu. V. Andropov stressed in his address at the December (1983) CPSU Central Committee Plenum, "will depend to a decisive degree on mobilization of the masses and an innovative attitude by people toward the assigned task...."

While holding in high esteem the noble and difficult mission of our outstanding teaching cadres, and while duly aware of the party-political work being carried out at Air Forces higher educational institutions, at the same time we are counting on the large detachment of commanders, political workers, party and Komsomol activists intensifying the search for ways to accomplish its further improvement. The quality of accomplishment of the large and complex tasks facing the Air Forces will depend in large measure on the degree to which each of these persons becomes permeated with a strong sense of responsibility for steady improvement in the effectiveness of the party-political work performed at higher educational institutions.

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## PROBLEMS WITH LOW-LEVEL INTERCEPTS ANALYZED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 3, Mar 84 (signed to press 2 Feb 84) p 17

[Article, published under the heading "For a High Degree of Combat Readiness," by Capt A. Zhilin: "Why the Intercept Failed"]

[Text] Military Pilot 2nd Class Capt V. Sysoyev scrambled to intercept an air target.

"Zero two six, heading.. altitude....," radioed the tactical control officer.

"Ten degrees right. To target....," the command post radioed several minutes later.

After making a heading adjustment, Sysoyev spotted and identified the target. Determining that the target was an "aggressor" aircraft, he pressed the "Lock-On" button at the prescribed range. Verifying range to target from command post and radar sight information, the pilot prepared to fire missiles. But when only a few seconds remained before pressing the firing button, he was suddenly ordered by the command post: "Terminate mission. Altitude...."

At first Captain Sysoyev could not understand why he was being ordered to break off the attack, for all that remained was to bring the target into the circle and push the firing button. The reason hit home when he glanced at his altimeter. In chasing after the target blip, the pilot had stopped monitoring his gauges and had dropped below minimum altitude.

Why had this become possible? Obviously the captain had considered that the main thing was promptly to execute ground commands, that the tactical control officer would guide the fighter to the target. This cavalier attitude had led to a gross error.

Analyzing mistakes made during low-level intercepts, the people in the subunit reached the conclusion that errors frequently occur due to the fact that some pilots rely entirely on the command post and sometimes fail to check flight configuration and guidance on their instruments. Assuming that the tactical control officer will do the bulk of the job of detecting the target and guiding the interceptor to it, they would pay too little attention to preparation for

executing the exercise. As a rule they would work only on the terminal phase -- the attack proper. An intercept sortie, however, consists of a logical chain of closely interlinked elements. An error even in a single one of the links of this chain will affect in one way or another the quality of execution of the subsequent element. For example, if a pilot has incorrectly maintained the specified parameters as he heads for the target, he will make the aiming process more difficult, which in the final analysis will affect effectiveness of his attack. Consequently the combat pilot should not break the flight down into principal and secondary segments, for otherwise errors cannot be avoided.

Most frequently errors occur during low-level air intercepts. The reason lies in the fact that the pilot is operating with tight time availability and must execute several operations at the same time. Some one action may very likely be omitted, because the pilot subconsciously is thinking about how to break off safely following the attack. The potential result is hasty aiming and failure to maintain the specified firing parameters. The pilot may sharply decelerate his aircraft with his dive brakes and throttle his engine back. This results in loss of swiftness of attack and diminishes probability of hitting the target.

The specific features of vectoring by instrument also affect the quality of execution of a mock combat sortie, for the pilot receives current information on the flight parameters from his gauges. The customary aural perception of commands from the ground is replaced with visual perception. Here some pilots are foiled by the inability correctly to distribute their attention across the panel. More time is required to read the instruments, analyze the readings, reach a decision, and execute a command. Errors are particularly substantial when the pilot delays in executing the final turn to the target and fails to maintain proper maneuver dynamics.

Can such errors be corrected? Of course they can. Thorough preparation on the ground for a training sortie is a guarantee of successful mission execution. Indicative in this respect is the example of Military Pilot 1st Class Capt A. Arkhipov. When preparing for mock combat sorties, he always thoroughly thinks through various situations which may develop in the air. He then practices mission procedures on the simulator, and asks his commander to give scenario instructions at the shortest possible time interval. In this way Captain Arkhipov teaches himself to operate in extreme conditions. Practicing on the simulator helps him correctly distribute his attention and helps him see his instruments not separately, but as a group, and enables him to read them with a single glance.

The experience of Capt A. Arkhipov and other combat pilots persuasively attests to the fact that when readying for a training sortie, a pilot should expect to encounter the "aggressor" in the most unexpected conditions. Then when he is actually in the air no command will take him unawares, and success of mission execution will be guaranteed.

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## PROMOTING ACTIVE KOMSOMOL INNOVATION EFFORT

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 3, Mar 84 (signed to press 2 Feb 84) pp 18-19

[Article, published under the heading "Anticipating the 5th Armed Forces Conference of Komsomol Organization Secretaries," by Capt N. Chebotarev: "The Ability to Lead"]

[Text] Various categories of young people should be more aggressively enlisted to scientific and technical creative achievement....

From the Komsomol Central Committee  
Accountability Report to the 19th  
Komsomol Congress

Night was falling. The glow of sunset was fading over the distant hills. A crescendo roar of jet engines could be heard from the airfield in the distance. Second-shift flight operations had commenced. Komsomol committee secretary Lt S. Popov neither saw nor heard any of this. Bent over a notebook containing the minutes of committee meetings, he was hastily filling one page after another with closely-spaced lines of handwriting.

A picture of bustling committee work activity was emerging: not a day went by without a technical quiz, a specific-topic evening function, a competition for the title of best specialist, a lecture or discussion. The impression was being created that work was going without a hitch and that the activists were laboring at full effort. The secretary devoted particular attention in the meeting minutes to technical innovation by the young aviation personnel. And there was good reason for this: they were expecting any day an inspection by a commission from the higher-echelon political agency of the job being done by the Komsomol committee to enlist Komsomol members and other young people into technical creative achievement.

Everything looked fine on paper. In actual fact, however, things were far from smooth, and Popov knew it. Therefore, arriving at the unit earlier than usual on the following morning, he hastily made his way to the subunit and endeavored to find out who of the enlisted men, noncommissioned officers, warrant officers and officers were actively taking part in innovator activities.

It is quite appropriate at this point to recall that the subunit Komsomol member-efficiency innovators had done a fine job on the previous evening. The specialists of the aircraft armament group led by young officer O. Dolgov had succeeded in reducing the time required to ready aircraft armament during the flight operations, utilizing a device they had designed and built. This new innovation, utilized by Lt K. Serov in performing an important operation on an aircraft, made it possible to free the services of two aircraft mechanics. The efficiency innovators received congratulations from the subunit commander and political worker. None of the Komsomol committee members, however, set about to disseminate the know-how of these leading performers.

An article by Maj S. Reutov entitled "Word Followed by Deed" (AVIATSIYA I KOSMONAVTIKA, No 2, 1984) raises in a timely manner the question of the role of the Komsomol secretary, an acknowledged and thoughtful leader of youth. He should be at all times among the men and have the ability to give advice in a timely manner and to listen to the opinion of his comrades, and frequently their just criticism as well. Incidentally, the absolute majority of our Komsomol secretaries perform precisely in this manner. Only a few create merely the semblance of busy effort. The discrepancy between word and deed on the part of such individuals is condemned by our military youth.

It is for good reason that it was emphasized at the 19th Komsomol Congress that Komsomol work should be permeated with businesslike efficiency, a scientific approach, and a high degree of demandingness, excluding any and all manifestations of smugness and complacency, excessive attention to form, and swagger. In reflecting on this matter, one cannot help but recall our vanguard Komsomol organizations. One of them is in the aviation unit in which Capt S. Rybalko serves. During the current training year the young aviators of this unit are successfully meeting their socialist pledges pertaining to devising and adopting efficiency-innovation suggestions. It is gratifying to note that more than 50% of the total number of proposed efficiency innovations are made by Komsomol members. Engr-Capt K. Marchenkov, who has submitted six valuable suggestions, Sr Lt G. Shadan, who is credited with four innovations, and Sr Lt V. Durnov, author of three innovations, have proven to be genuine enthusiasts of innovative quest. Devices adopted on suggestions submitted by Sr Lts V. Yegorov and R. Gubaydulin, Lt A. Lekomtsev, warrant officers A. Kulikov, V. Deykin, and others are bringing great practical help.

The Komsomol organization and its leader are skillfully guiding the innovative quest by efficiency innovators under the slogan "A high level of mastery of new equipment" toward further shortening of the time needed to make aircraft combat-ready, toward improving the quality of aircraft servicing and maintenance, and toward improving training facilities. Komsomol activists provide an example. A set of devices devised by Sr Lt R. Gubaydulin, Lt A. Lekomtsev, and Jr Sgt F. Sukhonos, for example, makes it possible to cut almost in half the amount of work involved in checking aircraft equipment in field conditions. An efficiency innovation suggestion by officer V. Durnov and WO V. Deykin is helping achieve a significant decrease in the time required to perform handling operations in readying aircraft ordnance. A method of determining an aircraft's heading on the ramp, suggested by Sr Lt B. Saranov and Engr-Maj D. Malanov, also proved interesting. This method is making it possible to shorten the time required to ready aircraft systems to go out on another sortie, and accuracy of aircraft navigation is improved.

Komsomol activists devote considerable attention to improving winter aircraft servicing and maintenance. For example, implementation of a suggestion submitted by technical maintenance unit Komsomol organization secretary Engr-Capt K. Marchenkov is making it possible to shorten the time required to fire up a service vehicle in cold weather. But innovator efforts are particularly focused on devising mechanisms and devices which make it possible successfully to ready aircraft for flight operations with a reduced number of ground crewmen. This was precisely the goal of officers V. Yegorov, K. Marchenkov, G. Shadan, and others. Adoption of an innovation devised by Senior Lieutenant Shadan, for example, frees three maintenance specialists in the performance of routine aircraft inspection and maintenance. A suggestion submitted by Engineer-Captain Marchenkov and Warrant Officer Kulikov produced a like result.

One cannot help but ask the following question: what is the secret of such successful accomplishment by unit Komsomol members of pledges pertaining to stepping up youth technical quest and deepening of technical knowledge? I believe that one of the main conditions is purposeful, substantive activity by Komsomol activists, involvement of aviation personnel in efficiency innovation and invention activity, and creation in the Komsomol committee of a lively, innovative atmosphere, precluding predictable routine and excessive attention to form with consequent detriment to content. In this unit questions pertaining to youth technical innovation are regularly brought up for discussion by the committee and Komsomol meetings, and specific decisions are reached, aimed at increasing the productive capabilities of each and every Komsomol member and at developing a taste for efficiency innovation and invention activity. All this is done, as they say, not for the sake of a check mark in the plan but rather in the interests of the goal being pursued.

For example, in the course of competition for the title of best aircraft maintenance specialist, in which the men of all aviation occupational specialties took part, activists drew attention to the fact that advanced work techniques and employment of devices which economize in time and improve the quality of work on aircraft equipment greatly helped aviation personnel place high. The competition also helped reveal shortcomings. They promptly decided on the spot to synthesize and disseminate advanced know-how and to help everybody master innovative work techniques. In addition, on the commanding officer's advice it was decided to prepare the same devices which were used by the competition winners.

The practical, efficient work done by the activists produced clear benefit. When a tactical air exercise was held in the unit, the Komsomol-member aviation personnel readied aircraft for departure with excellent quality and extremely rapidly.

We shall long remember the exhibit of young aviation personnel technical innovation which was prepared and held according to the Komsomol committee plan. The authors of instruments and devices acquainted the men with their design and operating principles. Party-member aviation engineer service officers spoke to the men, telling them of the tasks which the innovators must accomplish. The best efficiency innovators were given awards. Following this measure, many Komsomol members began to take more active part in efficiency innovation activities.

How is a Komsomol leader able to combine performance of his job-related duties with participation in unit volunteer work and constantly be involved in development of aviation personnel technical innovation? After all, we know that there are dozens of occupational specialties in an aviation unit, and it is necessary to understand them and know the finer points and specific features of each. In my opinion one must take two elements into account here.

On the one hand, close contact with the commission on efficiency innovation and invention and with aviation engineer service officers helps the secretary accomplish his tasks pertaining to organization of youth activities. Every commission meeting with the participation of Komsomol activists becomes, as it were, a group consideration of ways to improve application of technical innovations and on devising the most effective directions and areas of efficiency innovation work. At one such commission meeting, for example, Captain Rybalko proposed enlisting the most active efficiency innovators in holding classes in technical study groups. Officers K. Marchenkov and V. Yegorov, genuine experts at their job, held several classes with young officers and junior aircraft maintenance specialists. The Komsomol members became interested and began engaging in technical innovation in a more purposeful manner and in making sensible suggestions. Lt A. Lekomtsev and Jr Sgt F. Sukhonos, for example, designed and built an instrument which makes it possible to check several aircraft systems at the same time. By using it one can save time employed in routine inspection and maintenance at an alternate field.

On the other hand success, including that of the secretary, is determined in large measure by continuous technical self-education, by persistent efforts to expand one's knowledge, and by competence in technical matters. Officers Rybalko, Marchenkov, Yegorov, and other Komsomol activists are enthusiastic people. Their library borrower's records show a diversity of military technical literature and works on outstanding aircraft designers A. Yakovlev, S. Il'yushin, P. Sukhoy, A. Mikoyan, and others. The activists also read problem articles on development prospects for aircraft, aircraft equipment and armament published in journals.

But perhaps the finest school for activists is lively Komsomol work with personnel at the airfield, close contact with pilots, engineers, technicians, and junior ground maintenance specialists. It is precisely here that they have the opportunity to see how their suggested innovations perform, how they help increase combat readiness and flight safety, and they can gain an understanding of the specific features of each occupational specialty and understand the problems of concern to aviation personnel.

The Komsomol activists of the unit in question have many proven work forms in their arsenal. Ceremonies honoring outstanding performers in combat and political training, efficiency innovators, as well as review-competitions for the best Komsomol organization in technical innovation, for example, are held in an interesting manner. One will long remember special editions of radio newspapers devoted to innovators, advanced know-how bulletins, etc. Diversified work is being done, and it is not mere happenstance that the Komsomol organization has twice been awarded a Komsomol Central Committee Certificate of Merit for successes achieved in combat and political training.

...The inspection for which Lt S. Popov had been preparing did not take place. But a few days later Komsomol members openly expressed at a meeting their dissatisfaction with his work style.

Time passed, and I once again happened to visit this Komsomol organization. The secretary happened to be away from the Komsomol committee. A young officer, who was fashioning some device, informed me that Popov was at the flight line, talking with ground technicians and gathering material for a photo newspaper on efficiency innovators. Next to him stood a dark-complexioned, black-haired soldier who was carefully placing some instruments on a table. It seems that the Komsomol committee was preparing an exhibit of technical innovation by Komsomol members and other young people. I had the feeling that the Komsomol activists were getting with it. I would like to be confident that in the future as well, as the 5th Armed Forces Conference of Komsomol Organization Secretaries approaches, this youth collective will work at a high level together with its leader, leading aviation personnel to the heights of professional expertise.

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TITOV REMINISCES ABOUT GAGARIN

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 3, Mar 84 (signed to press 2 Feb 84) pp 20-21

[Article by Pilot-Cosmonaut USSR Hero of the Soviet Union Lt Gen Avn G. Titov: "Friend and Comrade in Arms"]

[Text] "...An obscure son of the Smolensk land  
Was adopted by the planet Earth."

A. Tvardovskiy, "To the Memory of Gagarin"

Every time I go to Baykonur, I visit this quiet little corner. Two small two-story buildings, tucked away in a small park, have been preserved here since the beginning of the space age. Children frequently visit the site. They come to a halt in front of a little building with porticoes and balconies on the second floor and, raising their heads, listen to their teacher. She relates to them how this planet's first cosmonaut lived with his comrades in this building, "right there in that room."

I don't know what impression it makes on the children, but when I visit this site I am carried by my thoughts back to April 1961, when the State Commission confirmed Yuriy Gagarin as commander of the Vostok and me as backup pilot, as we called it at the time. The buildings' walls, the fretted wooden summerhouse, the quaint old volleyball court, and the horizontal bar ensconced among the thickly-grown trees recall that time, which was filled with the mysteriousness of a forthcoming manned mission.

The six of us spent together the several days remaining before the launch. We went through training sessions, examined the on-board procedures documentation and mission instructions for a final time, and rested. Jumping ahead a bit, I shall state that our shared experience at Baykonur perhaps more than anything else drew us together and laid down the foundation of our friendship.

Journalists frequently demand of us, and of me in particular, something new. I shall state frankly that I did not keep a diary or journal, and therefore only the most vivid pages from those years remain preserved in my memory.

A great deal of various things have been written about Gagarin. I should like to note in this connection that there is no reason to embellish that part of Yuriy Gagarin's life which began in April 1961. He was an ordinary fellow, just like everybody else, and his life was filled with its joys and sorrows, setbacks and victories. He made mistakes just like everybody else, but he was not afraid to acknowledge them and endeavored to correct them at all costs. Yuriy lived in a simple and open fashion. Nor did he change, even after gaining world renown.

Fame did not spoil him although, as we know, even a small career advance effects such a change in a person! Yuriy was intelligent by virtue of that strong peasant intellect for which Russia had been famous from ancient times. He drew in with his mother's milk the breadth of the Russian soul, he inherited firmness and strength of conviction from the ancient and heroic Smolensk land, and he took his diligence and enthusiasm of endeavor from the Smolensk peasants. This natural gift helped him clearly understand the measure of his labor and merits in accomplishing man's first flight into space -- one of the greatest achievements of the Soviet people in world science and technology. On the other hand, heroes are formed not in isolation, but under the influence of society. But if they absorb their nation's finest traits, they become idols, entering the heart of each and every person.

Yuriy was a man of integrity, open and straightforward. He was unusually responsive. To help a comrade in trouble was a firm rule of conduct for him, and to buck up his friends was an ingrained habit. Every word uttered by Yuriy was sincere. Everything he did was natural. Later, after becoming detachment commander, he managed to remain on an equal basis, a good comrade, and at the same time was a demanding leader.

Read his biography carefully, and you will note that he worked hard from his very earliest youth. Young boys matured rapidly during those harsh war years. The war deprived them of their childhood and forced them to labor early in life. I recall my Altai, which was far from the battlefield.

After school those boys who were a little older and more dexterous would ride into the forest to cut firewood for the school, while the younger ones would be sent out into the fields to collect ears of grain left behind from the harvest. During summer vacation they would join the adults in harvesting hay for the horses of the school's subsidiary farming operation. At the time this was not called education through labor. It was a natural requirement from each individual, both old and young. One cannot live unconcerned, without labor. One must have a goal and strive toward it. When no need arises to overcome even the slightest difficulties, the necessity to do that which is needed rather than that which one wants to do, character building proceeds with difficulty; it is no easy matter for those who have left their parent's home to overcome the difficulties of life, and sometimes they long remain sheltered from the vagaries of life in the bosom of the home. It is difficult to become accustomed to overcast, rainy and cold weather following cloudless days of joys and no concerns. Yuriy was one who "gained his wings" early in life and commenced an independent life.

Just prior to departure for the launch center, a party meeting was held, with the agenda "How I am prepared to carry out the orders of the homeland." We swore an oath to the homeland, to the Communist Party, to the Soviet Government, and to our Communist comrades to carry out the mission with honor. Everybody listened with bated breath to a statement by Yuriy Gagarin.

"I am happy and proud to be one of the first cosmonauts...", he said. "I shall stint neither energy nor labor, I shall overcome all obstacles in order to carry out in a worthy manner the task assigned by the party and government."

I also spoke at the meeting and assured everybody that, if it became necessary, I would do everything in my power to carry out the homeland's orders, as befits a Communist.

We returned home from the meeting in an emotional condition and bursting with energy. We felt that there were no difficulties which we could not surmount. But before leaving for the launch center, we bade farewell to Moscow. This has now become a tradition. We went to the Lenin Hills, gazed at Moscow, which was wreathed in low clouds, drove past the university, and had our picture taken by the Lomonosov Memorial.

We drove over to Red Square and stood for a bit by the Mausoleum. We were in a high-spirited mood which even today I cannot precisely articulate, since I never before had experienced such feelings. On that day each one of us thought about the same thing in our own way.

The long-awaited day of departure for Baykonur came. I could see that my wife was anxious and uneasy, and I thought to myself: "Her grief has not yet abated from the death of our little boy, and once again she faces anxiousness and anxiety. How much anxiety you are forced to experience, our dear wives!" The events of that day and the following days have been presented in great detail by our mentor, Hero of the Soviet Union Col Gen Avn N. Kamanin, in his book "Lyetchiki i Kosmonavty" [Pilots and Cosmonauts]. He has very accurately described the atmosphere prevailing at the launch center on the eve of that historic mission. The thoughts and feelings of Yuriy himself are expressed in the statement he made just before launch: "Dear friends, dear ones and strangers, my fellow countrymen, people of all nations and continents! In a few minutes a mighty spacecraft will carry me off into the far reaches of the universe. What can I say to you in these final minutes before launch? My entire life at this moment seems to me to be one marvelous instant. Everything which I have experienced and done in the past was experienced and done for the sake of this moment. As you yourself well understand, it is difficult to analyze one's feelings at this moment, when a time of trials has drawn near, for which we have prepared long and hard. It seems hardly necessary to speak of those feelings which I experienced when I was asked to fly this mission, the first such flight in the history of mankind. Joy? No, it was not merely joy. Pride? No, it was not merely pride. I experienced great happiness. To be the first man in space, to engage one on one in an unprecedented contest with nature -- can one dream of more?"

"But immediately after this I thought about that immense responsibility resting on my shoulders. To be the first to accomplish that about which generations of men had dreamed, to be the first to blaze a trail for mankind into space.... Name me a task which is of greater difficulty and complexity than that which I have been assigned. This is responsibility not to a single person, not to dozens of persons, and not to a collective. It is a responsibility to the Soviet people, to all mankind, to man's present and future. And although I am nevertheless deciding to accept this mission, it is only because I am a Communist, because I am backed up by examples of unprecedented heroism by my fellow countrymen -- Soviet citizens. Aware of the critical importance of the mission, I shall do everything in my power to carry out this assignment by the Communist Party and Soviet people.

"Am I happy to be departing on a mission into space? Of course I am, for in all times and eras it has been man's greatest happiness to take part in new discoveries.

"I want to dedicate this first space flight to the people of communism -- a company which, I am confident, will be joined by all people on earth...."

Motion-picture film recorded for us the smile which lit up his face at that most historic moment of the launch, and flight by earthlings into space is linked forever in men's minds with Gagarin's smile! Intelligence and courage, love for man and emotional firmness, responsibility for the common fate of mankind and the heroic capability to be the first to stride beyond the limits of the known made up this smile. It contains dream and reality, the joy of great accomplishment and man's greatest test and ordeal....

Later there took place an unforgettable get-together in Moscow. Gagarin stood atop the Mausoleum alongside party and government leaders. The capital was rejoicing, celebrating the victory of Man and Mankind. We and our cosmonaut comrades, just as the hundreds of thousands of persons striding along Red Square, could not keep from erupting in loud shouts and applause. We very much wanted Yura to see us. My friends then lifted me up into the air. Yuriy caught sight of our group and proceeded to wave to us at length, accompanying us with his gaze.

The Soviet people and everybody on earth wanted to see the Earth's first cosmonaut. Now, this time "earthly" orbits commenced for Gagarin. He traveled practically everywhere in the Soviet Union and visited many foreign countries. Peoples of all continents greeted him as one of their own. He was an honored guest in every home. People smiled upon seeing him, because Yuriy belonged to that planet which he had left for a short while, for the first time in its history. And, of course, he always was a genuine patriot, a Communist. He believed that a Communist's duty consists first and foremost in always marching in the vanguard.

Recall the words spoken by S. P. Korolev about the 27-year-old Gagarin: He combines native courage, an analytical mind, and exceptional diligence. What's more, if Gagarin receives a solid education, we shall hear his name among the great names of Soviet scientists. Yuriy received a solid education, graduating

from the Air Force Engineering Academy imeni N. Ye. Zhukovskiy. He could have contributed a great deal to the development of the Soviet space program.

I should like to take this occasion to recall a statement made by our comrade in arms, Yuriy Gagarin, reflecting on the paths of development of Soviet astronautics: "Space flights are not an end in themselves, not a race for the conquest of space, as is claimed in the West. How wisely Tsiolkovskiy put it: 'The conquest of space will bring mankind mountains of grain and vast might!'"

"Astronautics can and should perform a great service to mankind -- opening up new worlds for man, giving power over the weather, achieving more rapid communications between continents. And it has already set about to accomplish this!"

In his many speeches Yuriy Alekseyevich spoke of the tasks connected with the conquest of space and the various problems standing in the way of accomplishing these tasks. "That time is past," he said, "when cosmonauts flew missions for the purpose of finding out how they felt, how their heart beat, what their pulse was, to test the biocurrents of the brain, to determine the possibility of working in a state of weightlessness, plus various other medical matters. Today we have more important, more serious tasks on the agenda, involving missions to the other planets of the Solar System, the construction of large space stations operating in space for an extended period of time."

As he dreamed of new space missions, Gagarin was well aware of the fact that they would be incomparably more complex and difficult than preceding missions. "Tomorrow there will be colonies on the Moon, journeys to Mars, scientific stations on asteroids, and communication with other civilizations..." he wrote in his last article. "All this is a thing of the future. Perhaps it will not come soon, but it is entirely feasible, for it will be accomplished on the foundation of that which has already been achieved. And we shall not grieve over the fact that you and I will not be going along on distant interplanetary expeditions. We shall not envy the people of the future. They of course will be quite fortunate; that about which we can only dream will become quite commonplace for them. But we too have been very fortunate. The fortune of taking the first steps into space. Let those who come after us envy our fortune."

Yuriy Gagarin was a great optimist, a person capable of infusing those around him with his optimism. I recall how on the eve of celebration of the 50th anniversary of Soviet rule, he was preparing a message of greeting to the readers of AVIATSIYA I KOSMONAVTIKA at the journal editors' request. He read the text aloud: "It is precisely this half-century which has opened up for us a path into space. This trail was blazed by Soviet citizens. I am confident that the future will bring us new victories in conquest of the heights and orbits. Let each and every one of us do everything possible to achieve this...." Yuriy stopped, thought a bit, and then added to his message: "And even that which sometimes seems impossible." And he signed it with a bold hand -- GAGARIN -- finishing off his signature, as was his custom, with a wavy line and a characteristic dash.

All Soviet cosmonauts remember this behest by their friend, our planet's first cosmonaut. They remember and they dream about new heights, about new orbits. And they are doing everything necessary to conquer them.

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## PREVENTING ROTOR LUGGING ON HOT-CLIMATE, MOUNTAIN-TERRAIN MISSIONS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 3, Mar 84 (signed to press 2 Feb 84) p 22

[Article, published under the heading "The Reader Reflects," by Military Pilot-Instructor 2nd Class Sr Lt S. Borodkin: "Main Rotor Lugging"]

[Text] Reliability of helicopters increases with improvement in performance characteristics. No matter how reliable an aircraft may be, however, professional training of flight personnel is of decisive significance in ensuring flight safety.

As statistics attest, mishap-threatening situations involving helicopters with gas-turbine engines involve in many instances lugging of the main rotor -- letting its rpm drop.

The highest probability of rotor lugging in conditions of thin air and adverse wind direction occurs in takeoff and landing modes (Figure 1). As we see, main rotor available thrust decreases, while required thrust increases. It is necessary to increase engine output in order to maintain hovering altitude. When the available power applied to the main rotor is less than that required to turn the rotor, lugging occurs. Required power increases with an increase in collective pitch (Figure 2).

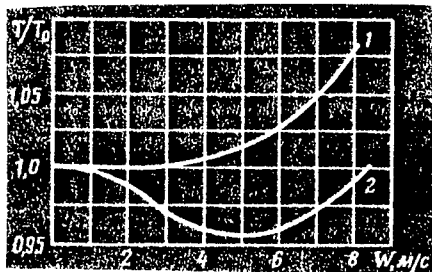


Figure 1. Effect of wind velocity and direction on turbine helicopter thrust

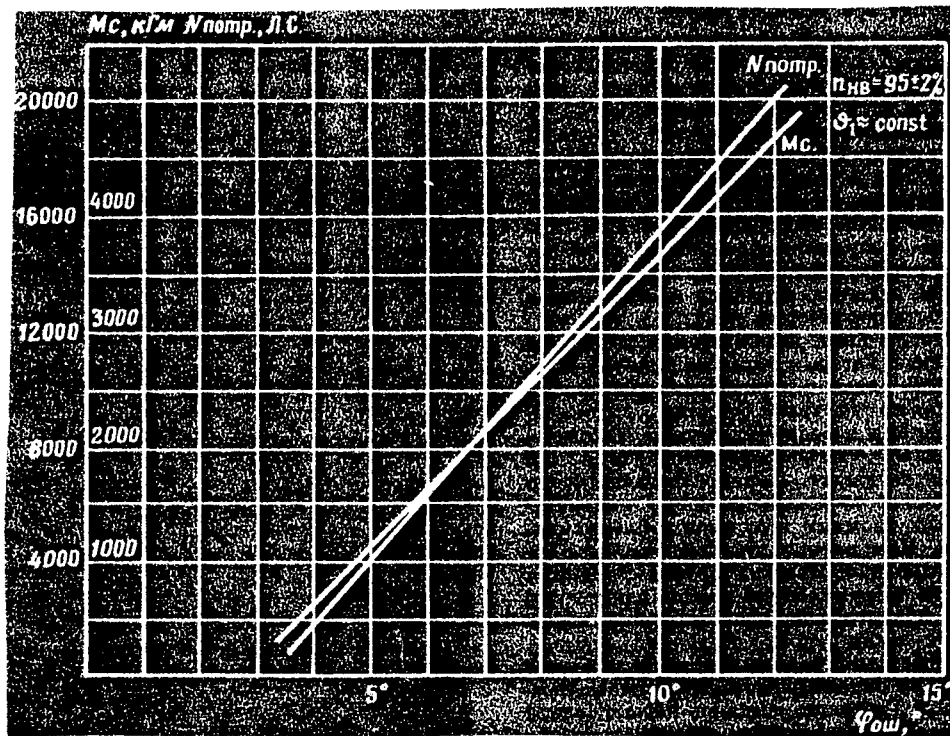


Figure 2. Relationship between moment of resistance to main rotor rotation and required power and collective pitch

Helicopter controllability worsens as main rotor rpm drops off, as the helicopter "responds" to the controls with considerable delay. It commences to settle, and since tail rotor thrust also decreases, the helicopter turns to the left, which makes flying the aircraft more difficult.

In hovering and close-to-hovering mode, the novice pilot most frequently will hastily pull upward the collective and throttle to maintain altitude, which only aggravates the situation. Pilot-instructors constantly remind their students of this fact and teach pilot cadets correct procedures, explaining the physical significance of the processes taking place with a helicopter. They teach student pilots to handle the helicopter controls intelligently in such a situation by means of systematic, purposeful practice sessions on the simulator and in the helicopter cockpit.

Here is one method of teaching future pilots to respond properly to such conditions. Let us assume that at a height of 20-30 meters above sea level, at an ambient air temperature of +35°C, in no-wind conditions, in a helicopter with a takeoff weight of approximately 11,100 kg, main rotor rpm has dropped off to 89%, with 12° collective pitch. Power required to turn the rotor is 2,933 horsepower, while the moment of resistance to rotation is 11,683 kg/m. In this instance it is necessary to stop increasing collective pitch or to reduce it. One can utilize the responsiveness of turbine engines in order to bring rotor rpm back up more effectively. In other words, when the engine increases output (determined by turbine rpm increase), collective pitch should be vigorously reduced to 4-5°. The required power will decrease, and the excess power on the free turbine will lead to increased rotor rpm. With the main rotor turning at

103 percent and a collective pitch of 5°, for example, moment of resistance to rotation is 6,945 kg/m, while power required to turn the rotor decreases to 2,017 hp. The rotor thrust coefficient decreases with a decrease in collective pitch, but rotor rpm increases, which as a result will not lead to a substantial increase in sink rate:

$$T_{\text{HВ}} = C_T \frac{\rho (\omega R)^2}{2} F_{0\text{M}}$$

In such instances the controls must be kept in a position close to neutral.

In order to prevent main rotor lugging when flying missions in hot-climate regions and in mountainous areas, it is essential thoroughly to prepare for a mission and strictly to adhere to maximum takeoff weight in each specific instance.

In my opinion one can also adjust the "engine-rotor" system in such a manner that even a slight, vigorously executed decrease in collective pitch will lead to a rapid increase in rpm, that is, relieve the rotor. The landing approach computation becomes somewhat more complicated with a system adjusted in this manner, but after acquiring skills in piloting a helicopter in these conditions this will not present any particular difficulty.

I imagine that many helicopter pilots have their own opinions on this matter, and it would be beneficial to learn about these views on the pages of this journal.

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## REASONS FOR FAILED BOMBING RUN ANALYZED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 3, Mar 84 (signed to press 2 Feb 84) p 23

[Article, published under the heading "This Could Have Been Avoided," by Maj Yu. Andronov: "Empty Run"]

[Text] A small, round indentation appeared on the uneven surface of the forest tract slightly to the right of the aircraft. Soon the sparkle of water could be seen. The pilot knew that the range was a few kilometers from here. He turned the aircraft onto the bombing run heading and spotted the brown patches of the bombing range up ahead. The dark forest lake swiftly disappeared under the bomber's fuselage. One could already make out grayish circles with cross marks -- the targets.

Following a brief radio communication the aircraft commander, Capt V. Agarov, was cleared for his bombing run. When the present range mark matched the release-point range, he pressed the bomb release button.

"141, ordnance released," Agarov informed the range.

In the meantime the navigator, Sr Lt R. Kostin, fingered in a familiar manner the automatic circuit breaker for the main switch, which was to be switched to the lower position in order to deenergize the bomb release circuits, but... he failed to encounter the expected springy resistance. A frightening thought flashed through his mind. A signal lamp burning on the display panel indicated that the bomb had not been released!

"What happened, navigator?" the aircraft commander inquired, after the procedures specified for this situation had been performed.

Several agonizing seconds passed.

"I forgot to switch on the main," Kostin was barely able to reply.

"One four one, bombing run without ordnance release," Captain Agarov immediately informed the range officer.

"Cleared for a second run," the latter replied.

The pilot and navigator did not exchange a single word during the entire trip home. The senior lieutenant felt responsible for the mission failure and was prepared to accept severe punishment. But most important, he wanted to find out the reason for what had happened, for he had a second-class rating. How could he have forgotten to switch on the main?

Check lists are used in order to prevent omission of procedures. Kostin also had a check list, his navigator's flight plan. There were notations along a route diagram specifying what was to be done at what point. He had been too busy, however, to take a look at the check list during the short bombing run.

He thought back over the flight. Having completed a difficult en-route segment flying at low level, the bomber reached the bombing run commencement point. Kostin ordered the pilot to turn to the proper heading, while he himself proceeded to place the aiming mark on the target and to reference. Agarov reported over the aircraft intercom that he was on the target heading. "Main on!" the navigator confirmed, moving his hand toward the proper toggle switch. "What is your indicated altitude?" the pilot inquired. "Captain, climb 100 meters," the navigator replied, checking his altimeter.

Thus at that moment when he was to switch on the main, Senior Lieutenant Kostin's attention was distracted to something else. The swift pace of the mission in the meanwhile was requiring new actions, and the navigator was performing them.

At first glance it would seem that the navigator alone was to blame for the error. In actual fact, however, the blame had to be shared. Each and every bomber crew member bears a great deal of responsibility for accomplishing the mission. The slightest error on the part of any crew member is intolerable. It is for good reason that the most critical operations involving aircraft flight procedures, aircraft systems and bombing gear are backup-checked. On this aircraft the procedure of switching the main on can be verified both by pilot and navigator. If the one forgot to perform the requisite procedure, why did the other not remind him?

The crew reached the target area with precision and on schedule, and did an excellent job with aiming procedures. In other words both pilot and navigator showed a good level of proficiency. Nevertheless they failed to accomplish the mission. The primary reason was their inadequate moral-psychological preparation. They clearly lacked the proper attitude for a specific sequence of interaction, which as a rule commences on the ground, long before the flight.

How did things go during preliminary preparation, on the eve of flight operations day? "I am making some crew changes," the squadron commander informed the men before commencing the mission briefing. "Henceforth you," he informed navigator Senior Lieutenant Kostin, "will be working alongside Captain Agarov." Thus by virtue of circumstances Kostin was to fly the mission with another pilot. The members of the newly-formed crew plotted out the route, filled out flight sheets and logs, and went through a mission rehearsal. Each man in his own way was ready for the mission. But the crew members had not coordinated procedures in the air.

As we know, there are a number of established commands which the pilot and navigator exchange. In addition to the mandatory commands, however, in practice backup commands and reminder commands are employed. They help eliminate inexactitude and help make mutual verification in operating aircraft equipment more reliable. Each member of a crew performing with precision knows precisely what to say to prompt his partner and on what to direct his attention during taxiing, en route, and on landing. As a rule the sequence of interaction on the most important elements is refined, at least briefly, prior to a mission or during preliminary preparation.

Agarov and Kostin, who would be flying together for the first time, essentially had to work out such a sequence from the ground up. The navigator wanted to bring this point up with the aircraft commander. The pilot, however, was busy preparing documentation. Senior Lieutenant Kostin mentally went through the mission -- a routine bombing run, no unusual features.... "So is there any real need to coordinate actions?" he thought to himself. This officer knew his duties well. "If any minor instances of lack of coordination occur, we shall discuss them after the mission," the navigator decided, and let it go at that. Agarov also ignored this important matter.

The readiness check commenced. The pilots were given emergency situation scenarios and quizzed on aerodynamics. In the meantime the navigators were writing ballistics formulas. Unfortunately none of the checking personnel sought to determine how well coordinated the newly-formed crew was.

There was one additional factor involved in failure to accomplish the mission -- lack of an adequate sense of responsibility for the outcome of the mission on the part of the pilot and navigator.

A great deal of time has passed since then. Today both officers are carrying out flight assignments in an exemplary manner. Their names have been changed for understandable reasons. The incident which occurred, however, is instructive. It convinces us once again that there are and can be no trivial items in aviation.

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EFFICIENCY IMPROVEMENTS AT AIRCRAFT OVERHAUL PLANT DESCRIBED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 3, Mar 84 (signed to press 2 Feb 84) pp 30-31

[Article, published under the heading "Know-How of the Best Into the Combat Arsenal," by N. Zheludkov, head of scientific organization of labor laboratory, aircraft overhaul enterprise; brigade leader A. Rykunov, shock worker of Communist labor: "On the Basis of Scientific Organization of Labor"]

[Text] In December of last year the CPSU Central Committee issued a decree entitled "On Further Development and Increased Effectiveness of the Brigade Form of Organization of Labor and Labor Incentive in Industry." This important document, which reflects a guideline of the 26th CPSU Congress, that the economy shall be made truly economical, was studied in detail in the shops and brigades of our aircraft overhaul enterprise. Workers, engineers and technicians wholeheartedly embraced the tasks assigned to working people in the area of the economy, ideological-indoctrination and economic management activity. They have begun to show greater concern about effective utilization of scientific and technological potential, material and labor resources, adoption of advanced know-how on repairing complex aircraft, and organization of labor. In the last year alone the enterprise has generated savings in excess of many tens of thousands of rubles. In certain sections jobs have been eliminated by incorporating scientific organization of labor.

We shall discuss just a few of the directions taken in development of creative initiative and adoption of scientific organization of labor, thanks to which production profitability and work hour efficiency have increased.

...A long, low building stands next to the entrance gate. It contains the aircraft engine overhaul shop, one of the enterprise's main shops. This shop performs complete aircraft engine disassembly and flaw detection on engine parts and assemblies, as well as assembly, tuning and adjustment, plus other operations. These labor-intensive operations require precision coordination among all the specialists, and a high level of skill and discipline on the part of each individual.

Until quite recently various, at first glance minor problems impeded smooth shop functioning. Economic indices also declined because of this. If there was not enough room on the racks, for example, to place engine cowlings, turbine rotors, compressors, and other components, they would be placed in any available

space, frequently clogging aisles, which was counter to technical standards as well as against safety regulations. In addition, time was wasted on finding and transferring a needed part and on handling operations.

Naturally the shop management and party organization could not accept this state of affairs. Was it possible to place equipment more efficiently, and what was needed to do so? Highly-skilled enterprise technical department engineers A. Dedov, V. Shadrin, and others helped accomplish this task. They made the necessary calculations, drawings and plans. Quite frankly, reorganizing facilities was a laborious and difficult task (and, we should add, this was done by the workers themselves). As a result the shop became transformed.

First of all we were able to reequip special galleries, on which the expendable materials department was located. This helped ease the load on the lower spaces and improve engine storage. The department's operations were facilitated, and coordination with specialist-assemblers became easier, as they now do not need to go to the warehouse for needed equipment and expendable materials. At the end of each working day senior shop foreman V. Lyubavin or other specialist personnel hand in a requisition slip to the section foreman. Section personnel assemble parts and place them in so-called sorting trays -- trays with partitions -- built at the enterprise. Before a workshift begins, these sorting trays are delivered to every assembler work station. In this way the aircraft mechanic does not waste time and effort on preliminary operations and on assembling materials and replacement parts.

Innovators have fashioned unique devices, so-called "Christmas trees." They consist of steel uprights to which holders are welded, carrying numbered identical replacement parts. This has made it possible to eliminate numerous trays and racks. Turbine rotors with disks are stored not on carts as before, but on stepped trays fabricated in the shop, which enable a single repair specialist to find and transfer bulky assemblies without any partical effort.

We use stackers in addition to electric hoists and single-rail overhead traveling cranes. A stacker is an electric-drive movable pedestal with a push-button panel. Now a single person, using a stacker, can raise virtually every engine component or assembly to any rack height.

These measures have made it possible to free production space, to clear previously operating engine overhaul and assembly areas, to increase engine overhaul output volume, and to improve working conditions. And when we removed partitions between work stations, lighting and ventilation improved, and the shop took on a neater appearance.

At first glance it might seem that these are trivial matters. But they all help increase labor productivity, help improve the level of worker and employee work efficiency, and make it possible to reduce labor expenditures. Of course every new innovation requires thorough preliminary study and a good deal of organizational work. Unfortunately not all new innovations receive prompt recognition and acknowledgement. This was the base, in particular, with the shift by some workforces from the brigade form of organization of labor to work with employment of a labor participation factor (KTU), which is being adopted everywhere at this country's vanguard enterprises.

This new innovation essentially consists in the following. In the past, for example, engine electrical equipment repair brigade pay for an entire completed volume of work would be credited to a common account and distributed among the brigade members in conformity with assigned proficiency categories and actual time worked. Such factors as the highest labor productivity, complicated and critical operations, performance of work for missing brigade members, assistance to comrades in performing the day's work assignment, plus others had no effect on the amount of pay credited to individual brigade workers. Employment of a labor participation factor, however, incorporates strict and specific accounting of the labor of each mechanic, crediting or denial of a factor by the brigade council, and docking for absenteeism and work stoppage through the fault of a mechanic. Now everybody has a financial incentive to master related occupational specialties, to boost their labor productivity and to raise their skill category, since all this affects earnings, brigade labor indices, brigade prestige and reputation.

It would seem that the benefit and advantages of such organization of labor would be obvious to everybody. It was not that easy, however, to surmount the psychological barrier or to dispel suspicion of the new system on the part of certain individuals. Therefore the brigade leaders, enterprise economist T. Sychevaya, shop superintendent Engr-Capt V. Krygin, and other specialists were compelled to explain its advantages patiently and with statistics. It took time for this system to gain recognition. Production vanguard workers V. Burma, V. Demidov, A. Podgornaya, K. Kuznetsova, Ye. Levkina, and many other brigade electricians, who are enthusiastically dedicated to their job and feel personally responsible for aircraft malfunction-free operation, set the pace on the job.

It would be incorrect to claim, however, that all technical and morale-ethical problems have been resolved in the brigades with adoption of the labor participation factor. One thing is certain, however: the new system now has many supporters. Today more and more brigades are making upgraded pledges in response to the decisions of the December (1983) CPSU Central Committee Plenum and the 9th Session of the USSR Supreme Soviet, 10th Convocation.

Our innovators E. Skorobogatov, Yu. Ovchinnikov, A. Pankratov, and others set a good example. Sixth-category mechanic E. Skorobogatov, for example, has submitted approximately 30 efficiency innovation proposals, most of which have been adopted. His compact panels of unique design make it possible to test and adjust numerous equipment parameters, with considerable savings in electricity, indicator gauges and other equipment. And a test bench he designed, to test exhaust gas temperature regulators, boasts a range of parameter monitoring which is greater than that of commercially-built equipment. Now a specialist does not need to open the thermal pressure chamber hatch to measure temperature. He employs a remote instrument. Vibration test bench control consoles and a standard work station for aircraft engine tuning and adjustment are distinguished by convenience and simplicity.

Recently our aircraft overhaul enterprise was visited by the commander in chief of the Air Forces, Chief Mar Avn P. S. Kutakhov. He had high praise for the performance of our specialists. This constituted a new stimulus to achieve further increase in labor productivity at our enterprise.

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READER RESPONSES TO ARTICLE ON BREAKING IN NEWLY-COMMISSIONED OFFICERS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian, No 3, Mar 84 (signed to press 2 Feb 84) pp 30-31

[Article, published under the heading, "In Response to Our Articles": "Party Concern for Indoctrination of Lieutenants"]

[Text] An article by Lt Gen Avn L. Klochikhin, chief of the Air Forces Personnel Directorate, entitled "The Regiment Greets Lieutenants" (AVIATSIYA I KOSMONAVTIKA, No 9, 1983), attracted the attention of and evoked interest in many of our readers. In their responses to this article, officer-leaders, party and Komsomol activists continue the discussion of the period of familiarization for recent graduates of academies and service schools and share their ideas on matters pertaining to political, military, and moral indoctrination.

There is good reason for such keen interest in the problem of development of young officers. Many lieutenants are serving in aviation units and subunits. They are entrusted, just as are the more experienced aviation personnel, with servicing and maintenance of complex aircraft systems and armament, training and indoctrination of warrant officers, NCO's and enlisted personnel. The successes of their outfits in combat training and in socialist competition under the slogan "Be Alert, in a State of Constant Readiness to Defend the Achievements of Socialism!" depend in large measure on the level of proficiency, ideological maturity, and methods skills of young pilots and aviation engineer service specialists.

Readers tell us what is being done in their units to improve indoctrination and training of lieutenants and share their views on how this work should be conducted. Officer G. Sergeyev, for example, reports that a certain amount of experience in breaking in lieutenants has been amassed in Air Forces subunits in the Turkestan Military District. Advance preparations are made to greet them: special training and indoctrination programs are devised, time and place are determined for holding classes, training sessions, and examination schedules. But military service in that region is highly demanding on people, as they must service and maintain modern aircraft in conditions of a hot climate and at high-elevation airfields in mountainous areas. The author of the letter emphasizes that it is very important that lieutenants find their niche in the outfit at the very outset and that they work with full effort. Indoctrination work with

recent service school graduates is of a combined nature. Allowances are not made for young officers in such matters as performance of routine garrison duty, observance of the daily routine, and participation in the campaign to strengthen military discipline.

Officer G. Sergeyev stresses that there are of course many unresolved problems affecting lieutenants' period of familiarization with their duties and enlisting them to participate in competition. There are various reasons for this, including those indicated in the article "The Regiment Greets Lieutenants." Negative phenomena are met with strictness and a party-mindedly severe and firm response.

Col V. Logvinenko raises the question of making recent graduates of service schools more personally responsible for successful accomplishment of combat training tasks. He specifies young officers days among diversified forms and methods of indoctrination work with lieutenants. The district air forces commander, his deputies, department chiefs and staff officers take part in these activities. Such get-togethers between young officers and higher-echelon personnel as a rule are of a businesslike, purposeful character. Frank exchange of opinions and clarification of the most important questions pertaining to military and moral indoctrination of subordinates help young aviation personnel surmount difficulties with flying colors and increase their vigilance and combat readiness. "This is particularly important today, in conditions of a sharp aggravation of international tension caused by the aggressive aspirations of U.S. imperialism," emphasizes V. Logvinenko.

"I must agree with that high value which the author of the article places on dissemination of fighting traditions and indoctrination of youth in these traditions," writes officer L. Kul'pin. These efforts are being stepped up in connection with the approach of an important date -- the 40th anniversary of the Victory of the Soviet People in the Great Patriotic War. Party and Komsomol activists in this officer's unit are constantly organizing get-togethers with war veterans, events which are quite popular with aviation personnel. And this is understandable. USSR Minister of Defense MSU D. F. Ustinov, member of the CPSU Central Committee Politburo, has characterized war veterans as men of fighting accomplishments, bearers of the lofty spiritual and moral values of the Soviet people, who are distinguished by total devotion and constant readiness and willingness to defend the Soviet homeland.

Officer Kul'pin told of a get-together between aviation personnel and a former fighter pilot, Hero of the Soviet Union Maj Gen Avn G. Bayevskiy, who cited examples from the experience of men from the same outfit and showed the sources of their courage, heroism, and willingness for self-sacrifice for the sake of bright ideals.

The majority of letter authors, particularly officers V. Lebedev, P. Sviridov, P. Novikov, G. Zharkov, and others, note that indoctrination of lieutenants is a common party concern. The young pilot, engineer or technician, who is beginning a new life, is a bearer and continuer of the glorious fighting traditions of the squadron and regiment.

Continuing the discussion begun by Lt Gen Avn L. Klochikhin, our readers relate how in many units it has become a tradition to have lieutenants present reports at meetings of the methods council and party buro on improvement of their combat proficiency and participation in community affairs. They stress the important role played by women's councils in strengthening the family of young officers. Recently they have stepped up their activities and have begun more effectively assisting commanding officers in resolving problems pertaining to housing and family living, in finding jobs for the wives of lieutenants, and in involving them in amateur talent activities, for a strong family is also an important element in ensuring safety of flight operations.

Is everything being done in the regiments to ensure that the breaking-in of lieutenants in the line units goes smoothly? Unfortunately the answer is no. Several officers make this point in their letters. In particular, certain commanding officers and superiors do not promptly take steps to ensure the availability of decent housing. This of course has a negative effect on the domestic life and off-duty time of young officers. Often such commanding officers and superiors show a lip-service attitude toward performing their duties in this regard.

The authors of letters in response to this article reach a valid conclusion: when breaking in new lieutenants it is necessary to show constant concern for indoctrination of the indoctrinators and to monitor their instructional activities. It is essential to ensure that the complacency and indifference on the part of certain officer-leaders receives a proper harsh party-minded response, for purposeful and effective work with lieutenants will help them more rapidly take their place in the ranks of winged defenders of the homeland and hold high the honor of officer in our glorious Air Forces.

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SIGNAL BATTALION COMMANDER DISCUSSES WAYS TO IMPROVE TRAINING AND INDOCTRINATION

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 3, Mar 84 (signed to press 2 Feb 84) pp 32-33

[Article by Lt Col A. Doronin, signal battalion commander: "Frame of Mind for Success"]

[Text] On the eve of commencement of the training year, subunit personnel discussed socialist pledges in a businesslike and exacting manner. Each specialist rigorously weighed his possibilities, taking into account that which he had already achieved in combat and political training during the most recent period, plus unutilized reserve potential. But the past training year did not end as one would have wished. At the final inspection the subunit's overall mark was reduced because of mistakes made by certain officers and warrant officers. Of course nobody is guaranteed against making mistakes. But the entire point is their consequences and how they affect the men's level of proficiency and morale in the unit.

It was not easy to begin the new training year with a low mark. Every man fully realized that vigorous measures and incentive to achieve stable end results of military labor were necessary in order to rectify the situation in short order. We also knew that overall success depends on individual proficiency and a conscientious attitude on the part of each serviceman toward performing his job-related duties. Mutual understanding and mutual assistance are very important here. Command authorities, the party and Komsomol organizations are currently devoting the most serious attention to these matters. The collective has increased demandingness on specialists, especially those who violate discipline.

A disturbing incident once occurred involving WO S. Popenkov. He was assigned to the subunit as radio repair shop chief. He was eminently qualified for his job, but he failed to display adequate enthusiasm for his work and showed poor efficiency. And things did not go very well for him. This unquestionably had an adverse effect on performance results and quality of tasks performed by the subunit. The specialists in the radio shop headed by this warrant officer proceeded to slip in their performance levels.

Nor was Popenkov distinguished by strong personal discipline. Once when he was assistant duty man, he committed a violation of regulations, for which he was punished. His misdeed was discussed at a meeting of the warrant officers.

Popenkov's fellow warrant officers voiced serious complaints about him. He was also raked over the coals at a Komsomol buro meeting for errors of omission in his job performance.

A detailed examination of the situation revealed that this young specialist did not have a real understanding of his role and place in the unit and did not understand what was demanded of him by the interests of the overall effort. And we officer-leaders, busy with our daily affairs, had failed promptly to guide him onto the straight and narrow.

Unfortunately, in the process of training and indoctrinating personnel, commanders do not always consider the individual features and inclinations of each subordinate, at times fail to consider his moral qualities, and do not take into account the conditions in which he was brought up prior to conscription into the military. If you ask some company commanders what they know about a given specialist, they will usually respond with the most general conclusions. Of course in such a case it is difficult to gain a correct and comprehensive understanding of a person's psychology, objectively to evaluate his performance at exercises and training drills, fully to recognize his capabilities and to utilize them in the interests of further improving combat proficiency. In the course of our daily affairs we do not always see each individual, we do not always have time to examine his inner world or inquire about his plans for the future. But all this is very important for the officer-leader, especially in present-day conditions.

Yu. V. Andropov stressed in his speech at the June (1983) CPSU Central Committee Plenum that it is exceptionally important that each person more deeply comprehend party policy in present-day conditions, be able to apply acquired knowledge in a practical manner, more clearly visualize and carry out his own duty in a practical way. The Plenum decisions, which address the mind and heart of each and every Soviet citizen, strengthen in us a feeling of pride in our country, involvement in the common cause, and heighten responsibility for our contribution toward strengthening the might and defense capability of the homeland. Personal responsibility for exemplary performance of job-related duties has always been of enormous importance in any activity. But in military labor it is today filled with special significance, for he who today stands under combat banners is responsible for the security of the homeland and for world peace.

The chapter "Defense of the Socialist Homeland" in the USSR Constitution stresses that the USSR Armed Forces were established for the purpose of defending socialist achievements, the peaceful labor of the Soviet people, the sovereignty and territorial integrity of the state, and that it is the duty of the Armed Forces to the people reliably to defend the socialist homeland and to be in a continuous state of combat readiness guaranteeing an immediate rebuff to any aggressor. Our daily lives offer many outstanding examples of a deep understanding and flawless performance of duty by military personnel.

Maj V. Bragin, a vanguard officer who is well trained in a professional respect, a right-flanker in socialist competition under the slogan "Be alert, in a continuous state of readiness to defend the achievements of socialism!" enjoys a fine reputation in his unit. He always works with inspiration and greatly cares for the common cause. Recently this officer did a fine job at an exercise.

Although the assigned mission had to be carried out under exceptionally difficult conditions, this first-class specialist was able to ensure reliable operation of communications equipment and earned a high mark from the command authorities. Chief Mar Avn P. S. Kutakhov, commander in chief of the Air Forces, commended Maj V. Bragin.

There are as many paths to take in building skilled organizers as there are individuals. But I believe that among these great many paths, there is one which should not be ignored. This involves reinforcing in a commander a feeling of personal responsibility for the assigned task, for prompt, timely and high-quality execution of combat and political training plans. It consists essentially in ensuring that an officer does not rest on his laurels but constantly moves forward. Precisely these qualities characterize Maj V. Bragin. He is constantly seeking ways to improve his work performance and seeks more efficiently to distribute men and equipment among training stations and more effectively to utilize visual aids. And young command personnel, recent graduates of service schools, become broken in more rapidly alongside this vanguard officer.

Maj I. Godz also works with innovativeness and initiative. This officer precisely plans and schedules his work and constantly verifies execution of specified measures. At an exercise he was to perform the duties not only of a staff officer but also those of a communications specialist. Party member Godz proved to be equal to the occasion and successfully accomplished the assigned task. He provided for every detail, skillfully planning and scheduling his men's activities while proceeding to the designated area and while setting up communications gear at the new site. Upon returning to the post, this officer energetically proceeded to synthesize advanced know-how and incorporate it into the practical training and indoctrination of communications personnel. He thoroughly analyzed shortcomings, determined their causes, and laid down specific measures to prevent future errors.

A demanding approach to performance of job-related duties also assures success to others of our officers and helps them continuously improve their level of proficiency and to achieve new performance levels in training and job performance. Vanguard specialists display an example of conscientious attitude toward military labor.

Every officer in the battalion who is involved in conducting training classes with subordinates has a personal methods training plan and schedule, execution of which is continuously being monitored by headquarters. It is therefore logical that the majority of training classes are interesting and instructive, and are permeated with a spirit of competition for excellent coverage of the subject, high-quality performance of exercises, and surpassing of tough performance standards.

In this connection we should like to direct the attention of young command personnel to the fact that innovativeness in method is more important today than ever before in the attitude of servicemen toward successes in military endeavor. Our subunit is receiving increasingly more complex communications equipment, while the time available in which to master this equipment is becoming shorter. Practical realities demand continuous improvement of the training and indoctrination process. Intensification of this process and making training classes more

comprehensive are effective techniques on which the efforts of one and all should be united. Today intensification is achieved not by increasing the number of training classes, exercises and drills, but by improving the quality of the training process.

I should also like to emphasize that in our commander's arsenal there are many time-proven forms of methods training of officers. These include methods training conferences, instruction classes and briefings, demonstration classes and open lessons, conferences, and exchange of advanced know-how. With an efficient combination of these techniques, thorough preparation, and a close link with the tasks being performed by the outfit, they help officers continuously expand their military-theoretical and pedagogic knowledgeability and continuously improve their professional skills. The quality of the training and indoctrination process, the attitude of personnel toward successes in military endeavor, and the effectiveness of socialist competition will depend on how fully we are able to utilize reserve potential.

Experience indicates that in order to build a strong collective which is capable of maintaining its strength for many years, required elements include industriousness, constant indoctrination to ensure that the men are totally devoted to the cause, personnel who are capable of skillfully and efficiently accomplishing their assigned tasks.

Another training month has come to an end. Our battalion has completed this month with good marks in training and competition. The number of excellent-rated individuals and proficiency-rated specialists has grown. The men have acquired solid skills in providing command authorities with reliable communications in the conditions of modern-day combat. As we know, however, there is no limit to improvement. Analyzing combat and political training results, one can clearly see that we still have a great deal of unutilized reserve potential for further increasing the skill level of communications personnel, for improving their moral-fighting qualities, and for full utilization of the performance capabilities of the modern communications equipment which our men operate and maintain.

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## COLONEL ELECTED DEPUTY TO LOCAL SOVIET

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 3, Mar 84 (signed to press 2 Feb 84) pp 36-37

[Article, published under the heading "4 March -- Elections to the USSR Supreme Soviet," by aviation regiment propagandist Maj M. Savin: "A Deputy's Daily Routine"]

[Text] The Soviet Constitution guarantees extensive rights to Soviet citizens. One of these is the right to participate in running government and societal affairs. Citizens of the USSR elect representatives to the Soviets of People's Deputies and can themselves be elected, and they take part in discussing and drafting laws and decisions of national and local significance, in the work of governmental, cooperative, and other public organizations, in monitoring their activities, in management of production and the affairs of workforces, and in neighborhood meetings.

Thousands of Soviet military personnel -- the finest representatives of the army and navy -- serve as deputies to the USSR Supreme Soviet, the Supreme Soviets of union and autonomous republics, kray, oblast, city, rayon, and village Soviets of People's Deputies. By their participation in the work of bodies of governmental authority they are making a valuable contribution toward accomplishing their assigned tasks.

The following article tells of Lt Col V. Mokhov, deputy to a city Soviet of People's Deputies.

He will long remember that day. The latest newspapers arrived at headquarters, containing results of the elections to local government bodies. Party member Military Pilot 1st Class Lt Col V. Mokhov learned that he had been elected deputy to the city Soviet of People's Deputies. His commanding officer, the political section chief, and his fellow aviation personnel -- pilots, navigators, engineers, and technicians -- warmly congratulated him. They congratulated him, and they felt pride: a representative of their outfit would henceforth be taking part in the work of the city soviet. Vladimir Vasil'yevich, in receiving their congratulations, was fully cognizant of the difficulty of his new task. He would now be answerable for a great many things. He, together with the other deputies,

would be called upon to settle issues pertaining to governmental, economic, and social-cultural development, to organize the implementation of decisions by the Soviet, and to keep an eye on the operations of government agencies, enterprises, establishments, and organizations. But he had not only been invested with considerable powers. Difficult obligations also rested on his shoulders. How important it would be to live up to the voters' trust through his labor, to be up to the task at hand at all times!

Trust was quite deservedly placed in Lieutenant Colonel Mokhov. This aviator has been in the service 15 years. Graduating from the Air Force Academy imeni Yu. A. Gagarin, he was assigned commander of a squadron of long-range bombers, and brought his outfit up to an excellent rating. Proving to be an experienced, knowledgeable, and well-trained methods specialist and mentor, he was promoted. This officer presently has difficult duties connected with training and indoctrinating subordinates and ensuring a high degree of combat readiness in aviation personnel. Vladimir Vasil'yevich does his job well. Flawless performance of duty and excellent political, professional and moral qualities have gained him a fine reputation and respect in his outfit. It was precisely for this reason that he was nominated for the local government body.

Lt Col V. Mokhov was nervous as he proceeded to the first session of the newly-constituted city soviet. The hall contained representatives of workers, intelligentsia, party and economic agencies. Many organizational issues were resolved at this meeting, and a deputy group was formed for the microrayon in which V. Mokhov had run. Vladimir Vasil'yevich was placed in charge of an important area of business in his electoral district -- social-cultural development, and military-patriotic indoctrination of the general public, preinduction and induction-age youth.

In addition to performance of his diversified job duties, Lieutenant Colonel Mokhov has for more than a year now, in his capacity as deputy to the city soviet, been extensively engaged in public affairs activities, justifying with flying colors the trust which has been placed in him.

In conditions of an international situation which has been deteriorating through the fault of the U.S. imperialists and NATO bloc allies of the United States, further improvement of ideological and mass-political work is assuming particular importance, as we know, as was pointed out at the June (1983) CPSU Central Committee Plenum. Party member Mokhov devotes constant attention to this matter. Carrying out his mandate from the city executive committee, he has synthesized experience in work in the area of increasing the sociopolitical activeness of working people at a number of enterprises.

He views military-patriotic indoctrination of future defenders of the homeland as an integral part of Communist indoctrination, as one of the most important tasks in the area of increasing the defense capability of the Soviet state. He has met with preinduction youth on numerous occasions, presenting lectures on the struggle against the numerous enemies of the homeland by the fighting men of the older generations, their courage and valor, the fine fighting traditions of the Soviet Armed Forces, and the constitutional obligation of Soviet citizens to defend the socialist homeland. The young men greet his every presentation with great interest.

Vladimir Vasil'yevich does not limit himself to personal participation in this activity. He has enlisted officers from his subunit to engage in military-patriotic indoctrination and military-technical training of the city's youth. He has also made a contribution to the holding of "Summer Lightning" and "Eaglet" military athletic games. At the initiative of Lieutenant Colonel Mokhov, a great deal has been done to strengthen patron ties between aviation personnel and the workforces of industrial enterprises and cultural establishments located in the electoral district, and regular get-togethers are held, bringing together military personnel and distinguished individuals, veterans of labor and the Armed Forces.

Every Thursday some member of the deputy group is on duty during certain hours at a room at the garrison Officers' Club, specially designated for receiving constituents. The deputies chat with visitors and take note of requests, complaints, and suggestions. The deputy group regularly holds meetings, at which they discuss pressing matters. Party member Mokhov displays initiative and works persistently to complete an undertaking once initiated.

On one occasion military constituents expressed dissatisfaction with the way the post exchange was running operations and, in particular, the personal services combine it was operating: they were delaying completion of tailoring orders, and the quality of their product was poor. Other deficiencies were also noted. Lieutenant Colonel Mokhov met with the head of the post exchange and his people, sought to determine the reasons for the shortcomings, learned about problems which had recently arisen, and discussed ways to solve them. He then shared his conclusions with the garrison commanding officer and higher-echelon authorities, and briefed them on the state of affairs. It was no easy matter to get the combine running smoothly. But ultimately the city soviet deputy achieved his objective. Supply of requisite materials to the combine was improved, and more serious efforts were focused on labor discipline and monitoring meeting of promised schedules and work quality. Other matters were also resolved along the way: smooth organization was achieved in supplying the military post with foodstuffs and supplying flight and technical personnel. The constituents' mandate was carried out.

On another occasion medical care and services for the residents of the micro-rayon was discussed at a meeting of the group of deputies. Many new buildings had been constructed in the area in recent years, the population had increased, but there had been no increase in the number of outpatient clinics and medical aid stations or in the size of their staffs. As a result it had started to become necessary to wait in line to see a doctor. Lt Col V. Mokhov set about to study in detail possibilities of resolving the problem and to draw up proposals for adoption of requisite measures. He presented a briefing at the next meeting of the city executive committee. The municipal authorities found themselves able to enlarge the staff of positions at rayon medical facilities. The people were sincerely grateful to their deputy for the concern he had displayed for their interests.

Mokhov is frequently called upon to deal with matters connected with provision of services to personnel at the military post and improvement of personnel housing conditions. I shall cite some examples. Housing conditions for squadron commander Maj V. Molofeyev were such that he was unable to obtain

adequate rest prior to flight operations. And yet a squadron commander bears great responsibility for the performance of his outfit. Party member Mokhov raised the question of improving his housing conditions. Officer Molofeyev was given a more comfortable apartment. Now he is able to get adequate rest prior to departing on long flights and to restore his energies. Aircraft technician WO N. Tarasov is also grateful to his representative. Learning that he had a sick child at home, Mokhov took pains to improve his housing conditions as well. He displayed equal concern for WO S. Bel'mega.

Party member Mokhov does a great deal in his capacity as a deputy, but he also has a great many regular job duties. Sometimes one wonders where he gets the energy to do everything. The secret apparently lies in the fact that Vladimir Vasil'yevich acts at all times according to the behest of honor and conscience, putting his heart into the assigned task. He is distinguished by a high degree of ideological conviction and the ability to assume full responsibility. He is skilled in promptly spotting the initiative of others, in mobilizing their volition and energy, and in obtaining support from them in accomplishing difficult tasks.

Performance results for the training year indicate that the military outfit in which Lt Col V. Mokhov serves has done excellently in combat training and performance of job-related duties. They achieved a high mark in navigation and tactical performance, and achieved an increase in the number of excellent-rated individuals and proficiency-rated specialists. Military discipline, order and organization are maintained at an adequate level. These successes of course have not been achieved without the aid of the party and Komsomol organizations. At the same time Lt Col V. Mokhov also unquestionably deserves credit. He has the ability to achieve unity of training and indoctrination and offers his subordinates a personal example in improving professional skill.

What is the most appealing thing about this officer? Vladimir Vasil'yevich has the ability to get people to like him. He is always tactful, self-controlled, and kindly. At the same time he is party-mindedly firm and strict. If he discovers any shortcomings or errors of omission, do not expect to be let off lightly. But people do not take umbrage at his demandingness. They know that this officer follows a fine rule of conduct -- while demanding full measure of others, be demanding first and foremost on yourself. He considers intolerable even the slightest slackening of efforts in his work and a superficial approach to directing the combat and political training of his men. Incidentally, Vladimir Vasil'yevich is also constantly teaching the subunit commanders the ability to work persistently and consistently for new and higher performance results.

In all areas of job-related activities and public affairs party member Military Pilot 1st Lt Col V. Mokhov displays an acute sense of responsibility. Each and every day is filled to brimming with large and important undertakings. Vigorous, energetic, and filled with optimism, he toils tirelessly for the common good. And people respond to this with respect and gratitude.

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## WAY TO ESTIMATE PILOT ATTENTION DISTRIBUTION CAPABILITY DESCRIBED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 3, Mar 84 (signed to press 2 Feb 84) p 37

[Article, published under the heading "The Reader Suggests," by Engr-Lt Col V. Sokolov and Docent Lt Col Med Serv (Res) B. Frantsen: "Evaluating Unutilized Attention Capability"]

[Text] Evaluation of a pilot's preparedness to operate in a complex situation is an important element in ensuring flight safety. An instructor evaluates under actual conditions a pilot's job performance pertaining to flight dynamics and precision in maintaining specified parameters. In addition, cleanness of individual flying performance can be quantitatively evaluated with the aid of airborne recording instrument data. Nevertheless it is extremely difficult to study directly in the air the psychophysiological features of pilots flying modern aircraft. Therefore scheduled practice sessions on cockpit simulators are utilized for this purpose.

A pilot's psychophysiological reactions in performing the same tasks on a simulator and on an actual aircraft are similar to a considerable degree, although they may be more clearly-marked in flight than on a simulator as regards absolute values. Flying on the simulator and in the air, even with identical qualitative indices, is performed with a differing stress and intensity, which depends on the pilot's degree of flying fitness and the difficulty of the task being performed. The more complicated it is, the smaller the human operator's capability to perceive and process additional information. It becomes more difficult to perform unforeseen work operations on the background of the principal activity, since the pilot's attention reserve potential diminishes. Usually attention reserve potential is determined by the quantity of additional information perceived and worked over in the process of flying, without a decline in the quality of the flying performance.

As experience has shown, the instructor can successfully utilize "Fiziolog M" equipment to investigate pilot attention reserve potential on a cockpit simulator. During monitored phases of the "flight" (takeoff, landing, etc) the pilot is instructed to respond to light signals (red, white, green) flashing on a special display, without diminishing the quality of his flying performance. To perform the first program, the subject presses a button on the throttle lever when a light flashes on and extinguishes the light.

Attention reserves are estimated as a percentage of the ratio of the number of correct responses during a "flight" to their number in a preflight (background) test. This method, however, does not take into account the total number of pilot responses to signals and errors made by him, that is, it does not reflect productivity or quality of the performed task. In connection with this, in order quantitatively to determine attention reserves, it is suggested that one utilize criteria of information theory. A pilot responding to additional information by pressing a button can with an allowable degree of error be considered as a "communication channel with interference."

For a communication channel of this kind, quantity of transmitted information is determined by the difference in degree of uncertainty of an event before and after receiving a message:

$$I_{xy} = H(x) - H_y(x), \quad (1)$$

where  $I_{xy}$  -- quantity of transmitted information in the signal;  $H(x)$  -- entropy of the event before receiving message, or quantity of information entering the channel;  $H_y(x)$  -- event mean entropy after receipt of message.

For a case of determination of quantity of information processed by the subject during performance of the first program, formula (1) takes on the following form:

$$I_1 = -N \left[ -1,585 - \left( \frac{N-D}{N} \log_2 \frac{N-D}{N} + \frac{D}{N} \log_2 \frac{D}{N} \right) \right] \text{ bits}, \quad (2)$$

where  $I_1$  -- quantity of processed information;  $N$  -- total number of responses in one minute;  $D$  -- number of errors in one minute.

Indicator  $I_1$ , however, takes into account only the "load" factor. Rate of information transmission  $R$  is the most general-purpose pilot work indicator:

$$R = \frac{I_1}{T} \text{ bit/s}, \quad (3)$$

where  $T$  is work time in seconds.

Determination of rate of processing of additional information makes it possible to take into account in a single indicator responses to additional signals and their accuracy.

To determine  $R$  we use data obtained during pilot's responses to signals coming from the "Reserves" unit. The total number of responses  $N$  and errors  $D$  recorded for each minute are substituted into formulas (2) and (3). Thus this indicator is calculated for the tested stages (background, takeoff, landing, etc).

In order to simplify processing of the figures obtained with the formulas, rates of information processing have been calculated on a computer. They appear in the following table, which includes possible results of tasks given to the pilot in one minute according to the first program of the "Reserves" unit:

N/D	0	1	2	3	4	5	...25
10	0,264	0,176	0,144	0,118	0,103	—	—
...							
79	2,086	1,958	1,863	1,781	1,707	1,640	0,930
80	2,112	1,984	1,889	1,806	1,732	1,664	0,921
81	2,138	2,010	1,915	1,832	1,757	1,689	0,938
...							
120	3,168	3,031	2,926	2,833	2,749	2,671	1,696

Knowing the total number of responses  $N$  and the number of errors  $D$ , we can determine from the table the rate of information processing during the background test  $R_{\Phi}$ , which quantitatively characterizes overall pilot work productivity on the presented program, and rate of processing of additional information during flight performance  $R_{\Pi}$ . This indicator estimates the pilot's attention reserves (psychophysiological reserves) and characterizes his degree of stress at various stages of the flight. Finding values  $R_{\Phi}$  and  $R_{\Pi}$ , we compute the decrease in rate of processing of additional information in conditions of "flight" in comparison with the background rate  $R_T$ , which quantitatively reflects the subjective difficulty of accomplishing a specific phase of the flight, that is, estimates the pilot's level of preparedness to a certain degree.

We feel that the proposed method makes it possible more fully to describe a pilot's individual psychological features, while the table simplifies their quantitative determination.

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## SQUADRON READIES FOR TACTICAL AIR EXERCISE

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 3, Mar 84 (signed to press 2 Feb 84) p 38

[Article, published under the heading "Be Alert, in a Continuous State of Combat Readiness," by Capt V. Makarov: "Tactical Air Exercise Puts Men to the Test"]

[Text] The aviators of the Far East Military District had prepared very diligently for the live-fire tactical air exercise. Adopting socialist pledges for the exercise, they resolved to accomplish all missions with marks of excellent and good.

A high degree of combat readiness is a matter of great national importance and a firm principle of military service. Constant readiness of aviation personnel to repel aggression and defeat the adversary in any and all conditions of potential unleashing and conduct of war is made up of many factors, first and foremost excellent air, weapon and tactical proficiency, as well as firm military discipline. The many concern of the men of our squadron is to hit targets with the first missile, first shell, first bomb, and to ensure malfunction-free operation of aircraft equipment in any and all conditions.

The complexity of the present international situation, aggressive militarist aspirations on the part of the present U.S. Administration, and the course of policy it has taken, which threatens the cause of peace, a policy of securing a dominant position in the world by the United States, ignoring the interests of other nations and peoples, obliges us to be alert at all times, constantly and continuously to increase political vigilance, and to work persistently to improve our combat proficiency.

The tactical air exercise in question was an important test for aviation personnel. Jumping ahead, I shall state that the aircrews successfully accomplished the mission, in spite of aggressive countermeasures by the "adversary" and his clever techniques of camouflaging and concealing ground targets. The senior-level commander commended those officers who did the best job, including the men of Maj Tech Serv V. Simonenko.

What helped these vanguard aviators achieve success? First and foremost -- high-quality professional training. Officer Simonenko and other subunit aviation engineer service leader personnel have served in the Far East for years. They

have totally mastered maintenance of aircraft in the local climatic conditions. In this subunit they conduct technical training classes, practical drills, and regular aircraft inspections.

Regardless of area of specialization and length of service, all aircraft maintenance specialists went through training drills on replacing various armament, and were tested. The mechanics and technicians of the aircraft armament, avionics, and aircraft equipment group studied the job duties of airframe and powerplant specialists. As a result many of them, providing uninterrupted technical-station mission-readying of aircraft, successfully performed such operations as servicing fighters with fuel, compressed air, oil, and when necessary gave useful assistance to ground technicians in replacing tires and "battle-damaged" equipment.

On the eve of the tactical air exercise, squadron aviation engineer service supervisors thoroughly inspected the aircraft, using test instruments. Maintenance personnel brought all parameters of systems, automatic equipment, computer and other devices as close to exact specifications as possible, and checked operation of backup systems. This of course required time and considerable labor expenditure. As experience showed, however, preliminary and preventive procedures were subsequently repaid with interest. Experienced technicians reminder-briefed young ground crewmen on safety precautionary measures to be observed when external-mounting munitions, and drew their attention to the fact that malfunctions can occur in electrical circuits if condensation occurs inside an aircraft.

Work with personnel by commanders, party and Komsomol activists played an important mobilizing role in preparing for the tactical air exercise. In talks and lectures and in totaling up performance results they reminded personnel that the range facility would test not only the skill of the aviation personnel but also their moral-psychological conditioning, ideological conviction, will to win, and ability to accomplish assigned tasks with reduced personnel in an extreme situation. Party members V. Simonenko, S. Khelashvili, V. Zagoskin and others held talks on vigilance and the aggressive nature of U.S. imperialism. The political worker reminded the men of the tasks assigned to the armed defenders of the homeland proceeding from the decisions of the June and December (1983) CPSU Central Committee plenums.

By decision of the party buro, experienced party-member specialists were placed at those points where a successful operation would be determined: at the technical inspection station, and at the point where munitions are mounted and aircraft weapons are unloaded after an aircraft's return from the range. The party members combated unnecessary relaxation of demands and unnecessary situation simplification, and they publicized the achievements of vanguard personnel. In particular, activists disseminated the know-how of aircraft technician Sr Lt Tech Serv V. Zagoskin, who does the fastest job of working with cockpit equipment, checking equipment and powerplant reliability.

A political rally was held in the squadron just prior to the tactical air exercise. Officer D. Shepelev and WO M. Kalyuzhnyy spoke at this rally. On behalf of their fellow personnel they assured the commanding officer that they would carry out the assigned missions with flying colors.

And they kept their word. Every man worked self-sacrificingly and carried out his job duties with precision. If there was a delay at any point, specialists from the neighboring aircraft would come to the aid of the ground crew. Party members G. Timakov, S. Khelashvili, and A Pribylovskiy, Komsomol member V. Fakhrutdinov and others displayed a fine example.

The tasks assigned to the new training year are quite tough, and the squadron's aviation personnel are working at full effort to accomplish them.

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## RECOLLECTIONS ON CAREER OF AIRCRAFT DESIGNER IL'YUSHIN

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 3, Mar 84 (signed to press 2 Feb 84) pp 39-41

[Article, published under the heading "Soviet Aircraft Designers," by Col V. Lebedev: "Academician Il'yushin"]

[Text] Hundreds of silvery airliners carry on their mighty wings the fame of Chief Designer Academician S. V. Il'yushin, three times Hero of Socialist Labor and recipient of the Lenin and State prizes, to many countries and continents.

Sergey Vladimirovich Il'yushin was born on 31 March 1894 in the village of Dilyalevo, Vologda Gubernia, in a peasant family. His first acquaintance with aviation took place in 1910 at Komendantskiy Airfield outside Saint Petersburg. It was here that he saw airplanes for the first time -- machines of foreign manufacture -- Farman and Bleriot. He closely observed how they were handled, serviced, and flown. Later Sergey Vladimirovich recalled: "My love of aviation was born precisely at that moment. And this love developed into a dream...."

But Sergey Vladimirovich was to travel a difficult journey before becoming a famed designer of modern aircraft.

In 1914 Il'yushin was conscripted into the army and was assigned to duty at that same airfield. He was assigned to a support team for a board which was engaged in acceptance formalities on the Vuazen and Lebed'-12 aircraft. At first Sergey's job involved airfield and hangar sweeping and cleanup. Some time later he became a motor mechanic, later an aircraft mechanic, and in 1917 passed the pilot's examinations. Subsequently this ability to fly an airplane was very helpful to the aircraft designer in his complex and multifaceted activities.

From the very first days of the Great October Socialist Revolution, Il'yushin was in the thick of events. He was elected to the airfield revolutionary committee. This was exciting work. He also did a great deal toward preserving aircraft for the first Red Air Force detachments which were being formed. He joined the party in 1918. In May of the following year Il'yushin joined the Red Army. He became an aircraft repair mechanic assigned to Aviation Train 6 of one

of the armies of the Northern Front. Soon he was appointed commissar of that train, and subsequently was placed in charge of Aviation Train 15. During this assignment personnel worked under his supervision restoring Farmans, Newports, and Havilands to operable condition near Rostov.

The Civil War came to an end. Our country, which had commenced rebuilding the national economy, was being faced with more and more new tasks. The problem of aviation cadres also arose. Sergey Vladimirovich already possessed a great deal of experience by this time: he had learned a great deal in the aircraft shops. But Il'yushin understood quite well that this knowledge was insufficient. Therefore in 1921 he enrolled in the Red Air Force Engineer Institute, which was soon redesignated the Air Force Academy imeni N. Ye. Zhukovskiy. Here Sergey Vladimirovich not only studied, working on gaining a mastery of science, but also took active part in amateur sailplaning. In 1923 he built a sailplane of his own design, the "Mastyazhart," which was followed by the "Rabfakovets," and in 1925 by the sailplane "Moskva." The future designer disseminated aviation knowledge among Moscow workers and students, organized the Mastyazhart Sailplaning Club at a Moscow industrial plant, and took part in the National Soaring Competitions at Koktebel.

Upon graduation from the academy, Il'yushin headed one of the sections of the Air Forces Scientific and Technical Committee. Performance requirements were formulated under his supervision, preliminary and detail designs were examined, and plans for development of new aircraft were drawn up.

In 1931 Sergey Vladimirovich was named head of the Central Design Office (TsKB), at which there were several teams. They were led by N. Polikarpov, P. Sukhoy, D. Grigorovich, S. Kocherigin, and V. Chizhevskiy. Two years later Il'yushin established his own design office within the framework of the TsKB. His was a small team, consisting for the most part of young persons lacking experience. In time this team was fated to develop into one of the leading designer organizations and to give the homeland an entire family of outstanding "Ils."

In August 1941 Soviet military aircraft flew the first powerful strikes on the capital of fascist Germany. These raids were flown by Il-4 bombers. This aircraft was designed in the mid-1930's at the design office headed by S. V. Il'yushin. During the Great Patriotic War our courageous fliers, flying thousands of kilometers and penetrating the enemy's strong antiaircraft defense with these aircraft, successfully carried out their assigned missions.

The Il-4 was the principal aircraft of Long-Range Bombardment Aviation, which was reorganized in February-March 1942 into Long-Range Aviation. It was also used with success by the Navy as a delivery platform for mines and torpedoes in the battle against enemy surface ships and submarines.

Aircrews, engineers and technicians had a great deal of affection for this combat aircraft, which in a number of performance characteristics was equal to foreign aircraft of its class, and was superior to them in some respects. The Il-4 accompanied our heroic Armed Forces with flying colors along the entire difficult but glorious journey -- from the first to the last day of the war.

"Sergey Vladimirovich," recalls one of his assistants, "was endowed both with a great deal of talent and considerable 'lift.' It is this which ensured a steady upward advance, without 'forced landings' or 'sideslips'."

He highly prized knowledge and a hardworking nature in others. But he had particular respect for those who were distinguished by a high degree of enthusiasm, confidence and conviction. Il'yushin considered well-known aircraft industry process engineer Vitaliy Ivanovich Demin, with whom he had a friendship spanning a period of 40 years, to be such a person.

"Important first and foremost in any work," Il'yushin said to Demin time and again, "are soaring flight of ideas, creativity, and conviction. But this applies in particular to our work."

He considered the labor of the aircraft designer to be not only creative effort grounded on advances in science and technology and directed toward designing and building a unique aircraft, but also the capability to combine designer abilities with the new demands which arise during the process of designing and building each new aircraft.

"Every newly-designed aircraft," states twice Hero of Socialist Labor and Lenin Prize recipient General Designer G. Novozhilov, "which is designed to perform specific missions, must meet new and very stringent demands. Dimensions, configuration, layout, structural design and, finally, all aircraft systems should be in conformity with its intended use to a maximum degree." The ability to solve complicated problems in a technically simple manner enabled Il'yushin to design aircraft which played a significant role in the development of our Air Forces and civil aviation. They have taken a worthy place in the history of Soviet aircraft engineering.

As we know, every designer usually has a specialization. The team established and tutored by Il'yushin is rightfully called a group with a broad aviation profile. It designed ground-attack aircraft, bombers, and passenger aircraft.

In a letter to the CPSU Central Committee dated 27 January 1938, Sergey Vladimirovich substantiated the need to design and build an armor-plated ground-attack aircraft and requested that the Central Committee assign him the job of accomplishing this difficult and critically important task, a task which he carried out with flying colors.

At the end of 1939 test pilot V. Kokkinaki commenced testing the new Il'yushin aircraft, which bore the factory designation TsKB-55 (BSh-2). It was an all-metal two-seater. At the end of March 1940, after finishing touches were made, this aircraft was submitted to the Air Forces Scientific Research Institute for government flight testing; the tests were performed by Maj A. Dolgov and senior engineer N. Kulikov. Following successful completion of testing, Il'yushin visited the plant in December. He was accompanied by a large group of leading specialists.

Sergey Vladimirovich was greeted by Nikolay Dmitriyevich Vostrov, who had recently been appointed plant chief engineer. He firmly shook the hand of his

schoolmate from academy days: "I see that you have come leading an entire army, like a real general."

"Hello, Nikolay Dmitriyevich. I am happy to see that you are in good health," Il'yushin replied with a smile. "And you are right about the army. You and I have been assigned a job which requires, as they say in the navy, 'all hands on deck'."

That same afternoon supervisory personnel from the principal services were summoned to a technical meeting in the office of the plant general manager. Sergey Vladimirovich stepped over to the wall, on which hung a sectioned drawing of the ground-attack aircraft, and picked up a blackboard pointer.

"Comrades!" he began, quietly but firmly. "A few days ago the Soviet Government made the decision to adopt the new Il-2 ground-attack aircraft for the Red Army. You and I have been instructed to set up in extremely short order large-series or, to be more accurate, mass production of this aircraft. Your plant is the lead enterprise in a group of enterprises which will take part in building the new aircraft. The Il-2 is an exceptional aircraft...."

Il'yushin told them that the armored fuselage had already been tested at a proving ground in the Moscow area. It had been subjected to a hail of bullets and shells. This helped the experts choose the right armor thickness. They decided that wherever hit probability was high, the plate should be up to 8 millimeters thick, with lighter plate in the upper areas, as thin as 4 millimeters.

Our armor-protected ground-attack aircraft became a formidable force in the battle against enemy tanks and motorized infantry, becoming the principal aircraft in the sky over the battlefield. Frequently the crews of the redoubtable Il-2 delivered heavy strikes on airfields and other enemy targets, and they successfully engaged in aerial combat with fascist fighters.

On 2 December 1944 S. V. Il'yushin's design office was awarded the Order of the Red Banner for designing the new ground-attack aircraft; this new decoration was added to the Order of Lenin. During the years of the Great Patriotic War our aircraft industry provided the battlefield with more than 40,000 Il combat aircraft.

The first Soviet jet-propelled bomber, the Il-28, was built in 1948. It went into series production.

After the war the design office headed by S. V. Il'yushin developed an entire family of passenger aircraft for the Soviet Civil Air Fleet -- the Il-12, Il-14, Il-18, Il-62, Il-76, and Il-86. It would surely be a difficult task to find a continent which has not been visited by aircraft sporting the letters IL on the fuselage. The design and improvement of aircraft has been the lifework of Sergey Vladimirovich Il'yushin, fulfillment of his duty to his beloved homeland. He always had work plans extending 3 years and 10 years into the future, and he labored on each of these plans, embodying his soaring dream into reality.

"The light in the windows of the General Designer's office," recalled Hero of Socialist Labor and Lenin and State Prize recipient chief designer V. Borog,

"was switched on earlier and extinguished later than in all other windows. The morning was reserved for creative work, to be spent exclusively with the designer teams, in engineering calculations, and in the shops. Sergey Vladimirovich could approach anybody; he knew everybody and was familiar with the work of each. At meetings, which were brief, businesslike, and which presented a clear picture of immediate plans, Il'yushin demanded that every individual who spoke be specific and show inner conviction above all else."

Everybody who worked for many years with this remarkable individual preserves his bright countenance in their hearts. Il'yushin had the ability to organize the complicated work of a design office without unnecessary reproach or criticism and without raising his voice. But if he addressed his closest assistants by first name and patronymic, everybody knew that the General Designer was unhappy.

He liked to walk over to the board, sit down, and analyze in great detail the behavior of a curve on a diagram. In spite of his vast knowledge, he never hesitated to check himself once more, not fearing to display his ignorance or to learn something new.

"I recall," relates one of the leading specialists at the design office, "I had just come to work at this design office straight out of college. Right out of the blue I was summoned to the General Designer. I was nervous as I headed for his office. When I reached there, I saw that the electrical engineers had gathered. I realized that a serious discussion about aircraft electrical equipment was in progress. 'What are your thoughts on this?' Sergey Vladimirovich turned to me, even though we were in the company of experts who had worked with him since 1933. I now realize that what he wanted was to compare their approach with fresh theories."

The General Designer could talk about aircraft for hours on end, enthusiastically discussing the development prospects of Soviet aviation, but he did not like to talk about himself. Modesty was a distinctive trait of Sergey Vladimirovich.

"Airplanes sing in the sky about aircraft designers," he once stated in an interview with a correspondent.

Engaged in enormous, truly titanic work connected with developing aircraft, Il'yushin still found time for active participation in this country's public affairs. He was repeatedly elected deputy to the USSR Supreme Soviet. He was continuously a member of the design officer party buro. He, a person of a great soul and responsive heart, was constantly visited by people, while those who could not get together with him personally would write letters. And each and every one of them received good advice and reliable support.

Sergey Vladimirovich found time for everything and was always successful. Himself being a disciplined, organized and precise individual, the General Designer achieved a high degree of discipline on the part of the design office staff.

"There has long been a rule in this famed design office," relates former computing engineer M. Butenko, "that one enter the premises five minutes before

the start of the workday, in order to start work when the bell rings. Outside lines are connected only to the department supervisors in the morning hours, and meetings of various types are held only in the afternoon...."

Very friendly interpersonal relations were established in the design office from the very outset. Everybody understood one another perfectly. Sergey Vladimirovich was the heart and organizer of many comradely get-togethers. In winter and on days off he would initiate organization of cross-country ski excursions, while in summer he favored riverboat excursions. He read a great deal. He loved poetry and music. He was an enthusiastic angler and hunter. He usually spent his vacation at home in Vologda Oblast.

"We have a lake there, called Kubenskoye. It contains a lot of little islands. Great hunting," related Sergey Vladimirovich. "Father would come back home," recalls the academician's son, Hero of the Soviet Union and Honored Test Pilot USSR V. Il'yushin, "would build a rude hut on some little island, and would take up residence there with his shotgun and fishing gear. He considered this to be the best form of rest and recovery from his busy life at the design office and the bustle of Moscow. He would usually return well rested and full of vim and vigor...."

Everybody who knew Sergey Vladimirovich well comments that he had a strong character and never yielded to depression. The second test flight of the Il-62 took place on 31 March 1963, the General Designer's birthday. Il'yushin observed the takeoff from the control tower. The flight was a success. Everyone was expectantly waiting for the new airliner to land.

"Suddenly the aircraft appeared," relates one of the principal engineers, "entered the pattern and came in for a landing. But the rollout was not exactly a good one. The nose gear and the outer part of one wing were damaged. This dampened everybody's mood. One would think that discussion of the flight, study of the test materials, and determination of the causes of the mishap might upset Il'yushin. Nothing of the sort occurred, however, although we well understood how hard it was for him to retain his composure. In addition, that evening he acted as an affable, hospitable host. On that March evening Sergey Vladimirovich played the accordion as always, we sang songs in harmony, and everybody joked...."

S. V. Il'yushin, an outstanding designer and organizer, a Communist who was dedicated to the party cause, an ardent patriot, and a person of great civic courage, continuously directed the staff of the design office for 37 years. In the middle of the 1960's, when his health began to fail, he commenced to think about a replacement. Sergey Vladimirovich took pains to see that the design office would be in reliable, worthy hands. His choice was Genrikh Vasil'yevich Novozhilov, a gifted designer and an experienced party organizer, a man who had spent formative years on the design office staff.

"He had guided Novozhilov through all the stages of development of an aircraft: manufacture, testing, operation," recalls twice Hero of the Soviet Union Honored Test Pilot USSR V. Kokkinaki. "Convinced that his choice was correct, in 1970 he recommended that the ministry appoint Novozhilov General Designer, while he himself entered retirement. Il'yushin's style and school were also clearly manifested in this...."

Sergey Vladimirovich did not err in his successor. Today the staff of the design office headed by twice Hero of Socialist Labor and USSR Academy of Sciences Corresponding Member Genrikh Vasil'yevich Novozhilov are worthily carrying on the undertaking of their mentor and teacher, designing high-quality aircraft for our great homeland.

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#### COMPONENTS OF POLITICAL OFFICER'S SUCCESS DESCRIBED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 3, Mar 84 (signed to press 2 Feb 84) pp 42-43

[Article, published under the heading "Marching in the Vanguard," by Maj N. Antonov: "Always With People"]

[Text] I was not able to get together immediately with Gds Maj V. Rodchenko. Flight operations were in progress, and Valeriy Pavlovich was in the air.

"The deputy commander for political affairs is flying dual with an officer Gizatullin, recently assigned to the subunit," explained squadron commander Gds Maj B. Vladarchuk, adding with a smile: "That's the way he is. Always on the go. And flying is as important to him as breathing."

This was said with a special warmth. I could not help but recall comments about this political worker by staff officers at the higher-echelon headquarters. They spoke of Valeriy Pavlovich not only as a Communist of high principles, a first-class pilot and a hardworking and energetic political worker, but also as a sensitive, responsive friend.

We finally met. "Guards Major Rodchenko," a stocky officer of smart appearance introduced himself.

His dark hair showed occasional strands of gray, but youthful lively sparks flashed in his large hazel eyes. His manner of bearing and speaking gave away a vigorous, energetic nature. Valeriy Pavlovich proved to be an interesting interlocutor. His judgments were bold, distinguished by precision and clarity.

"Quite frankly," he admitted, "sometimes things are not easy. This is a difficult job -- to be a deputy commander for political affairs. But it is an essential job."

Engrossed in our conversation, we did not note the passage of time. Therefore the signal to assemble took us by surprise. Within minutes aviation personnel were assembled.

This year the men of this guards fighter regiment were the initiators of socialist competition in district Air Forces units. Based on the experience of past years,

the men knew that there would be no time for slipups. Commanders, political workers, party and Komsomol activists did a good job of working with the men, explaining to them the importance of the combat training missions at hand, and an enthusiastic mood now prevailed in all subunits.

Upon receiving his mission assignment, Guards Major Rodchenko made the necessary calculations and reported mission readiness. This military pilot 1st class, trained to fly in all weather conditions and possessing profound knowledge, has had a great deal of experience. This helps the political worker march in the vanguard at all times, to gain his bearings in any situation, to know people, and to have a sense of whoneeds what help. For this reason, while waiting for his turn to go up, in spite of the fact that every single minute counts, Rodchenko nevertheless found time to brief party and Komsomol activists. His experience was also a factor here. Valeriy Pavlovich, following a plan and schedule worked out in advance, assigned duties fairly quickly. For example, he instructed Gds Maj Tech Serv V. Gerasimenko to have a talk with technical personnel, and he instructed Gds Capt I. Biryukov to prepare a news bulletin leaflet. He himself arranged for veteran pilots to speak, relating to their fellow personnel about various past tactical missions. The men became infused with the political worker's energy and confidence and proceeded to ready themselves for their missions with aggressive enthusiasm....

A great many years have passed since that day when young pilot Lieutenant Rodchenko and his comrades first entered the guards fighter regiment combat glory museum. With bated breath they acquainted themselves with the history and fighting journey of the famed, highly-decorated unit. During the Great Patriotic War 8 of its pilots were named Hero of the Soviet Union, and these famed Soviet falcons fought more than 1,000 air engagements, destroying more than 270 enemy aircraft. Valeriy gazed with emotion at the time-yellowed photographs of men of the regiment and read the lines of action reports and descriptions of feats accomplished by combat soldiers in fierce clashes with the hated foe. Lieutenant Rodchenko would remember that day his entire life, because it was on this day that he first felt the feelings of adulthood and comprehended the entire extent of his responsibility for his actions and deeds.

A great deal of attention was devoted to breaking in the regiment's young combat pilots. Commanders and political workers taught the lieutenants not only to fly and fight in various conditions, day and night, but also instilled in them Communist moral fiber, a high degree of morality, as well as pride in their profession. Rodchenko was one of the first successfully to accomplish all flight drills. His character of persistence and purposefulness was an important factor. He worked to master flying skills day and night, at low level, confidently conducted aerial combat and reconnaissance, and hit ground targets with accuracy. His commanding officer noted the ability and effort of this young pilot, and soon appointed him leader of a 2-aircraft element, and subsequently flight commander.

There finally came a day which, just as the day he first reported for duty to the regiment, compelled Valeriy to appraise his actions in greater earnestness: the Communists had elected him squadron party organization secretary. This meant a greater work load. The young party organizer himself studied and taught others, and worked together with the squadron commander and deputy commander for

political affairs in settling various matters pertaining to combat training and unit affairs. When he did have any free time, he would hasten to the library or to the clubhouse. He and his wife Yelena took part in amateur talent activities. In short, no matter what Valeriy did -- reading poetry or discussing with comrades an interesting book, movie, newspaper or magazine article -- he did everything with energy and enthusiasm. And people were drawn to him.

It appeared that Valeriy was successful in all things, that everything was running smoothly. But once a pilot made a serious mistake due to lack of discipline. Some time later a young technician violated military discipline. This called for a serious discussion between the party organization secretary and the squadron commander, Gds Lt Col N. Lapin, whose opinion Rodchenko held in high regard. It had been Lapin who had noted in the young officer a proclivity toward community affairs. The party organization leader long remembered this conversation: although not a major step, it nevertheless was a step along the road of his maturation as a future political worker.

"Your main task is to assist the squadron authorities in accomplishing present tasks and to focus party members toward this. And how about yourself? You run around a lot, but up to the present there have been no results in evidence," stated the squadron commander, and each word in his statement injured the party organizer's self-esteem. "What steps can be taken by the party organization and by you, its secretary, to eliminate disciplinary violations?"

"We shall hold a meeting of the party buro and severely punish the guilty parties," Valeriy replied, a note of resentment in his voice.

But the squadron commander, seeming not to notice this, asked: "And after that? You will take care of these ones, but what if others commit violations tomorrow? No, think it through thoroughly on how to organize things so that we have no violations whatsoever."

And in fact things went as the commanding officer predicted. Scarcely had the comrades finished firmly condemning the misdeeds, and scarcely had the authorities applied disciplinary punishment, when new instances of violation of discipline occurred in the subunit. And once again the squadron commander summoned the party buro secretary. Valeriy tried to make excuses, but his explanations suddenly began to seem unconvincing even to him. He shrank back and fell silent. The squadron commander commented: "The command authorities are taking measures to strengthen discipline in this outfit. But the party organization should also play a role in this. Are you personally, Valeriy Pavlovich, confident that those party members who were recently punished are deeply aware of their guilt and will henceforth cause no problems to our outfit?"

No, I am not...."

His party member conscience told him: you do not yet know the men, nor do they know you very well, because as yet nobody has come to you for advice or assistance, and nobody has shared with you their innermost thoughts....

After this conversation the young party organizer made a great many revisions in his work. His older comrades helped him understand that it is not enough to be

an excellent pilot and commander, nor is it even enough to be constantly with the men and to enjoy their respect. One must have the ability to analyze and understand people, to learn to see the finest traits in them, to develop good points and to help them eliminate bad points.

There is no question but that the squadron commander, Gds Lt Col N. Lapin, and his deputy for political affairs, Gds Maj V. Solomentsev, were experienced officer-indoctrinators. Valeriy learned a great deal from them and, most important, began studying the men, their personality and character, and proceeded to inquire into their proclivities, abilities, and habits. This helped him find the way to the heart of each and every aviator, to come to their aid in a prompt and timely manner, and to note good things accomplished.

For example, Rodchenko helped WO V. Podkhomutnikov rectify his behavior in a prompt and timely manner. There had been many complaints about this aviator, and the party organizer decided to get to know this warrant officer more closely. He ascertained that Podkhomutnikov, who was unsociable and quite changeable in his moods, lacked confidence in himself, in his ability, while his superiors and fellow servicemen viewed him as a potential disciplinary offender. With this attitude they worsened his already poor attitude. Rodchenko spoke with the head of the subunit's aviation engineer service and with the members of the party buro. In view of Podkhomutnikov's high degree of job skill, they decided to praise his work efforts more frequently, while not being less demanding on him. The result proved gratifying. His spirits picked up, and he began showing a desire to work, and not merely to work, but to do a job which would be commended and praised.

The party organizer did not stop with this. He knew from experience that such individuals as Podkhomutnikov need extended, constant attention. Only in this case does indoctrination work reach its ultimate goal. This is precisely how the matter was stated at the 6th Armed Forces Conference of Secretaries of Primary Party Organizations. Officer Rodchenko also adopted its recommendations. Having conferred with the party member-supervisors of the subunit aviation engineer service, he decided to assign Podkhomutnikov patronship over one of the young maintenance specialists and enlisted him in efficiency innovation activities. Although it took time, this individual proceeded to take the correct path, found himself in his job, and became firmly established in the collective.

There are many similar examples of an individual, thoughtful approach to personnel in the practical work experience of Guards Major Rodchenko. Each such instance helped him develop as a party buro secretary.

Valeriy Pavlovich is presently a squadron deputy commander and one of the unit's most experienced political workers. The subunit rightfully bears the title of excellent. They are a smoothly-running outfit, and a large part of the credit for this goes to Rodchenko. He saw from the very first days after he was appointed to his position, while becoming acquainted with the men, that the majority of the squadron's pilots and technicians are highly proficient specialists who totally dedicate themselves to their job. Some things were cause for concern, however. For example, the political worker noted that certain pilots and technicians consider their own personal professional training to be a matter

of high priority, but they fail to be sufficiently demanding on one another. This results in a diminished intensity of socialist competition. Valeriy Pavlovich shared his observations with the squadron commander, Gds Maj V. Vladarchuk, and party buro secretary Gds Capt A. Chasnyk. They proceeded to support his efforts. Together they drafted a general line of policy in ideological-indoctrination work.

They commenced with socialist competition. Quite frankly, this was not proceeding all that well in the squadron. Each individual was concerned primarily with his own personal performance, and was not interested in the problems of his comrades. There was a need to alter people's consciousness, to get them moving, to intensify a spirit of competitiveness, and to give competition a collective character. First of all they decided to be more demanding in grading observance of precision characteristics of flight parameters and precise execution of all flight elements. Leaders and laggards were noted. Those who were lagging behind became concerned: why had they been outstripped by their comrades? At this point squadron leader-Communists and party activists commenced a broad exchange of experience and know-how in the subunit. Fliers who on previous sorties had performed combat training missions with excellent quality shared the secrets of their expertise. Pilots 1st class officers I. Pozdnyakov, V. Aniskin, and S. Yel'kin related in detail how they prepared for flight operations involving specific training missions, and how they performed in the air during the most critical moments of air combat. In addition, at post-mission debriefings and critiques, when totaling up competition results, and at party meetings they began to commend not only those who had achieved good results in combat training, but also party member-activists and organizers of adoption of advanced know-how. All this unquestionably helped develop in the men a sense of collectivism, mutual assistance, as well as helping advance to the forefront the interests of the group rather than those of the individual.

As Rodchenko supposed, this upturn could not help but also reflect on other aspects of aviation personnel's daily life and combat training. People became more demanding toward one another and more firm in appraising their own actions and those of their comrades.

Valeriy Pavlovich encountered various problems in the new outfit, but he solved them all quickly and intelligently. Experience helped. He was gaining increasing respect. Once deputy commander for aviation engineer service Maj Tech Serv V. Gerasimenko confided in the political worker a feeling of concern: relations among personnel had not developed well in one of the maintenance groups. Valeriy Pavlovich studied the state of affairs in the subunit. Group chief Gds Sr Lt Tech Serv V. Poteryayev is a highly-proficient specialist, but he makes serious mistakes in indoctrination work. These mistakes have reflected on job-related matters. Rodchenko shared his thoughts with the commanding officer, his deputy for aviation engineer service, and the party organizer.

"There is not a single party member in Poteryayev's group," the political worker stated. "How about assigning Guards Senior Lieutenant Korepanov to assist him? He is a knowledgeable officer, a person with life experience, and a party member. I believe that he will be helpful with indoctrination work."

The command authorities decided this matter affirmatively. And results were soon in evidence. Officers Poteryayev and Korepanov soon found common ground and established good, meaningful relations. On Valeriy Pavlovich's advice the group chief began devoting more attention to working with individual subordinates, started a special journal in which he entered his observations and impressions of others, and he proceeded to keep records on accomplishment not only of job-related tasks but of community-activity assignments as well. Soon this small collective became more cohesive, gross disciplinary violations became a rarity, and the quality of maintenance on aircraft equipment improved.

There has perhaps not been a single issue in resolving which Guards Major Rodchenko did not participate, just as, incidentally, there is not a single person in the squadron who has not felt Rodchenko's attention and solicitude, who has not received meaningful advice and support. Time and again the political worker also was compelled to become involved in family squabbles and in aviation personnel housing problems. And he always displayed the requisite tactfulness and persistence in resolving pressing problems.

...Aircraft were landing one after the other. The combat pilots had done a good job at a tactical air exercise. A fighter touched down. It was being flown by Military Pilot 1st Class Gds Maj V. Rodchenko. He had been assigned a difficult mission: an intercept. The "aggressor" had proven to be quite experienced. But Valeriy Pavlovich made a successful intercept.

Climbing out of the cockpit, Rodchenko immediately headed for the other aviators: he was giving advice to one of them, praising another....

"Yes, that is our deputy commander for political affairs," Guards Major Vladarchuk repeated, not without pride. "A restless spirit.... But the main thing is that he is constantly in the middle of events, among the men, and always in the vanguard."

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3024

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## GAGARIN'S WIDOW REMINISCES ABOUT HIS CAREER

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 3, Mar 84 (signed to press 2 Feb 84) pp 44-45

[Interview with Valentina Ivanovna Gagarina, widow of Yuriy Alekseyevich Gagarin, by AVIATSIYA I KOSMONAVTIKA special correspondent N. Kon'kov, on 9 March 1984: "He Was Such a Man...."]

[Text] Yuriy Gagarin.... We have become accustomed to this name, which became a symbol of courage, heroism, and valor. It entered our consciousness on a certain day in April 1961. Yuriy Gagarin's flight lasted 108 minutes. The genius of the Soviet people and the mighty power of socialism are embodied in this feat, which will be remembered forever. Interest in the first man to fly in space is not abating with the passing years.

Yuriy Alekseyevich Gagarin would have celebrated his 50th birthday on 9 March 1984. Our special correspondent N. Kon'kov met with the cosmonaut's wife and friend, Valentina Ivanovna Gagarina, and asked her to answer a number of questions.

[Question] During the years of your life together, Yuriy Alekseyevich was transferred on several occasions to a new duty assignment. They included Orenburg, a distant Arctic garrison and, of course, Zvezdnyy. Could you tell us something about those days?

[Answer] It was in Orenburg that I met Yuriy, joined my life with his, that of a military man, and became, as they say, his fighting companion. I also remember well that distant Arctic garrison. The aviation unit to which Yura was assigned was flying all the time. The deafening roar of turbines could be heard day and night. Yura would leave our quarters early in the morning and not return home until evening. Although military service took up a great deal of his time, both then, when we were newlyweds, and later, after Lenochka was born, he made an effort to find a little time for his family. His love for us was sincere and tender.... He always sought to help others, to share other people's sorrows and burdens. His mother, Anna Timofeyevna, described Yuriy's character very well: "He was very cheerful, rarely angry, and did not like to quarrel; on the contrary, he would make peace with joking words and laughter. And everybody loved him. He was everybody's favorite. Just take a look at

photographs of Yura -- his face is always cheerful. This is characteristic of him." Orders came in March 1960. We quickly packed our belongings and gave our few pieces of simple furniture away to the neighbors. Our friends gathered with us that evening, to bid farewell. "I am going to be a test pilot," Yura said to his friends, as if making excuses for our departure. "I'll get to fly all I want!" I knew that he had dreamed about this for a long time, to get as much flying as possible. And not only regular production models. We set up housekeeping in Moscow, in a small room in a barracks-type building, practically bare of furniture.... The cosmonauts commenced training in two old buildings on Leningradskiy Prospekt. Four months later we moved to the facility in Moscow Oblast which subsequently occupied a special place in our lives, which represented an embodiment of Yura's dream. His work went very well here. He spent many a night at his desk poring over books and notes, copying down materials, and making calculations. Once he brought a small Tsiolkovskiy volume home from the library. He read it with great interest. He was amazed: how could it have been possible at the beginning of the century to foresee and describe those activities in which they were now engaged? This delighted him. Shortly before the mission Yura was asked why he was working so hard and intensely. He replied: Are people who have been assigned an important mission, a lofty goal, going to think about themselves and about how much energy and effort they should expend? A patriot, a Komsomol member, a Communist never thinks about this. The main thing is to accomplish the task.

[Question] It is said that one can correctly judge a person by how he conducted himself during the happy and difficult moments in his life, and how he continued serving the cause. What was Yuriy Alekseyevich like on those historic days in April 1961?

[Answer] I remember on the eve of Yura's departure for the launch center we put Lena and Galya to bed a bit early and had a long conversation after supper. We reminisced about the past and discussed plans for the future. We talked about our daughters. I understood or, more accurately, sensed where he was going and why, but I did not question him. He joked and cheerfully spoke about various things. It was difficult for him to hide his direct involvement in the forthcoming events. Morning came, but we were still engaged in conversation and could not get our fill of it. A car came to a halt under our window and honked. It was time to go! Yura kissed his daughters, we said good-bye, he walked over to the door, and stopped. His clear, lustrous eyes gazed at me, very tenderly, very warmly. They contained neither worry nor doubt. On 12 April the day began quite normally for me. I sent Lena off to nursery school, and was busy with Galochka. Suddenly there was a knock on the door. It was a neighbor lady. "Valyusha, turn on the radio! Yura is in space!" "The world's first," they said on the radio. "The world's first," they wrote in the newspapers. And everywhere they were saying his name. The world's first.... They also spoke about the danger involved, for not always does an encounter with the unknown end well for the trailblazer: a difficult and dangerous experiment is attended by risk, which somebody must take. "Not everybody can handle it: To be the very first to rise and attack!" Konstantin Simonov wrote at that time.

[Question] You have surely been asked time and again how it is that precisely Yuriy Gagarin became the first man in space?

[Answer] Of course. Even our daughters were interested. It is a natural question. Why him and not somebody else, since there was an entire group of trained and ready candidates? I have heard all this. As it puts me in a rather awkward position, I can merely repeat that which others have said. Sergey Pavlovich Korolev stated that Yura was a felicitous combination of innate courage, an analytical mind, and an exceptionally hardworking nature. Once when we were vacationing in Sochi, Sergey Pavlovich told me that he had seen a great many very interesting people in his life. In his opinion Yuriy was a remarkable, unique individual. During the days when preparations were being made for the mission, when everybody was caught up with concerns and nervousness, he alone remained calm, even cheerful. Here is an incident related by the Chief Designer. On the morning of the mission, when Yuriy was putting on his spacesuit, Sergey Pavlovich looked into the "wardrobe room" and asked: "How are you feeling?" "Fine. How about you?" Yura peered into Korolev's grayish, tired face; Korolev had spent a sleepless night. His smile disappeared. "Don't worry, Sergey Pavlovich, everything will be just fine," he said softly and reassuringly.... Yevgeniy Anatol'yevich Karpov, who was the first head of the Cosmonaut Training Center, recalled that Yuriy never lost his composure at difficult moments. He related that when the State Commission made the decision that Gagarin would be the first man in space, an unforgettable scene occurred. Dozens of eyes were riveted on him. Yuriy swallowed, and his eyelids began to tremble. He was not embarrassed at this show of feelings. Everybody realized that he was experiencing the greatest feeling of inner delight. Kind, happy smiles appeared on the faces of those present. It seemed that at any moment one of the scientists, designers, doctors, and engineers would no longer be able to restrain his feelings, would go up to him, embrace him, and say to him in a fatherly fashion: "Fly, my son. You have our blessings." Gagarin firmly and clearly articulated: "Thank you for your great confidence. The mission will be accomplished...."

[Question] In each of our lives there are (or will be) decisive days, hours, and minutes. For Yuriy such a time was when he arrived at Zvezdnyy. And later it was the spring of 1961. It was 12 April. The launch from Baykonur. And the return. how did he change after the mission?

[Answer] After the flight Yura was literally flooded with an avalanche of fame, respect and admiration. Probably no person on earth had ever been so famous. He was rendered great honors, and at the same time he was given civic duties which involved a great deal of work. Deputy to the USSR Supreme Soviet, delegate to party congresses, member of the Komsomol Central Committee, and chairman of many commissions.... I am still amazed that Yura had the time to serve as a member of the Komsomol Central Committee and head the Soviet-Cuban Friendship Society, to serve as a member of the parents' committee at school and head the Water-Skiing Federation Board, to write books and appear on the radio, to perform legislator duties, party assignments, and to accomplish a great deal of work. I may be prejudiced about Yura, but as far as I am concerned he did not change a bit: he was kind, sensitive, restless, cheerful, and obliging. Yura liked children very much. He called our little daughters "Miss Why Is It?" In spite of the fact that he was extremely busy, he always found time to play with them, to devote to them, and he engaged in endless conversations about their doings, mistakes they made, and books they had read. Yuriy was drawn to people, and people were drawn to him. Everybody has his own

character, personality, destiny, joys and sorrows. But everybody has the same faith in man, that a good person will not let you down, will not deceive you, will not stab you in the back. It is easy to get along with good people. Everybody knows that. Yuriy quickly made friends. He had the ability, as they say, immediately to spot the good in a person, and he acutely sensed phoniness and insincerity. It would be quite a job to list everybody with whom he was close, whose friendship he valued and of which he was proud. He inherited a wise peasant habit -- to weigh every word. His family and its traditions forged his character and taught him to value human pride, to respect his elders, and to be hospitable. And his mother, Anna Timofeyevna, gave him a generous heart.

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## HELICOPTER'S FUTURE BATTLEFIELD COMBAT ROLE CONSIDERED

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[Article, published under the heading "Abroad," by Military Pilot 1st Class Hero of the Soviet Union Maj Gen Avn (Res) M. Fesenko: "Helicopter Against Helicopter"; based on materials published in the foreign press]

[Text] Statements by experts on the rising probability of an armed clash between helicopters of opposing forces in the course of their performance of combat missions are appearing in the foreign military press with increasing frequency. As they note, helicopter air combat is presently at the stage of investigation and experimentation. The experience amassed by fighter pilots of different generations is being studied. The most suitable weapons and aiming systems are being selected. Modes of combat, standard tactics and formations are being devised.

Simulation and practical tests have confirmed the assumption that combat between helicopters may be close-range maneuver combat. It is considered close-range combat because the visual detection range of a helicopter (from a helicopter) ranges to 3 kilometers, which ensures that the pilot can execute the initial stages of combat -- closing and attack -- beyond the effective range of "light" weapons. And combat in visual contact between adversaries, according to the classification adopted abroad, falls within the category of "close-range." In addition, the pilot also visually friend-or-foe identifies a target by its external characteristics.

Air combat between helicopters is considered maneuver combat because a vigorous maneuver is the best means of setting up for weapons delivery and for evading hostile attack. Straight-line breakaway is reasonable only with a fairly substantial superiority in speed and acceleration, which is almost out of the question for helicopters of the same generation.

Most frequently air combat between helicopters will evidently be group combat, inasmuch as they perform their principal mission -- fire support of ground troops -- as pairs, sections, and sometimes squadrons (battalions). Employment of one-on-one tactics is little probable when attacking airborne helicopters ("hunting" has its own rules and is conducted in other conditions). Therefore air combat between helicopters is governed by the traditional principle of teamwork and cooperation, with a 2-ship element linked by stable fire and tactical contact.

At the same time group air combat cannot be chaotic. The actions of several aircrews are coordinated by a commander, who estimates the current situation, taking into account situation changes, and makes a decision on achieving a unified objective. Continuous and precise command and control (including from the ground) is one of the fundamentals of combat. It is achieved by organizing monitoring of airspace over the battlefield, by reliable target designation, and by prompt alerting to enemy actions.

Since helicopter-mounted weapons fire only forward, this determines the leading role of offensive tactics. Combat aggressiveness is a most important principle of these tactics. It obliges the helicopter pilot, when he is in a defensive situation, to look for ways to seize the initiative rather than resorting to flight.

The initial attack pass, just as in fighter combat, is of determining significance. It involves closing undetected, with maximum exploitation of all possible camouflage and concealment, and ends with delivery of lethal fire. If the initial attack fails, the adversaries proceed to maneuver, whereby the hit-scoring capabilities of the helicopter's weapons diminish. Thus the element of surprise, alongside teamwork, coordination, and offensive aggressiveness, is also one of the most important principles of helicopter combat.

Foreign military experts consider the aircraft cannon to be the most reliable close-range weapon. The process of rearming the AH-1 Cobra, the U.S. Army's principal helicopter gunship, with a three-barrel 20 mm turret-mounted gun is presently in the completion stages. Its effective range of fire is 1,500 m, its rate of fire is 680-780 r.p.m., and it carries a combat load of 750 rounds. This weapon is designed to hit both air and ground targets. It is a lightweight version of the well-known M-61 Vulcan.

The AH-64 Apache multirole helicopter which is becoming operational in U.S. Army Aviation carries a 30 mm Chain Gun with a rate of fire of 600-650 r.p.m. It carries 1,200 rounds and has a muzzle velocity of 807 m/s. As we know, these helicopters are tasked with engaging tanks. Therefore the gun is to be used in defensive air combat.

The conditions of its employment, as experiments have shown, are almost identical with the conditions of attacking a mobile ground target. In view of the relatively short range at which fire is delivered (less than 1,500 meters), closing is considered to be the most difficult element. It is possible to take the adversary unawares and gain the element of offensive surprise only if the helicopter suddenly and unexpectedly appears in the immediate vicinity of the enemy.

Aiming, after the attacking helicopter enters effective weapons range, does not impose tough demands on pilot weapon training, since the size of the target is fairly large, rate of movement is not too rapid, and determination of lead is not difficult. In addition, added to helicopter maneuver is fire maneuver, made possible by the movable turret mount. Only a high degree of survivability can save a helicopter coming under a surprise cannon attack.

The AH-64 Apache helicopter boasts a redundant control system, partial fuselage armor protection, fuel tank protective covering, and blast-protective bulkheads (shields) forward of the crew space. During survivability tests a 23 mm shell was detonated in the gunner's space in order to determine the effect of the shock wave on the armor bulkhead separating cockpit from the gunner's space. The bulkhead withstood the load. A projectile hit into the fuel tank did not cause fuel leakage. In spite of satisfactory strength figures, experts believe that in present-day conditions survivability is achieved chiefly by means of intelligent combat tactics, maximum exploitation of terrain cover, concealment of intentions, and maneuver during performance of principal combat missions.

Arming a helicopter gunship with air-to-air guided weapons is considered more difficult from the standpoint of practical implementation. As early as the 1970's U.S. Army command authorities were devoting attention to the development of a relatively inexpensive, simple-to-operate, quick-response homing missile system. The Stinger man-portable anti-aircraft missile launcher was selected (a trooper shoulder-fires a heat-seeking missile after locking onto an air target). The launcher, minus IFF gear (Identification Friend or Foe), was modified for mounting on a helicopter. The launcher employs a fixed sight (crosshairs), rigidly aligned with the helicopter's longitudinal axis. A launcher with two missiles is mounted on a pylon alongside the fuselage (total weight 23 kg).

During in-flight experiments (simulating a combat situation), the pilot would maneuver the helicopter to place the cross hairs on the target and would place a two-position switch in first position. When the heat-seeking head locked onto the target upon closing, an audio signal would sound in the pilot's headset. Commencement of target tracking would be confirmed by cross-hair blinking. When sure that the lock-on was good, the pilot would switch to the second position and fire. The missile would independently seek the target (homing to a source of thermal radiation), and the pilot could immediately commence an evasive maneuver.

Foreign experts consider as advantages of guided missiles over aircraft cannons the capability of almost immediate combat delivery following visual detection of a hostile helicopter at maximum range. This substantially reduces the closing phase and increases probability of offensive surprise. In addition, the damage-inflicting capabilities of a missile are greater than those of a cannon: protective armor cannot withstand a missile impact.

According to the magazine FLIGHT, British Aerospace Dynamics has developed an active IR jamming unit (weight 15 kg), designed to be used by helicopters. A carbon rod serves as infrared emission source. A disk with slit-aperture lenses turns around it, causing cyclic winking, similar to that of aircraft navigation lights ( $\pm 25^\circ$  angular altitude). The winking action causes a missile seeker to "wander" and thwarts lock-on.

Experts also consider suppression of aircraft thermal emissions by shielding or by cooling hot zones as countermeasures against heat-seeking air-to-air missiles. The two engines on the Apache helicopter, spaced at a maximum distance from one another to reduce the probability of damaging both with a single projectile, contain special fans which mix the hot exhaust gases with ambient air. As a result

the temperature of the gases drops from 593 to 149°, while the temperature of metal parts in the vicinity drops to 93°.

Ram cooling is used in the majority of infrared suppression systems presently under development. This method is insufficiently effective, however, while hovering and at slow speeds (up to 110 km/h), when there is little or no dynamic pressure. As tests have shown, employment of decoy flares is warranted in defensive combat, but at low altitudes their "burning" time is extremely short.

U.S. helicopter gunships, just as the fire support (antitank) helicopters of the European NATO nations, are currently not being armed with air-to-air guided missiles. The U.S. Department of Defense plans to arm the OH-58 Kiowa reconnaissance helicopter with Stinger antiaircraft missiles. It is believed that the Cobra and Apache are capable of fighting defensive air combat with cannons against attacking helicopters. The pilot's helmet gunsight should be very helpful in delivering fire and enable him to commence delivering fire before the enemy is able to do so.

It is noted in the foreign press that in the very near future the U.S. military is planning to have in its arsenal a small combat helicopter (possible based on a promising reconnaissance helicopter) which is specifically adapted for air combat. It is believed that it will be built of composite materials, will be equipped with a lightweight millimeter-band airborne radar, as well as an aiming device mounted above the main rotor hub. Armament will include a high-muzzle-velocity gun and a lightweight air-to-air missile.

The NATO command authorities intend in the future to field only a relatively small number of helicopters, specially designed to engage airborne helicopters, taking into consideration limited resources and priority missions. Modes of combined employment of ground-attack aircraft and helicopters have now been field-tested and have been incorporated into the air-force and army tactics of the Western nations. At experimental exercises A-10 ground-attack aircraft and AH-1 Cobra helicopters were incorporated into antitank forces. Results indicated that effectiveness against tanks by such a composite force is three to four times that of separate actions by homogeneous forces. The problem "ground-attack aircraft against helicopter" also arose.

Alpha Jet ground-attack aircraft of the French and West German air forces took part in experiments to test their capability to hit airborne helicopters. High maneuvering speed, which made it difficult to aim and employ weapons at close range, proved to be the first obstacle. Speed also became an ally during closing, however, when it helped reduce distance rapidly. A second obstacle is the considerable reaction time for ground-attack aircraft when departing from the ground on request. It is much more difficult for ground-attack aircraft than for helicopters to loiter in the air above tanks (or to accompany them). At the same time, when departing from an airborne loiter zone, ground-attack aircraft reach the final coordination line faster than helicopters. A third obstacle is the high cost of a ground-attack aircraft and, correspondingly, their fewer numbers among the forces capable of engaging helicopters in the air. Ground-attack aircraft, however, are armed with heat-seeking air-to-air missiles; therefore they do not require refitting, and they possess considerably greater damage-inflicting capabilities than a helicopter gunship.

The U.S. military is also investigating the possibility of developing an air-to-air missile based on the Hellfire antitank missile, with which Apache helicopters are currently armed. The plan is to place proximity fuzes on the missiles and to improve their maneuver characteristics (turns at a speed of Mach 1.7, pulling 13 Gs). The Hellfire antitank missile, which homes to a hostile tank by reflected laser beam (without the pilot's intervention after firing), is comparatively accurate. U.S. experts believe that its subsonic speed and 7-G transverse loading enable it to hit a laser-illuminated maneuvering enemy helicopter.

The tactics of antitank helicopters are grounded on a reasonable combination of strike capabilities and securement of an acceptable survival rate. One of the principal modes of engaging tanks is the attack from ambush. An attack helicopter is deployed on the ground or hovering, concealed from hostile observation behind a natural barrier. Working in coordination with it is a reconnaissance helicopter, which seeks out tanks and provides target designation after spotting them. It also illuminates the target with a laser emitter. After receiving target information and designation, the attack helicopter pops up out of ambush at the moment the tanks approach maximum effective antitank missile range.

The entire process does not take more than one and a half minutes (according to experience at exercises), from the moment a helicopter pops up out of ambush and drops down behind a natural obstacle after firing an antitank missile. Foreign experts believe that an enemy helicopter with the intention of thwarting such an attack must therefore be airborne at a distance permitting closing and subsequent firing of air-to-air weapons. In order to respond to a swiftly moving situation and to engage in a prompt and timely manner, the crew should have information on the adversary's actions and quickly determine the enemy's location. Thus both attacker and defender should work in close teamwork and coordination with airborne reconnaissance, command and control entities in order to achieve success in combat.

According to the magazine FLIGHT, utilization of the AWACS E-3A airborne command post and organization of a long-range reconnaissance system employing high-altitude piloted aircraft and drones will substantially expand capabilities to gather information on the battlefield and air situation data on a real-time basis. Reconnaissance aircraft carrying synthetic-aperture radar should have the capability, without crossing the line of contact, to warn of enemy forming of a force of combat helicopters over his own territory, while an E-3A aircraft, with a radar operating in terrain mapping mode, will track the movement of these forces (the effective scattering area of a combat helicopter is approximately equal to that of a fighter).

The tactical principle of concentration of fire on the axis of attack is applied in helicopter air combat (as it once was with slow airplanes). With equal destructive capabilities, numerical superiority is desirable. If the leader of a 2-aircraft element delivers the attack, the wingman covers him and at the same time endeavors to take up a more advantageous position for weapons delivery. In case of a failed (not resulting in downing of the adversary) attack by the leader, he swings in and delivers fire for effect.

Foreign experts believe that arming a helicopter, specially tasked with waging air combat, with air-to-air missiles could lead to revision of the "pair" principle of attack or at least to reorganization of the helicopter formation. Defensive combat by helicopters escorting an airborne assault force is considered to be tactically the most complicated. In the course of repulsing hostile air attacks, they are not authorized to abandon the general formation and deny protection to the escorted group. If sufficient support forces are available, it is recommended that an immediate escort group and a free maneuver group be designated, with the latter free to engage attacking hostile aircraft. This variation has been tested in local wars.

Thus on the basis of the results of studies, foreign military aviation experts have reached the conclusion that a fighter-helicopter is capable of waging air combat in weather conditions which restrict or exclude the employment of fixed-wing aircraft. For example, weather minimums for the U.S. Cobra helicopter for en-route visibility range from 90-640 meters or from 150 to 1,500 meters, depending on time of day and sky conditions.

A helicopter is capable of 360° surveillance and search with the aid of a second crew member, which improves conditions for detecting, identifying, and attacking a target. The comparative simplicity of the weapons and their employment (guns and heat-seeking missiles) means that considerable efforts are not required. A helicopter responds more quickly to battlefield situation changes (attacks from ambush).

A relatively uncomplicated process of training aircrews, and consequently more rapid replacement of combat casualties, as well as satisfaction of the cost-effectiveness requirement are attracting close attention by the experts to the rotary-wing fighter. In addition, fixed-wing fighters and ground-attack aircraft have their own, more extensive missions, and to detail them to engage helicopters means violating the principle of economical expenditure of resources.

All this attests to the fact that U.S. and NATO member nations military command authorities, in order to accomplish their far-reaching plans of predatory conquest, are developing and perfecting new aircraft and weapons without regard to cost, and are devising tactics appropriate to these aircraft and weapons, in order to gain absolute air supremacy over the battlefield.

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