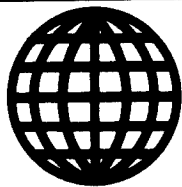


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No 6, June 1988

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AVIATION & COSMONAUTICS

No 6, June 1988

Efforts to Reduce Excessive Number of Air Mishaps Urged

91440072a Moscow *AVIATSIYA I KOSMONAVTIKA*
in Russian No 6, Jun 88 (signed to press
6 May 88) pp 1-3

[Article by Mar Avn P. Kirsanov: "Flight Safety: Human Factor Reserves"]

[Text] The 19th All-Union Party Conference is an important event for the Soviet people. Air Force personnel, seeking to mark this event with new military achievements, have done a great deal to attain more significant success in combat and political training in the current training year. Party members have inspired and led them. Following their example, the personnel of Air Forces units and subunits have become actively involved in socialist competition under the slogan "Selfless military labor, exemplary performance of duty, and the highest degree of discipline constitute our contribution to the cause of defense of the homeland."

The results of the winter training period are gratifying. The overwhelming majority of military units have met their pledges and are confidently proceeding along the path of increasing their professional skill. Commanders, staffs, political agencies, and party organizations are constantly concerned with ensuring that combat training proceeds in a fruitful manner, that discipline and organization become strengthened, and that flight operations are mishap-free.

At the present time, having commenced the summer training period, Air Forces personnel are critically appraising past achievements, are synthesizing advanced know-how, and are analyzing the causes of isolated setbacks or lagging behind the targeted performance levels in combat training. Unfortunately there are many deficiencies in this important area alongside successes.

As was the case in the past, those Air Force units in which intensive flying was not strongly reinforced with conscientious observance of flight safety rules and regulations ended up in an unenviable position. For this reason in many cases combat training was accompanied by dangerous air near-mishap situations, and there even occurred air mishaps and tragedies involving loss of life. Such phenomena lead to loss of personnel and expensive equipment, as well as to other extremely undesirable consequences. An inevitable result of each such occurrence is a break in the rhythm of flight training, in the morale and psychological state of Air Force personnel, and impairment of precise efficiency in the performance of leader personnel.

The airmen of the regiment commanded by officer A. Labkovskiy found themselves precisely in such a situation in the past training year. Having achieved pretty fair results at the beginning of the process of mastering a complex modified aircraft system, they began making various departures from flight safety rules and procedures. They analyzed in a superficial manner errors by pilots during join-up into formation, and they utilized in a partial and sporadic manner the data provided by flight recorder tapes and other pilot performance monitoring devices. They virtually ignored in their preventive efforts information on typical air near-mishap situations received from other Air Force units and components. Elements of mere lip service, complacency and lack of care or concern began to crop up with increasing frequency in organization, preparation for and conduct of flight operations in this regiment, and frantic rushing around became a frequent occurrence. These and other shortcomings led to a situation where personnel failed to achieve designated performance levels in socialist competition and failed to meet fundamental flight safety requirements.

The unit now has a new command element. Things are difficult for this outfit. It is essential not only to restore the level of flight proficiency but also to ensure future growth.

This example attests to the fact that matters pertaining to combat training cannot be resolved in separation from tasks pertaining to flight safety, without seeking the most effective ways of activating the human factor. This is a behest of the times, the essence of the restructuring process which is taking place in Air Forces units and subunits. USSR Minister of Defense Army Gen D. T. Yazov stressed in his book "Na Strazhe Sotsializma i Mira" [Guarding Socialism and Peace]: "Applied to the Armed Forces, activation of the human factor means increasing the sense of responsibility, professional preparedness and demandingness first and foremost of command and political personnel, as well as all military personnel, and development of their initiative and independence."

Of course activation of the human factor cannot take place spontaneously. Political workers, party and Komsomol organizations in the units and subunits are called upon to work toward these ends, alongside command personnel. The creation of favorable conditions for effective combat training and flight safety depends on them to a significant degree.

Today aircraft, flight operations support and control facilities are becoming increasingly more reliable, and are being provided with various backup systems and automated devices which ensure high quality of equipment operation in the most complex, sometimes emergency situation. Combat training courses, methods recommendations, simulator systems and performance monitoring equipment are also improving. The role of personnel mastering modern aircraft systems is also

growing in connection with this. To achieve victory in combat it is not enough for pilots to possess boldness, daring, and intrepidity. These traditional excellent moral and fighting qualities should definitely be combined with a high degree of professionalism, thorough knowledge of all the capabilities of one's aircraft and aircraft armament, the rules and regulations governing the activities of flight personnel, and also combined with a level of proficiency honed to a conscious automatism.

At meetings and conferences on flight safety, conferees study suggestions and proposals from the units and subunits on improving the forms and methods of combat training, preventing air mishaps, and the most valuable of these are recommended for practical adoption. But does everybody treat such recommendations with the due and proper attention? This concern is addressed chiefly in the vanguard units, where they genuinely and fully address the question of aviation personnel combat proficiency. In lagging units they fail to do so, and that is most regrettable.

Of course in every unit there are airmen who restructure their work habits and procedures and alter their attitude toward the task of ensuring flight safety. And they do achieve some success. Results of flight operations attest, however, to the fact that a goodly number of Air Force regiments at present have failed to improve their performance.

Many deficiencies in prevention efforts aimed at achieving mishap-free flight operations are due to growing pains in the work style of commanders, staffs, political agencies, party and Komsomol organizations. Officer-leaders cannot be reproached for failing to spend time in the squadrons, detachments, and flights. They do spend time, and perhaps a great deal of time, but there is little result from their visits. Why is this? They do not wish to take the trouble of painstaking individual indoctrination work with the men. Consequently they fail to notice many shortcomings, mistakes and overlooked procedures and become accustomed to them.

Restructuring of the process of flight training is proceeding with stress and difficulty in some outfits, not as intensively and without the results one would wish. It is high time to realize that it is not enough to acknowledge that a great deal was being done wrong in the past. It is now time to take remedial steps. What should be discarded, and what should be adopted? Unfortunately one sometimes hears the following comments: is it really worth it to change everything around? It would seem that everything has long since been thoroughly tested, smoothed and perfected, because it has been years in the making. After all, past forms and methods of prevention to ensuring flight safety have sometimes produced pretty fair results.

There is no question that in inventing new methods of training combat pilots one should not forget old methods which have been tried and proven by practical experience. There is a broad area of activity here for unit

command elements, staffs, party committees and methods councils. And one should begin with a well thought-out, comprehensively validated plan. When everything has been optimally planned, people work with enthusiasm and initiative. This not only ensures quality of performance of flight training maneuvers and completeness of performance of assigned tasks, but also develops discipline and follow-through in aviation personnel as well as respect for the strict rules and procedures of flight operations. The fundamental element here is a clear-cut plan.

It is essential to conduct a more vigorous campaign against lack of originality and predictable pattern, excessive attention to form with consequent detriment to content, compromise with realism and unrealistic simulation, as well as that notorious and long-since condemned emphasis on quantity over quality in planning flight training. How were things sometimes in the past? In drawing up a flight assignment, a pilot would be assigned specific maneuver sequences, according to the combat training course, and that would be it. There was virtually no assignment regulation and control pertaining to content and sequence of execution. It is understandable that such an approach to pilot training created difficulties in their independent training and in effectively monitoring their performance on the ground.

This system has now been changed. At the present time the squadron, detachment, and flight commanders not only specify to their men the number of sorties per flight operations shift but also plan and schedule sequence of execution of maneuvers, altitude and airspeed, power settings, etc. This makes the instructor personnel more responsible for the pilots' training and for quality of combat training and flight safety.

New changes have also taken place in other areas in Air Force regiments and subunits. For example, combining of combat training program maneuver sequences makes it possible to create conditions of actual combat in the air and forces pilots to perform at full energy output and to apply all their knowledge and skills, which has a positive effect on improvement in their combat skill. The fact is that there is still a great deal of reserve potential available in military units. It is merely necessary to seek it out and to utilize it skillfully to increase combat readiness and improve flight safety.

Analysis of actual flight safety for the various Air Force component forces, categories of personnel, aircraft types, etc, attests to the fact that, in addition to the need for further investigation of matters pertaining to reducing air mishaps it is important to intensify the search for reserve potential to accomplish effective prevention of accidents right today. The best way to accomplish this most important task is to make maximum use of the subjective prevention capabilities of each person in authority in an Air Force subunit, in the combined unit command element, at the military educational institution, at the scientific research establishment, and in the

central administrative offices, for all these elements put together represent the content of the human factor in work directed toward maintaining flight safety in today's Air Forces. Its role is becoming increasingly more determining today, constituting that principal link which makes it possible effectively to launch an accident prevention campaign and to achieve consistent end results. This is due to the following.

The overwhelming majority of air mishaps—3 out of 4 on the average—are presently taking place due to incorrect actions, errors and violations of regulations and procedures by all categories of Air Forces personnel. It is apparent from this where we should concentrate daily accident prevention efforts, especially at the "pilot (aircrew)-squadron-regiment" level.

Unfortunately one sees that in a goodly number of units the conclusions drawn by commanders, chiefs of services and methods councils when determining performance results, and the directional thrust of party-political work in the area of flight safety are in one way or another linked with the qualitative state of aircraft, flight operations support, and matters pertaining to living and working conditions, off-duty activities, services and amenities. Patent deficiencies and shortfalls, however, and sometimes major errors of omission in observing fundamental flight safety requirements dependent on commanders and other persons in authority are frequently ignored. Not only are these deficiencies not corrected, they become chronic, as it were.

The following factor is also important. The combined nature of causality of air mishaps is expressed today in the fact that they occur most frequently not from any one isolated cause or error of omission by some one specific individual, but rather as a consequence of coincidence of a number of factors forming a cause-and-effect linkage. For example, due to actions or inaction by several persons of various services and occupational specialties. If we trace the dynamics of emergence and development of a given accident situation, one readily discovers that it was not an isolated error by a pilot (flight operations officer or commander) which led to it, but rather deficiencies in organization of flight operations as a whole, subsequently activated by poor leadership. On the other hand, even with precision performance, for example, by an aircrew or air traffic control team, a mistake by a single person, by no means the principal person in authority, can also become the cause of a mishap situation.

Guaranteed prevention of air mishaps is possible today only with active participation in preparing for, conducting and supporting flight operations, without exception, by all specialist personnel capable of promptly spotting and localizing the basic cause of mishap situations, including those arising for reasons falling within the competence of other services. In short, accident prevention presupposes unification of the efforts of all categories of personnel.

Such an approach to intensification of the possibilities of the human factor in ensuring flight safety in our opinion will make it possible to prevent the majority of accident situations, which occur in one Air Force regiment, and subsequently in another, with similar causes. Following are the most typical of these: fixed-wing and rotary-wing aircraft getting into a stall situation; descent below minimum safe altitude; mistakes in operation of engines and other vitally important aircraft systems; arbitrary change in the sequence of performance of assigned tasks during a training flight; violation of the rules and procedures of formation flying, etc.

One can cite many examples of how a good level of pilot proficiency and a pilot's precise observance of regulations, as well as prompt, timely, and correct actions by the air traffic control team have made it possible to come out on top in such situations, and in any case avoiding the creation of critical situations.

The influence of the human factor on preventing air mishaps is manifested most concretely in the daily activities of the air regiment. In this well-balanced military organism all conditions exist for airmen optimally to perform their military duty and to observe requirements pertaining to flight safety. And on the basis of mutual help, comradely assistance, and cross-monitoring, they eliminated all departures from regulations in flight activities.

Combat training of aviation personnel is organized precisely in this manner in the unit in which officer A. Naumov serves. The commanding officer, a 1st-class military pilot and skilled methods specialist, does a great deal to increase the unit's operational readiness and flight safety. He has unified his personnel and focused them on achieving excellent end results in their work. Having thoroughly mastered the practical aspects of organization and conduct of flight operations, execution and verification, the regimental commander skillfully directs the energies of his men toward unconditional accomplishment of the combat training plan and schedule, with rigorous observance of the demands of flight safety.

We should note that the term "requirements of flight safety" is sometimes interpreted too broadly, which leads to loss of specificity in implementing the human factor, for these aviation personnel actions are strictly regimented both in normal, routine situations and when abnormal or emergency in-flight situations arise.

Due to excessive saturation of one's work with current instructions, recommendations, and an abundance of information, the professional knowledge of some flight personnel, and especially leader personnel, is unfortunately declining, which inevitably leads to violation of regulations which are fundamental for flight operations and flight safety: regulations on flight operations, the combat training program of a specific air component,

and aircraft (helicopter) operating manual. In any situation airmen must strictly and precisely observe the requirements of these documents, which virtually comprise a unique air code. Failure to grasp this common truth leads to undesirable consequences. As regards initiative, it consists essentially in rapid, vigorous correction of causal factors which can lead to an emergency or mishap situation during execution of a combat training program and in strict observance of existing provisions of the appropriate rules, regulations, and manuals.

...The following happened in an air regiment which until recently was under the command of officer N. Kolbasko. Higher headquarters staff personnel were evaluating the airmen's proficiency. In the course of a tactical air exercise which involved penetrating "hostile" air defense, the aircrews were to hit a target defended by a strong SAM missile force. Unquestionably both the unit command element and the higher-echelon officers wanted the mock combat mission carried out as successfully as possible. Toward this end they suggested that all strike force aircraft "duck under" the antenna radiation pattern lobes of the search radars, target designation and SAM missile guidance radars, particularly since the aircraft being flown was capable of nap-of-the-earth flight.

It would seem that aggressive recommendations to fly "a bit lower," to radiate massive airborne radar emissions to jam the "adversary," and to employ vigorous vertical and horizontal maneuvering would have caused concern. But none of the specialist personnel of the regiment nor those from the combined unit who were present during mission formulation, briefing, and element-by-element calculation in the process of preparing the pilots and especially during execution of the mission, took the trouble to ascertain what actual and corresponding indicated minimum safe altitude had been specified, how the terrain following system would operate in conditions of maneuver, and whether the interference would jam not only the "hostile" radars but the aircraft radar altimeters as well. In addition, the poorly organized strike mission coincided at the formation descent phase with a solid overcast virtually at ground level. This meant the possibility not only of mock losses but actual casualties as well....

Unfortunately one still encounters the opinion that only flight personnel and flight safety service officers should deal with matters of mishap-free operations and flight safety predictions. This is an erroneous view. It offers one of the main reasons for the slow improvement to the entire business of reducing the accident rate. Without a committed, competent attitude toward prevention of air mishaps on the part of officers from other services, and without integrating their efforts on the basis of absolute consideration of the requirements of regulations, a decrease in the rate of air mishaps cannot be achieved. It is for this reason essential on each occasion

thoroughly and meticulously to prepare operational-tactical, aviation engineer, rear services and other measures. This will help avoid many mistakes in organization and direction of flight operations. Everyone involved in flight operations should be familiar with the specifics of ensuring flight safety, and not limit oneself to reference to documents or serial numbers of pertinent orders and directives.

It is obviously high time to differentiate for the various categories of Air Force personnel presentation of the requirements of flight safety, formulating them in the form of accident prevention tasks appropriate to each person involved.

As we know, specific tasks are assigned for each training year virtually in all areas, from operational readiness criteria to number of flight hours logged by types of training. Requirements are presented in generalized form only in regard to flight safety. Why, for example, not assign the rank and file pilot a year's task pertaining to flight safety as follows: no dangerous air mishap-threatening situations through one's fault, and precise, efficient response when such situations occur for any other reasons. An air regiment should be given the task of having no serious air mishaps during this period through the fault of personnel; a combined unit which has completed an accident-free year should maintain the achieved level of flight safety, while one which has had air mishaps in the current year should reduce the accident rate.

I believe that these and other measures will make it possible more fully to utilize the potential of the human factor and of all personnel for an integrated approach to improving flight safety in the Air Forces, which would constitute a practical contribution by each and every airman toward implementing the decisions of the 19th All-Union Party Conference.

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**Bomber Regiment Commander Discusses
Perestroika Progress, Problems**

91440072b Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 6, Jun 88 (signed to press
6 May 88) pp 4-5

[Article, published under the heading "Great Vigilance, Constant Combat Readiness," by Col B. Tumanov, commanding officer of bomber regiment: "The Kettle-drums Will Wait...."]

[Text] The initial phase of perestroika was difficult for our outfit, failing to produce unambiguous results. Abandonment of obsolete principles of organization of combat training was taken without good grace. Unfortunately we were unable to avoid mistakes. We were unable to spot in time the preconditions for future

problems in our activities. We were prevented from seeing them by a mirage that everything was just fine, which engendered a totally unwarranted feeling of complacency.

The following events were the reasons for this. Over a short period of time higher headquarters had run several practice alerts to test the regiment's readiness. Personnel had met the performance standards. Aircrews had accomplished their missions on unfamiliar ranges with marks of good and excellent. As a result our outfit was one of the socialist competition leaders. What happened later, however, showed us that it was a bit premature for us to rest on our laurels.

When we were performance-evaluated by a Ministry of Defense commission, personnel failed to meet the performance standards. It took longer for aviation engineer service ground personnel to ready one of the aircraft for mission departure than prescribed by the performance standards. In addition, when the inspecting officer sent up a two-ship bomber element armed with guided weapons, the element leader, Military Pilot 1st Class Lt Col Ye. Yermakov, received a mark of excellent on hitting the target with a straight-in run, while his wingman, Maj A. Serdtsev, lost his lock on the target for reasons not his fault. He had to fly a second pass on the target. In the final analysis the bomber element was given only a mark of satisfactory.

What kept us from performing as well as before? I believe the principal reason was lack of coordination in the actions of supervisor personnel. Take, for example, the delay in readying the bomber for departure. The aircraft was limited operational, so to speak: a hydraulic pump pressure reading was somewhat low. When the practice alert sounded, squadron deputy commander for aviation engineer service Maj I. Belokonov decided to put into service an aircraft which was in the technical maintenance unit, on which routine inspection, servicing and maintenance procedures had been performed. The ground crew quickly serviced the aircraft. Preparations were completed in time. They failed to report this fact to the command post, however. The inspecting team drew a quite logical conclusion: the regiment was lacking efficient monitoring and verification of the process of bringing the subunits to a state of operational readiness.

The command element and party committee analyzed the situation and gave a frank evaluation of shortcomings. Regimental and subunit supervisory personnel took the blame. At the next party meeting the Communists unanimously resolved to declare a no-holds-barred campaign against connivance and lack of organization! At that point we also placed heavy emphasis on the point that we cannot tolerate giving excessively high performance marks at the range, on proficiency rating examinations, and during the conduct of squadron tactical air exercises. We resolved to begin restructuring of our

activities on the basis of glasnost and truth. The restructuring process was headed by party members officers P. Makshakov, V. Yevsikov, A. Kochetov, and others.

The end-of-year performance evaluation was drawing near. Viewing it as an opportunity to restore our good reputation, we prepared thoroughly for it. We worked through different variations of performance of possible missions, analyzed modes of utilization of various tactics and devoted particular attention to matters connected with increasing the effectiveness of weapons delivery. Nevertheless, as we subsequently ascertained, we had failed to consider everything.

The end-of-year performance evaluation began with a surprise alert. Our mission was difficult: we were to hit our targets after penetrating a strong "hostile" air defense. The plan adopted by our headquarters staff called for hitting the target by bomber elements coming from different directions, at short intervals, at extremely low altitude, and with complex maneuver. Several variations were planned out in case of change in the tactical situation, and a combination ordnance load was prescribed, providing capability, if adverse weather prevented the employment of guided weapons, to hit the targets with bombs. A final prestrike reconnaissance aircrew was readied in advance, an element to suppress hostile air defense en route and in the target area as well as other tactical elements were specified. It seemed to us that all details had been considered.

...The strike element leader reported with certitude to the command post: "Target in sight. Commence run!" The range officer gave range clearance. A few seconds later the pilot reported despondently: "No ignition." Number two and three also reported failure of their missiles to fire.

The fact is that it is unpleasant to observe aircrews carrying off unfired missiles. In spite of the fact that on the next pass the bombers, flying complicated attack run maneuvers, scored hits on the target with their bombs, the preliminary missile pass was given a mark of unsatisfactory.

This performance worked up a few of the top regimental brass and members of the party committee, first and foremost because the performance was not in keeping with the enormous amount of work the airmen had done. It is not surprising that at first some of the command element officers stated the opinion that the tactical air exercise mark was unfair. Soon a performance analysis tempered their high opinions. In an actual combat situation, one might ask, what does it matter who is to blame for failure to accomplish a mission—the aircraft industry, the pilot, or ground maintenance technicians? There is only one criterion: mission accomplishment or failure.

Regimental personnel thoroughly analyzed the causes of the repeated failure. It was established that the return to base with unexpended ordnance through the fault of

personnel was a consequence of poor knowledge of the aircraft equipment on the part of pilots and navigators. Our undoing was a consequence of the fact that there had been a failure fully to think through the causes of the first failure, they had not taken the trouble to establish firm contact between navigation and engineering-technical services, and they had failed fully to analyze, on the basis of the flight data recorder tapes, the reasons for failure of the guided missiles to ignite and release. The following conclusion is suggested by the above: there are no trivial matters, and particularly in such an important, complicated and critical activity as combat training.

Following the above incident, the regimental command element and party committee focused more strongly on restructuring. Meetings were held in the subunits, at which shortcomings revealed by a commission from higher headquarters and by our own as well were communicated to personnel. Maj N. Kurchenkov, commander of the 1st Squadron, and his deputy commander for political affairs Maj G. Protasov spoke at a party committee meeting on the leadership role and personal example in improving proficiency. It was ascertained that measures in the subunit are carried out without considering their specificity and effectiveness. Resolutions of party meetings contain too many abstract formulations such as "improve," "strengthen," and "increase." The same comment generally applied to party work. This enabled some individuals to diminish their personal responsibility for the affairs of the collective as a whole. Lip-service formulation of a task to personnel was engendering a negligent attitude toward task accomplishment.

In connection with this I would like to stress that, unfortunately, there are also few instances of specific statement of tasks from the higher echelon. The majority of orders and directives received by the unit are wordy but meager in practical recommendations. Judging by all indications, the stereotype which became established during the years of stagnation has also not yet been scrapped at the higher echelons of command and control of combat training as well.

We revised many aspects of regimental activities precisely from the standpoint of concretization. We began devoting greater attention to people. On the one hand we began holding each individual more strictly to account for his assigned work area, and on the other hand we try to encourage conscientious work effort by all available means.

Increasing the personal responsibility of Air Force personnel for their activities is now expressed in more clear-cut and accurate statement of the task or mission and in strengthening intermediate monitoring and verification of progress in and quality of execution of orders and instructions on the prescribed timetable. A counselor is assigned to each lagging individual. We have noted changes for the better as a result of these measures. By the end of the winter period of training the regiment had

regained its former ranking in socialist competition. A great deal has been done to improve promptness in notifying personnel and in arranging coordination and interaction between subunits and services, which has had a positive effect on increasing combat readiness.

It was gratifying to note that an atmosphere of mutual comradely demandingness and integrity was being established in the regiment. Strict measures were taken against those who were disinclined to keep pace with the others and who displayed poor efficiency, follow-through, and discipline. For example, officers A. Lisovtsov, P. Karpov, and V. Martikhin had their pay docked for carelessness which resulted in jettisoning external fuel tanks. The financial loss was repaid in part at their expense. Officers V. Sukhachev and G. Nikitenko were severely reprimanded for violation of rules and regulations governing hydraulic pump and storage battery operation and maintenance.

Today in our regiment not one single instance of violation of military or process discipline gets by without response by party and Komsomol organization. We endeavor to ensure that all elements and levels of combat training are under continuous monitoring and oversight not only by command personnel but also by the military community.

The regiment's supervisory personnel and party committee have begun devoting more attention to socialist competition. I shall state quite frankly that for many years we lacked clear-cut criteria for rating competition performance results. Winners would be determined at a meeting of supervisor personnel using the volitional method, so to speak. Hence the total domination of an oversimplified approach and subjectivism in this important area. While, for example, winners in bombing training, navigation, and flying proficiency could be determined on the basis of average performance grading mark or by absence of mishap-threatening incidents, subunit combat readiness, state of aircraft, and quality of performance of job duties would be estimated intuitively. This resulted in failure to achieve social fairness, which made personnel indifferent toward competition.

On the initiative of party committee secretary Maj P. Yaskevich, each chief drew up grading criteria for his own service, criteria which were subsequently broadly discussed within the unit. The resulting grading system made it possible to determine competition winners not on the basis of the personal impressions of command personnel but rather on the basis of specific indicators of job performance. Now every airman knows what determines the grade given for his work performance and that of his entire collective for the day, week, and month. This helps increase the men's initiative.

We endeavor to support the men's activeness by providing labor incentive for vanguard performers. A Hero of the Soviet Union G. Minnibayev pennant is awarded to the top subunit when regiment performance results are

totaled up, and right-flanker crews are given the honored privilege of logging one of the month's sorties in the pilot's logbook of Hero of the Soviet Union B. Karachun.

Things are more complicated in regard to material incentive. Very little funds are allocated for this.

Reviewing the progress made by the regiment from the beginning of restructuring to the present day, I note with satisfaction that, in spite of mistakes made, we have nevertheless succeeded in achieving pretty fair results. The collectives led by party members officers A. Sasunkevich and V. Gorbachev are doing a good job. In the subunit under the command of Lt Col V. Gorbachev they innovatively solve problems with combat training and seek out reserve potential for shortening the time required to bring equipment to a state of combat readiness. And this is being achieved even though the squadron contains a great many young and inexperienced combat pilots! It is not surprising that at the final performance-graded tactical air exercise the young pilots did an excellent job even with level one weather minimums. The subunit commander deserves a large share of the credit for the squadron's achievements. He is a highly-cultured, competent officer, an excellent pilot, a knowledgeable methods expert, who has been able to organize the training process so that there are no passive individuals in his squadron. Without question this would have been impossible without the active assistance of his deputies, Majs A. Kochetov and G. Ivanutkin, the party and Komsomol organizations.

Speaking about vanguard officers, we must state that unfortunately their work style has not yet become typical of all without exception. Last year, for example, there was a lack of purposefulness in the work of the party organization of the squadron led by party member Capt A. Derusov. This subunit, which contained the most experienced aircrews, was according to our plans to be the leader in weapons delivery and in carrying out tactical air exercise missions. The year's results failed to measure up to our expectations, in large measure because the subunit's leader personnel had failed to find common ground with one another and were unable to unify the men and focus them on reaching the summits of combat skill.

We must give due credit to the squadron party organization. Party members self-critically assessed their activities, held violators and indifferent individuals strictly to account, analyzed the causes of deficiencies, and specified ways to correct them.

In conditions where the regiment has begun working in the new way, whereby perestroyka is encompassing all our activities, special significance is assumed by support and assistance from the higher-echelon headquarters and political agency. In my opinion this assistance should at the present stage consist in giving greater independence in selection of forms and methods of accomplishing the tasks which face us. This is not observed at the present

time. A stream of instructions coming down from higher headquarters began from the very first days of the new training year, instructions which disrupt the smooth rhythm of combat training. Scheduled training activities on a given topic were held in the regiment, for example, and then a week later we receive instructions to hold another training session or drill on the same topic, since something happened somewhere. Such duplication inevitably engenders excessive attention to form with consequent detriment to content and makes it impossible to complete the training program and schedule.

I as a commander am concerned by the following. In spite of demands issued by the commander in chief of the Air Forces not to disrupt the smooth rhythm of flight operations, flight operations shifts are cancelled for the most varied reasons. And yet it is a well-known fact that as a rule sharply-increased occurrence of air mishap-threatening situations is observed following frequent interruptions in flight operations.

Securing the materiel, aircraft and truck spare parts and fuel planned for the year remains our number one problem. In short, there is plenty of work to do. Full utilization of a unit's productive potential in order to achieve the heights of military expertise is an essential condition of perestroyka.

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Importance of Discipline and Prompt, Precise Execution of Orders Stressed

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in Russian No 6, Jun 88 (signed to press
6 May 88) pp 8-9

[Article, published under the heading "The Army's Strength Lies in Discipline," by Col V. Obukhov: "If an Order Is Given"]

[Text] USSR Armed Forces Disciplinary Regulations contain some lines filled with profound meaning: "An order issued by one's commander (superior) has the force of law for subordinate personnel. An order shall be carried out unquestioningly, precisely, and promptly."

How many times Soviet airmen were given order to destroy the enemy during the Great Patriotic War! And each of these orders was followed by difficult air engagements and accurate bombing attacks on enemy ground troops and lines of communication.

Once the pilots of the 62nd Ground-Attack Air Regiment received an order to deliver a massed strike on two strongly-protected airfields from which the fascists were flying raids on Moscow and other Soviet cities. P. Yegorov, who was later named Hero of the Soviet Union, led the strike force into combat. Seeking to gain the element of surprise, they decided to take off before dawn. By sunup the attack force, proceeding at low level,

had approached the target undetected. The Hitlerites had left their aircraft undispersed: the bombers stood wingtip to wingtip. "We're going straight on in!" ordered Yegorov.

The bombs and rockets turned the enemy aircraft into shapeless heaps of metal. The ground-attack aircraft also sent a concealed and camouflaged gasoline storage tank up in flames. Black smoke blocked out the rising sun.

The ground-attack pilots led by P. Yegorov carried out with honor the order given by the command authorities. This was the case in many sectors of the Soviet-German front.

Difficult military service possesses a number of specific features. One of them consists in the fact that military personnel are one another's superiors or subordinates, on the basis of rank and position. Regulations give the former the honorable and difficult task of commanding, issuing orders and verifying their execution. The latter are charged with obeying their superiors unquestioningly, with carrying out their orders and instructions promptly and to the letter.

In a book by A. Bek entitled "Volokolamskoye Shosse" [Volokolamsk Highway] a battalion commander of the famed Panfilov Division addresses his men: "...Yesterday you were people of different trades and occupations. From today on you are soldiers and noncommissioned officers of the Workers' and Peasants' Red Army. And I am your commanding officer. I give the orders, and you obey. I dictate my will, and you carry it out.... Each of you will do everything I order. Yesterday you could argue with a superior; yesterday you had the right to discuss the question of whether he had stated something correctly and whether he had acted properly, legally and lawfully. From today on you have one law to obey—the commander's order. The homeland has authorized me to command and has ordered you to carry out orders.... Military ways are harsh, but this is what holds the army together...."

Combat veterans used to say: you can die, but you cannot fail to carry out an order. And they followed this rule of conduct. When the situation demanded it, they consciously marched to their death, but they achieved victory.

USSR Minister of Defense Army General D. T. Yazov, candidate member of the CPSU Central Committee Politburo, states: "Feats of valor in defense of the socialist homeland constitute embodiment of faithfulness to the military oath of allegiance. Heroic deeds always demand selflessness, a clear awareness of the necessity of carrying out an order at all costs, to act as demanded by military honor and dignity, by duty to one's comrades, by the interests of the homeland.... In the Armed Forces a commander's order has the force of law for subordinate personnel. A serviceman must do everything to carry out an order precisely and promptly.

He bears responsibility for this. One of the key thrusts of perestroika in the Army and Navy today consists in ensuring that this responsibility is expressed not in words but in concrete deeds, that a less than conscientious attitude toward carrying out orders and instructions be met with appropriate action by one's superiors or by the military community."

Carrying out orders in the course of current training is no less important. Today successful progress in restructuring the training and indoctrination process in the Air Forces and organization of performance of duty depend to a considerable degree on conscientious, precise, unquestioning and prompt execution of orders and instructions given by command personnel and other superiors.

At a certain tactical air exercise the fighter flight commanded by Military Pilot 1st Class Gds Maj K. Totskiy was assigned the mission to intercept multiple threats and then to proceed to the range and engage in gunnery practice on small target drones. The pilots had to operate not only in a complex tactical situation but also in less than VFR conditions. The guardsmen carried out the assigned mission with honor, adding to the fighting traditions of the combat veterans of their regiment.

At the debrief and critique following the tactical air exercise a question was asked: "What ensured this flight's success?" In addition to other components of victory, Guards Major Totskiy named precise efficiency and discipline by his men in the air.

"Discipline is the foundation of all things," he said. "I never had any doubt whatsoever that the pilots would carry out any order or instruction I gave."

These are not merely words. Indeed, conscientious, disciplined airmen serve in this flight. The other men in the squadron also work hard and rigorously observe the requirements of regulations and the military oath of allegiance. They do not rest on their laurels but are continuing to improve their professional skills in the course of restructuring, and they are increasing discipline and organization.

Party members officers A. Chichkov, V. Grishin, A. Chekunov, and others concentrate their efforts on achieving further esprit de corps, cohesiveness and unity in the flights and maintenance groups and on maintaining a healthy moral atmosphere in the collective and mutual relations in the aircrews and in the subunit as prescribed by regulations. They explain to personnel the requirements of Soviet laws, the military oath of allegiance, and general service regulations, emphasizing that these requirements should be carried out unquestioningly and conscientiously. They remind the men what great importance V. I. Lenin attached to organization and flawless efficiency in the military; Lenin repeatedly pointed to the need for iron military discipline.

Today, during a period of restructuring, the role and significance of efficiency and follow-through have increased immeasurably. Increasingly more sophisticated aircraft, the highly dynamic nature of combat operations, abrupt changes in the air situation, new approaches in training and performance of duty, as well as other features require of airmen constant inner composure, readiness and willingness to carry out orders and their job-related duties precisely and promptly, in any and all circumstances.

The guards airmen fully understand that efficiency and follow-through are not inborn qualities. Officers A. Shishkin, V. Pogrebnoy and others instill conscientious obedience in their men through painstaking, purposeful work grounded on compulsion and commander demandingness, in addition to conviction.

As we know, a commander's demandingness is always an expression of his personal efficiency and follow-through in implementing received orders and instructions, for in demanding from others, he is carrying out his military and party duty, his duties of office as prescribed by regulations, and is implementing the party's policy of acceleration and restructuring as well as the instructions of his superiors, rigorously observing the provisions of guideline documents which define flight operations quality and safety.

Just and fair demandingness on the part of the aircraft commander, technical maintenance unit chief, maintenance group chief, and other specialist personnel in execution of received orders and instructions is a sign of high standards of military competence. At the same time an officer's clearly-marked striving to carry out a received order in an exemplary manner of course has nothing in common with a mere show of great willingness and readiness to act. Unfortunately one still encounters officers who can tirelessly repeat: "Yessir!", "Right away sir!", but when the time comes to report back results, with equal facility they find "objective" reasons which allegedly hindered the order's execution. What kind of respect do such officers enjoy? They themselves undermine it both in the eyes of their superior and, what is particularly poor, in the eyes of their subordinates.

There is an apt saying in the military: like commander, like subordinate. Gds Majors V. Kabanov, K. Tot'skiy, A. Chekunov, and other flight commanders readily and successfully adopt from the squadron commander and his deputies the best forms and methods of working with personnel.

An article which once appeared in the newspaper PRAVDA stated that young officers V. Selyutin, A. Mozharov, N. Dyatel, D. Kizilashvili, and V. Kovalskiy had been assigned to this squadron upon completing higher military aviation school for pilots and commented that they had experienced certain difficulties in

conducting political indoctrination work with the aircrews. The older comrades promptly came to their assistance, working to improve their methodological preparation and skills in teaching their subordinates to carry out orders in a stricter and more rigorous manner, as well as efficiency, follow-through, and discipline. Instruction methods classes are held on a regular basis for the young officers in this squadron, and they hold discussions on issues of Soviet laws, political and military indoctrination, on the fundamentals of military education science and psychology, general service regulations, and exchange of advanced know-how.

Instructive discussions were held, for example, on the following topics: "Forms and methods of instilling conscientious military discipline in airmen"; "Legal basis of the commander's order"; "Organization of duty activities of military personnel in conformance with the requirements of regulations." The officers prepared carefully and thoroughly for them. The command element and party organization provided them in advance with topics and subjects to cover. Veteran personnel helped them select appropriate training literature and gave advice on what materials to use from military periodicals. Therefore the group discussions were held in the form of a businesslike dialogue on relevant topical issues pertaining to military duties, flight operations quality and safety. They made it possible to synthesize the know-how of leading aircrews and thoroughly to analyze the causes of violations of regulations.

Implementing in a practical manner suggestions voiced in the course of the discussions, a seminar was held in the squadron, which included discussion of such matters as instilling in airmen a conscientious attitude toward observing the demands of discipline and affirming the unswerving firmness and authority of an order. In addition, ways of strengthening proper interrelations and enhancing the commander's role in organizing duty activities of personnel in the barracks and at the airfield were examined. Such measures are conducted on a regular basis in this unit and produce tangible effect in developing efficiency and discipline in personnel.

Purposeful work is also conducted with the young officers at the regimental level. Regular seminars and lectures on knowledge of the law are used to provide comprehensive discussion of the most effective forms and methods of teaching and indoctrinating aviation personnel, of gaining esprit de corps, cohesiveness and unity in aircrews and maintenance groups, and ways to accomplish effective strengthening of military discipline. The lieutenants also master the art of an individual approach to primary-rank enlisted personnel, NCOs and warrant officers, study their character and personality, the men's individual characteristics and propensities, their conduct and behavior in a combat training situation, on alert duty, and during performance of routine administrative duties, garrison duty, and guard duty.

The subunit party and Komsomol organizations play a major role in affirming the authority of an order and in maintaining proper observance of regulations in the squadron. Utilizing diversified forms and methods of political influence on the men, they perform a tangible service to the squadron commander in ensuring that the men adhere precisely to the flight operations schedule, training class schedules, and strict observance of the schedule of daily routine. Officer-Communists I. Alyabev, V. Strelyayev, and A. Skotchenko, Komsomol activist I. Maksimov and others endeavor to influence each and every man in the squadron on a daily basis and to instill in each man a strong sense of personal responsibility for strict observance of regulations, the military oath of allegiance, orders and instructions by superiors. The party organization reveals negative phenomena in a prompt and timely manner, thoroughly and objectively analyzes their causes, and takes prompt measures to correct deficiencies.

In this subunit not one instance of an indifferent or excessively casual attitude toward training and performance of job duties, violation of military, flight and process discipline is ignored, nor are the slightest deviations from the strict rules and regulations governing life in the military tolerated.

Once aircraft technician [crew chief] Gds Lt S. Gorskiy displayed an attitude of casual unconcern when pre-flight his aircraft. Having carelessly performed the prescribed procedures, he did not take the trouble to tighten and secure a nut on the nose gear. This came very close to causing a serious air mishap. For this error of omission the officer not only was punished but was also subjected to harsh criticism within the Komsomol organization. In the final analysis this helped him change his attitude toward his job.

In the course of the new phase of restructuring, matters pertaining to ensuring exemplary performance by Communists and Komsomol members and a vanguard role by these personnel in the campaign for prompt, precise execution of orders and firm observance of regulations in the squadron are regularly discussed at party meetings and buro sessions.

The results achieved in strengthening discipline give reason to believe that the indoctrinational work being conducted jointly by the command element and subunit party organization is producing substantial success, which can and should, however, be even more substantial. Party members of aircrews and flights see their party and professional duty in further improving the quality of political indoctrination measures aimed at achieving better organization and strengthening discipline of all personnel and at securing exemplary performance of duty activities by military personnel.

The guardsmen are presently reinforcing the success achieved in the winter period of training, during preparations to honor the 19th All-Union CPSU Conference

in a worthy manner. The command element, party and Komsomol organizations are endeavoring fully to utilize all reserve potential to improve the efficiency and discipline of personnel, without which a cohesive, smoothly-functioning, solidly unified and purposeful military collective is inconceivable, and therefore without which an effective campaign to achieve further increase in vigilance and combat readiness and implementation of the decisions of the 19th All-Union Party Conference is also inconceivable.

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Political Officer of Military District Separate Helicopter Squadron

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[Article, published under the heading "19th All-Union Party Conference," by Lt Col N. Antonov: "Climbing Skyward"]

[Text] The helicopter smoothly lifted off, hovered for several seconds, and then accelerated forward. Small patches of woods, rectangular fields, and the sinuous ribbons of winding roads flashed past below them.

"I am about to change heading," reported Maj Nikolay Machanskiy after a few minutes.

I looked over at the pilot: his actions were crisp and confident, and his movements were calm and precise. It was only when he turned around to give the next status update that his flashing eyes betrayed his hot-blooded temperament and his joyous feeling of control of the helicopter and conquest of altitude.

Today Machanskiy was practicing putting down into a small landing site to unload assault troopers and cross-country flight involving penetration of "hostile" air defense. His flying skills are those of a first-class pilot. On the eve of this training sortie he had gone up with a check pilot and had received a mark of excellent—incidentally, just as he had received on previous check rides.

At higher headquarters I had heard the following comment about Major Machanskiy: "He flies with daring and confidence. He rose from third to first class practically in 3 years. He has done a fine job as squadron deputy commander for political affairs."

...Nikolay had been "bitten" by the flying bug while still a schoolboy. After grade 10 he firmly resolved to enter military aviation school for pilots. But at this point he experienced a setback: he was turned down for flight school for reasons over which he had no control.

He did not give up his dream of flying, however. He studied airplanes with great zeal and took an interest in purely flying matters.

His other calling—working with people—also took clear form during those years. Sincerity and genuineness, sensitivity, and moral purity attracted others to him like a magnet. Machanskiy could spend hours going over the most difficult diagram with his colleagues, explaining the function and operating principle of some device, instrument, or system. He worked with equal effort and zeal constructing a training display and putting out a wall newspaper, and he enthusiastically took part in athletic competitions and in amateur performing arts. Nikolay became a genuine leader of youth, and it is not surprising that his comrades elected him Komsomol committee secretary.

He began parachute jumping, became a parachute instructor, and commenced studying aviation in a DOSAAF aviation sports club. He saw no other way to get into flying.

He was most probably the hardest-working student in the group. He was quick to learn, and he remembered what he learned. Finally that long-awaited day arrived.

"I'll never forget my first solo," Machanskiy would reminisce. "I was filled with joy and pride, because I was flying, because the helicopter was obedient to the controls, and I was conquering the skies...."

Things proceeded in this vein. Frequently Machanskiy would go out to the airport early in the morning, parachute jump, then go to work, and that evening would go up again. He spent all his free days at the aviation sports club.

Not everyone has the follow-through to accomplish what he did, for it took weeks and months. Going to work, flying, study.... But Machanskiy was true to his dreams. And everything was going well: he was doing a good job with his Komsomol work, and he was flying with confidence and skill.

The time came to take the next step. And Nikolay took that step—he submitted an application to enroll at the Syzran Higher Military Aviation School for Pilots.

The examination was given by a veteran flier, through whose hands dozens of young pilots had passed. He could flawlessly determine their level of training and proficiency. When he went up with Machanskiy, he gave him a mark of excellent on his flying technique. This was a victory!

Nikolay received the highest marks in all subjects. One subject remained—tactics. He strode confidently into the examination room, with faith in his own knowledge.

And that knowledge did not let him down. He received a mark of excellent. It looked like Machanskiy was going to be accepted for enrollment.

But the test was not over. One of the members of the examining board, who had not heard Machanskiy's answers, decided personally to determine the depths of his knowledge and asked him to answer only one question. If successful, he said, the grade would remain as is, but if he failed, it would be lowered. Machanskiy answered and... was given a second question, and a third. Finally, having fully tested his knowledge, the board confirmed the grade.

Time passed. Machanskiy was already known as one of the finest Komsomol workers. Examining his service record file and efficiency reports from those years, one cannot help but note that the rating of excellent is encountered most frequently in each document: excellent knowledge of the equipment, excellent marksmanship ability, excellent athlete, and the political instruction group led by him always received marks of excellent....

Machanskiy organized Komsomol activities not just to go through the motions but to accomplish something useful. As a rule a serious, lively discussion on the forms and methods of Komsomol work would take place in the course of these events; advanced know-how would be discussed, and practical recommendations and decisions would be made.

There was plenty to do. In addition, Nikolay was enrolled as a correspondence student at the Kurgan Higher Military Political Aviation School. He was also advancing as a pilot; he conversion-trained over to an unfamiliar type of helicopter. In view of his excellent professional, flying, and moral-political qualities, the command element made Machanskiy deputy commander for political affairs of a separate squadron.

Nikolay was generally familiar with the state of affairs in the subunit. The squadron was performing difficult missions. Now, on closer acquaintance, he saw numerous deficiencies. Command personnel were not on top of things. The party buro assumed the position of an outside observer. And yet there were frequent occurrences of heavy drinking and carousing in the subunit, as well as gross violations of military discipline.

The new deputy commander for political affairs set to work to bring elementary order to the squadron. He encountered new problems. He imposed strict demands on his subordinates, and they in response told him of their needs: a shortage of housing, crowded kindergarten, and an inactive military personnel club. The men lacked proper barracks facilities. One could not simply turn away from these matters; they had to be resolved.

At that time Machanskiy regretted only one thing—that there were only 24 hours in the day. He did a lot of flying, studied theory, and prepared to boost his proficiency rating. Every day he visited the flights, the barracks, the technical maintenance unit, and spoke with the men. He adopted the regular practice of visiting his subordinates at home and becoming acquainted with their families and off-duty lives. He attended party buro sessions and Komsomol meetings. But it was difficult, very difficult to get perestroyka moving, to move people from a state of stagnation, to teach them to think and live in the new manner.

There were those who attempted to “set the deputy commander for political affairs straight.” They would argue that the squadron was not your standard outfit, that it operated in the interests of military district headquarters, and it was for good reason that it was called—half jokingly and half seriously—a “palace” squadron.

Once Machanskiy learned that Capt A. Bozhko was not attending classes at the university of Marxism-Leninism and was deceiving the command element and party buro. He proposed conducting a party inquiry and meting out severe punishment to the guilty comrade. The party buro secretary, however, decided to do a cover-up, while Machanskiy received a telephone call from headquarters, which had not looked into the matter, and found himself at the receiving end of a heated conversation. This probably would have had an effect on some people, but Machanskiy, while maintaining courteousness, firmly stood his ground. He followed through with the Bozhko affair to the end. Bozhko received deserved party punishment. It had been a long time since something like this had happened in the squadron, and those who had wanted to “teach a lesson” to the deputy commander for political affairs fell silent. This was more than they could handle.

The political worker waged a campaign against lack of principles, indifferent carelessness, and laziness. He saw that the party buro was incapable of working productively with its current makeup. He addressed this point at meetings and, when report and election time came around, he proposed that the party members discuss new candidacies. They paid heed to his recommendations, and they believed what he had to say. This was real progress. Machanskiy proposed that they elect Maj A. Sokolov secretary. He had taken a long and close look at Sokolov and reached the conclusion that he was a modest, hard-working, honest and upright individual. Aleksandr Ivanovich had performed his international duty in Afghanistan, had been awarded the Order of the Red Star, and was an excellent pilot.

“Another good thing,” Machanskiy related, “was the fact that prior to this time Sokolov had not been a member of the buro and had not become infected with such vices as unfeelingness, a lip-service attitude, and duplicity, which

unfortunately characterized some of our activists. Precisely such a person was needed in order to begin things anew, in a spirit of the demands of the time.”

Machanskiy was right about Sokolov. They quickly found common ground. The other buro members were also fine individuals. Almost all of them had taken part in rendering internationalist assistance to the Republic of Afghanistan, in recovering from the accident at Chernobyl, and had been awarded government decorations. Buro members included officers A. Kirillov, V. Khovayba, Ye. Omelyashko, and V. Zhuravlev. They are distinguished by sincere commitment to party work, to improving things and, finally, by personal example both on and off duty. Now the squadron command element also can confidently rely on the party buro.

...The meeting of district party activists had been going on for hours. The speakers, one after the other, had spoken for the most part about obtaining fuel, spare parts, about the shortage of housing, and raised personnel issues. Major Machanskiy listened closely and waited for them to address problems of indoctrination and to discuss new, effective work forms and perestroyka, for these things had been discussed in the report, and were also the main task of the meeting. Finally he asked to speak.

He stated that principal efforts were being focused on establishing a body of truly working activists and enhancing the role of party work assignments and responsibility for their execution. Party members are given tasks with the aim of encompassing with their influence all aspects of the daily life and activities of the collective. For example, a “Pulse of the Planet” young officer’s political club council had been formed, as well as a council of the “Army Family” club, which arranges ceremonies honoring the top pilots, navigators, technicians, and mechanics. Airman suggestions containing various criticism connected with increasing the subunit’s combat readiness are also being considered and analyzed. Party verification is also being conducted of progress in the phase-by-phase prevention of mutual relations which are at variance with regulations. He also related what is being done in the collective to carry out the decisions of party meetings, how the job-related and party activities of Communists are being monitored and verified, and how the principle of social justice is being carried out in practice. Those present at the meeting of party activists gained many useful things from what he had to say.

And he also has new things to do and new concerns. Now the political worker has found support in the person of Lt Col F. Lappo, commanding officer of the separate squadron, other leader-Communists, and the party buro. They have done a lot of thinking together on how to strengthen discipline and increase people’s sense of responsibility. In particular, they decided to use the tried-and-proven method of visual agitation, but resolved to make it more interesting, practically relevant, and incisive. A good

many high proficiency-rating specialists serve in the squadron, who are modest, hard-working soldiers. Outstanding performance publicity sheets began to be devoted to them. These contain no trite, hackneyed phrases. They present information on the person in a warm, truthful, and interesting manner. Such sheets were devoted to Maj N. Alekseyenko, Capt A. Kirillov, and other respected individuals in the squadron.

The visual agitation materials not only lauded vanguard performers but also showed shortcomings. The political worker suggested organizing tours of inspections to check discipline, proper observance of regulations, thrift and economy.

In the past some leaders, party and Komsomol activists considered themselves to be outside the zone of glasnost, that is, they could criticize others, but nobody could criticize them. Now things have changed, and everybody realizes this fact.

Whenever he saw injustice, irresponsibility, laziness, and remissness, Nikolay never shut his eyes to it, never compromised with his conscience or engaged in obtaining proper behavior through coaxing or intimidation. If necessary he displays strictness and firmness, regardless of the position or past merits of the guilty party. But regardless of a person's need or concern, Machanskiy embraces it as his own or, more correctly put, takes it even closer than his own. Having thoroughly studied the men, this political worker very keenly senses changes in their conduct and mood. This serves as a warning signal to him: something has happened, the matter must be looked into, and help must be given. Once he noticed that Maj V. Luchshev seemed to be worried about something, depressed and irritable. He spoke with him and learned that the officer had family problems. He paid a visit to their quarters and had a talk with the officer's family. In order to rectify the situation it was necessary for the family to move to a new apartment. In addition it was desirable for his parents—his father was a war veteran—to live close to their son. Luchshev was certainly not looking for miracles, aware that the apartment situation at the base was not good, and he needed two apartments, both close to one another! This was the reason for his depression.

Machanskiy could see that this was not capriciousness or a whim, that the situation threatened the family's disintegration. He talked to various officials, explained the reasons involved, and maintained that it was essential to help this officer immediately. Finally he appealed to the district commanding general and received his support. The family's problems were solved.

The political worker also gave thought to the enlisted men's quarters. There was no possibility of building a new barracks, but the old one wasn't fit to live in. What could they do? How about adapting a former administrative offices building as a barracks? He discussed the possibility with the commanding officer, the party bureau

secretary, and Komsomol activists. Everybody was in favor of the proposal, and they decided to do the repairs and renovation with their own manpower and resources. Thus the men of the separate squadron obtained their own barracks, and such a nice, clean, comfortable barracks that the commanders and political workers of other subunits are truly envious.

The deputy commander for political affairs always shows the new barracks to parents who come to visit their sons. He shows them their son's bunk, his weapon, tells them how he is doing in the military, tells them both the good things as well as about their son's shortcomings, and introduces them to his comrades and superiors. When the parents leave, he always gets a car to take them and personally sees them off. And the parents feel reassured about how their son is getting along in the military.

Once Machanskiy said jokingly that if he were to be given clubhouse facilities, he would really go to town! He said it jokingly, but he had long been giving serious thought to organizing leisure-time activities. The men complained of boredom and, as we know, idleness causes some people to engage in unhealthy activities. The political worker could see that when the men went off duty the thread binding them began to unravel. He decided to hold an evening activity in honor of the top-performing specialist personnel. The officers, warrant officers, their families, and the enlisted men assembled. It was pleasant for all of them to hear not trite banalities but warm words coming from the heart. There was joking and laughter. After this they began thinking about giving some amateur performances. Nikolay and his wife Valeriya took the initiative, as they had back in the regiment, and met good response. The talent they found in the outfit was such that when the separate squadron holds an evening recreational event, many of the garrison personnel make an effort to attend.

There is perhaps not one person in the squadron who has not experienced both the political worker's demand-gness and solicitude. You never find Machanskiy alone. At the airfield, at headquarters, and on the base on his day off he is always surrounded by people.

Nobody has ever seen him idle. Thanks to his energy and purposefulness he can accomplish as much in a single day as takes some people a week.

...Soon after Machanskiy joined the squadron, one night he was awakened by a telephone call. Higher headquarters ordered him to turn the men out immediately and get ready to perform an important mission. The squadron commander and deputy commander were elsewhere, and the deputy commander for political affairs assumed command. Soon somebody from headquarters arrived to brief Machanskiy on the mission—several helicopter crews were to ready themselves immediately to take off for the Chernobyl area.

Time was of the essence, and some of the squadron officers decided to carry out the order at all costs, cutting corners in departure preparations in violation of prescribed procedures. They regarded the deputy commander for political affairs as a newcomer, who could have little to offer. But Machanskiy displayed firmness from his very first steps and instructions. He made sure that things did not become disorganized. He made decisions quickly and with precision, and he displayed excellent knowledge of regulations applying to flight and staff activities, the actions of personnel in emergency situations, as well as the professional and moral-psychological qualities of his subordinates. He personally checked the crews' departure readiness and mission-briefed them in a competent manner.

After the mission had been completed, both Machanskiy's superiors and his subordinates could not help but note that the political worker had handled the difficult situation well. During the entire time he was not only demanding of others but also himself and profited from this learning experience, not permitting either himself or his fellow soldiers any relaxation of demands.

Nikolay Machanskiy is presently enrolled as a correspondence student at the Military Political Academy imeni V. I. Lenin. This year he endeavored to take the tests and examinations ahead of schedule, explaining: "They're waiting for me in the squadron. The weather people have promised to provide instrument meteorological conditions—precisely what I need to earn 1st class."

This is the kind of man Maj N. Machanskiy is. He is always out in front, wherever the action is, where a party member's personal example and inspiring word are most needed. This is how the military, Komsomol, and the party have taught him to be.

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Flight Instructor Proposes New Pilot Training Procedures

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[Article, published under the heading "A Reader Asks," by Military Instructor Pilot 1st Class Lt Col N. Litvinchuk, candidate of technical sciences: "Does Reserve Potential for Effectiveness Lie in... Reserve?"]

[Text] As aircraft become increasingly more complex, the demands on the people who fly them are constantly increasing. Practical experience shows that only a knowledgeable, fully competent specialist is capable of fully utilizing the combat capabilities of today's aircraft.

In spite of the considerable attention devoted to training flight personnel and the growing costs of this training, a gap has developed between the level of proficiency of combat pilots and the demands imposed by the aircraft.

In my opinion there are several reasons for this. One of them is the lag in the pace of improvement of flight training methods behind the pace of development of aircraft. In what does this lag consist and how can it be overcome?

As we know, the task of flight training is to provide the student pilot with the requisite skills and abilities in flying an aircraft and operating aircraft systems and weapons.

The fact is that the techniques and methods used in flight training were used back in the early days of aviation and have remained unchanged right up to the present day. They consist essentially in the following: first the student is shown the correct technique, after which, as he gradually assimilates what he has been shown, he transitions to flying with his instructor assisting with the controls, with subsequent transition to solo flight. Teaching student pilots to fly by repetitive flying in the pattern is called "nataskivaniye." Flying skills and ability are acquired gradually and without acute awareness, while the method itself has been honed almost to perfection and can be handled even by an instructor pilot of limited experience. When repeated with regularity, it produces pretty fair results. But at what cost?

Alongside its advantages, the "nataskivaniye" method of flight instruction in a modern aircraft requires enormous material expenditures due to the need for a large number of repetitions of flight procedures and maneuvers. With piston aircraft one could execute a large number of maneuvers during a single training flight and develop certain skills, while in modern fighter aircraft this requires dozens of training flights, the cost of which has greatly increased. Of course this enables one to master only a narrow range of the capabilities of the modern aircraft, which not only fails to produce combat effectiveness but fails to produce flight safety as well.

This shortcoming of in-air flight instruction can be compensated for only by instruction on the ground, with conscious acquisition of flying skills and abilities. There are no restrictions or limitations imposed by time, weather conditions, etc, and costs are greatly diminished. Such training demands greater expenditure of labor by the student and instructor, however, as well as more precise determination of training result, which makes it less attractive.

Ground instruction or ground school has usually been viewed as preflight training, that is, as an assisting activity to flight training. At first everything boiled down to preparing the student pilot to perceive flying technique. Gradually the need for instruction on the ground and its contribution toward forming flying skills and abilities increased, and today a pilot should take to the air with fully developed skills and abilities, such as a test pilot flying a new aircraft.

Thus preflight training developed from a supplement to flight training into a separate and independent part of pilot training and requires a change in one's view of its tasks, objectives, grading criteria, and correlation with flight training. Today requirements of conscious, aware acquisition of the requisite skills form the basis of pilot training. New methods aids, training displays, and flight simulators are developed with this aim in mind, greater time is being devoted to preflight training, and the content of this training is improving. However, attempts to fit it to past flight training methods, which in fact are not compatible, lack of a clear goal to achieve from ground training, lack of criteria for determining preparedness of student and instructor for demonstration of flying technique in the air, as well as a narrow group of tasks performed in the air have led to a number of negative phenomena. The most typical of these is substitution of paperwork for genuine preflight training; in most cases this paperwork merely satisfies the legal aspects and takes away time needed for pilot training.

The biggest loser is the student pilot, who loses faith not only in the usefulness of preflight training but in study of theory in general. This is noticeable after the first year of pilot training: the student counts on the instructor demonstrating everything in the air.

The instructor pilot in turn, forced to meet the paperwork requirements, is also counting on demonstrating all the important points and practicing with the student in the air, since the flight program is geared to "nataskivaniye." Thus taking notes becomes a lip-service activity.

As for inspecting superiors, they too are guided by general rules and regulations. And it is also a simpler matter to check a pilot's level of preparation from his notes and notebooks. As a result, however, the resources spent on pilot training are expended in a very inefficient manner.

With the present method, pilot training takes place in two phases. During the first phase, the dual-instruction phase, the student follows his instructor's actions and procedures. In the second phase, during solo training, he acquires individual traits. But since nobody is backing up the student pilot in the single-seat aircraft flown during the second phase, quality of flying performance drops off sharply after several solo training flights, and the number of mishap-threatening situations increases.

Experience indicates that if flying skills have been acquired primarily via "nataskivaniye" and have been maintained by regular flying, they are of a nonpersisting nature and, following a period with no flying, even an experienced pilot is unable to restore them without some dual time and instructions over the intercom, in spite of his solid knowledge of flying theory. Thus pilot training on the basis of current methods provides the pilot with virtually no possibility of restoring and maintaining his

level of proficiency by any other means than regular flying, which with today's aircraft is becoming increasingly more expensive and difficult to manage.

Attempts to raise the level of proficiency of flight personnel by increasing flying time are entirely justified from the standpoint of dialectics: quantity eventually becomes quality. But this is effective only if the fundamental principles of instruction are observed. If flight hours logged are increased by repeating already-mastered maneuvers, student pilots show an appreciable decline in interest in flying, which slows their development and even diminishes their level of flying skills and abilities. The picture changes if an increase in flying time is accompanied by increasing complexity of assigned tasks during training flights.

There are also other negative phenomena, efforts against which fail to produce the desired results if decisions are made purely on the basis of will or volition. It is essential to improve the process of flight instruction by improving ground training and instruction. If it becomes a necessity, both instructor and student will show objective interest and commitment. Then the negative phenomena will lose their very foundation, and there will be less need for busywork writing activities.

First and foremost, beneficial effect can be produced by a unity of instruction on the ground and in the air, that is, flight instruction should be a continuation of and be based on ground instruction. The task of pilot ground training is to develop rudimentary knowledge and thinking habits and abilities, and subsequently, on this foundation, with the aid of various models, mock-ups, training displays, simulators, and the aircraft cockpit, in the process of numerous, deliberate repetitions, to develop sensorimotor skills and abilities. Practical experience indicates that basic textbooks on practical aerodynamics, navigation, and engineering psychology, other literature, as well as theory of flying an aircraft serve as a source of knowledge.

The principles of acquiring skills and abilities on the ground are the same as those applied in the air. In contrast to in-air flight training, however, they are grounded not on empirical but rather on thoroughly analyzed knowledge, which ensures the strength and durability of these principles. The end objective of ground instruction is to acquire that knowledge, the building bricks of flying skills and abilities, which will enable the student pilot to execute a maneuver or flight procedure on his own in the air, without demonstration. In this instance the instructor's role boils down to monitoring the student pilot's actions and serving as a safety pilot.

In view of the fact that purposeful ground instruction constitutes a form-determined, controllable process, it offers feedback linkages which constitute devices and methods of testing and grading during the learning process. Not only instructors but students as well should

make use of these devices. This will enable a student independently to rate and improve his level of proficiency. Speed and accuracy of a student's answers to questions and hypothetical problems connected with carrying out a training flight can serve as criteria for evaluating knowledge and mental skills.

Quality of execution of a training flight or training flight elements for which a pilot has been preparing himself can serve as an indicator of flying skills and abilities acquired during ground instruction. Training displays and training simulators which most fully simulate an actual flight, as well as the aircraft cockpit can be used for this purpose. It is difficult to obtain an objective picture, however, since it is not possible fully to simulate an entire flight and the state of the student in the air. Quality of unassisted performance of an element of a training flight in the air can serve as an integral criterion for grading a pilot's level of preparedness and proficiency gained on the ground. If the student receives a mark of good or satisfactory on his performance in the air, one can consider the objective of the ground instruction (preflight training) to have been accomplished.

From this standpoint I feel that the following method is a good idea. As stated above, the requisite knowledge is acquired and the "building blocks" of flying skills and abilities are developed in the course of ground training and instruction. In the air the instructor does not demonstrate, as is currently the practice, but checks the quality of execution of that maneuver or flight procedure for which the student has trained and prepared on the ground. If the student is unable to execute a maneuver or perform a flight procedure or if he performs it poorly, the instructor tells him how to do it right and demonstrates the maneuver or procedure, or else executes the procedure together with the student, after which the student works on it until he gets it right. The student's grade for preparation for the given training flight is reduced, taking into consideration the student pilot's individual characteristics (in all cases it is advisable to grade ground preparation following completion of a training flight), and a determination is made regarding subsequent ground instruction. After checking quality of execution of a flight maneuver or flight procedure, the instructor determines the student's need to practice the procedure to the point of mastery before moving on to more complex maneuvers and procedures.

A question might arise at this point: does this mean that the instructor never demonstrates a maneuver or flight procedure? Not at all. This cannot be entirely eliminated. The proposed method consists essentially in the fact that demonstration is shifted over to ground instruction. That which cannot be reproduced and portrayed on the ground must be demonstrated and practiced in the air. During basic pilot training demonstration is performed during familiarization flights; in-air demonstration is also essential in the course of mastering such complex procedures as takeoff and landing. In-air demonstration can be omitted whenever level of preparation

is sufficient. For example, if a student pilot has mastered the 360 degree banked turn, he can go ahead and practice other variations of the banked turn without in-flight demonstration. In the final analysis it is the instructor who determines the need to demonstrate a procedure, taking the individual student into account.

The proposed method incorporates the same techniques and procedures and therefore presents no difficulty. It does presume, however, that a student pilot has need for and interest in ground training and instruction, and it presumes a proper correlation between methodological foundation and level of knowledge on the part of flight personnel and student pilots. Of course training following this method would require that a number of fundamental matters be resolved. First and foremost it would require a higher general level of instructor teaching proficiency. It is also necessary to diversify the pilot training curriculum in order to ensure the principle of sequential learning and to stimulate the interest of pilot cadets. For example, in addition to constant-rate 360 degree banked turns at a single airspeed, as is currently the practice, students could practice turns at various speeds and bank angles, at maximum thrust, and on afterburner, rolling out to a preselected heading at a preselected airspeed. This makes it possible to appraise a pilot's proficiency and experience not only on the basis of flight hours logged but also on the basis of his ability to prepare for a flight assignment and on the quality of its execution.

Up to the present time no special studies of this training method have been made. Many instructors, however, have worked out in a practical manner individual components of this method connected with decreasing in-air demonstration and improving ground preparation for training flights. There are examples of conversion-training pilots over to a new aircraft without use of trainer aircraft.

Amassed experience gives reason to believe that such an instructional method will make it possible to provide, without simply copying the instructor's demonstration, under the instructor's supervision and watchful eye, development of solid individual flying skills during the process of dual instruction and to prevent the deterioration of flying technique during solo flying. Pilot cadet and pilot interest in and commitment to fruitful efforts on the ground, assuming adequate availability of training equipment and facilities, will make it possible, in an optimal period of time and at lower cost, to master to the fullest degree the combat capabilities of modern aircraft and to increase flight safety.

We should emphasize that instructors and student pilots support such an approach to flight instruction. In-air demonstration should be limited from the very beginning of pilot training. It should gradually be reduced to a minimum, by graduation from pilot school. The graduated pilot should have the knowledge and ability to study and train on his own. However, if cadets are first taught

with the current method and subsequently transition to the proposed method, there can occur such negative phenomena as student pilot denial of need for knowledge, especially by those who are strong in flying ability, as well as inability to prepare unsupervised on the ground for training flights, which will impede transition to the new learning principle and could prove inadvisable.

We should state that training student pilots with this method is not an end in itself. It is demanded by practical realities and air tactics, for in a combat environment it will be necessary to employ immediately a new device, method or tactic in air-to-air or air-to-ground combat following appropriate and sufficient training and preparation on the ground, without practice or rehearsal in the air. Consequently the training process should be as dynamic as possible. From the standpoint of economics, training based on thorough knowledge of theory and solid flight simulator practice promises a substantial decrease in costs and increase in the intellectual reliability of the combat pilot in comparison with "nataskivaniye."

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Helicopter Pilot Serves Tour of Duty in Afghanistan

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[Article, published under the heading "They Were Decorated by the Homeland," by Capt Yu. Gavrilov: "Lines in One's Biography"]

[Text] Sasha Boykov visited his first airfield as a child.

The father of his friend Serezha Ocheredko was a military officer. He arranged an outing for the boys. It was perhaps then, when he gazed enraptured at the helicopters, that this lad's dream of becoming a pilot was born. In any case, upon graduation from secondary school Aleksandr enrolled at the Syzran Higher Military Aviation School for Pilots.

Aleksandr Boykov studied hard. He solidly mastered theory and practice. He loved each and every training flight. This cadet's teachers and flight instructors greatly appreciated his enthusiasm. Section commander officer A. Bazarov did not conceal the fact that he had high hopes for Boykov. He liked the fact that his young charge had a high capacity to accomplish work, and he liked his ability to perform with precision in a difficult situation. The young aviator successfully completed service school.

In the fall of 1975 Lieutenant Boykov was assigned to a military aviation unit in the Transbaykal as copilot-navigator of an Mi-8 helicopter.

When the young officer reported to his section commander, Capt D. Medyankin, the latter had words of praise for his service school efficiency report.

"Well, you have good marks on theory. I hope you will do a good job of flying as well."

"I'll do my best, Comrade Captain."

Captain Medyankin was known as a skilled and conscientious training methods specialist. Boykov's instructor helped him hone his helicopter flying technique and helped him develop excellent moral qualities and a firm character. Sensing his superior's attention and support, the lieutenant worked conscientiously. He was one of the first pilots of his graduation year to pass the examinations for Third Class. More and more frequently he was being referred to as a pilot of great promise.

Five years passed unnoticed in the routine of intensive combat training. During this time Boykov was twice reassigned to new duty stations and became a helicopter commander. The following practice was observed in the outfit headed at that time by officer V. Pismennyy, who has since been awarded the title Hero of the Soviet Union: the commanding officer would personally go up with each and every pilot, would teach his pilots precision helicopter flying in conditions of high mountain terrain and would teach them to put a helicopter down onto constricted-area mountain landing sites.

The advice of Aleksandr's mentor came in very handy when he himself was placed in command of a helicopter section. The fact is that gathering in pearls of experience from his senior comrades is one of Boykov's characteristic traits. It is perhaps for this reason that he succeeds in avoiding major errors in his instructor activities. His crews repeatedly flew difficult missions involving airlifting important cargo to various destinations, carried out special missions, and took part in natural-disaster recovery efforts.

As the years passed, Boykov developed qualities which distinguish the genuine commander—the ability to assume responsibility for one's decision, the ability to defend one's point of view, and the ability to carry a job through to the end. These were particularly useful qualities when he was performing his internationalist duty in the Republic of Afghanistan.

Those were busy times. He made many Mi-8 flights to towns and villages scattered among the mountain valleys, and he flew to practically every part of the country, transporting civilian goods and food supplies to the civilian population. When the situation required, he and his comrades in arms would come to the assistance of the fighting men of the Afghan People's Army. He would deliver a heliborne assault force to the rear of dushman [Afghan rebel] bands and would pick up wounded from the battlefield. Sometimes he would have to spend 8-9

hours in the air in a 24-hour period. He would also come to the aid of Soviet soldiers. The following incident is particularly memorable to Aleksandr.

Giving a mission briefing, the commanding officer concisely described the situation.

"In this area," he pointed on the map with his pencil, "the bandits have crippled one of our aircraft. The pilot has ejected. We've got to make an extraction as quickly as possible. You are going to have to do the job."

"Yes sir," replied Boykov.

The two-ship element took off. They reached the search area without incident. They soon picked up the sound of an emergency locator beacon. Down below Aleksandr spotted a parachute canopy standing out in contrast against the background of the mountain terrain. Somewhat off to the side they could see muzzle flashes: the officer was under fire. The dushman spotted the helicopters and turned their fire skyward. A burst of machine-gun fire struck the fuselage of the lead aircraft with a typical drumming sound. One of the bullets grazed a control rod. This placed in question whether the ship could land.

"Let me go down," Captain Yefimov requested of the element leader.

"Go ahead, I'll cover you...." Boykov assented. His crew opened fire on the dushman. Aircraft navigator Sr Lt V. Khnykov, squeezing off bursts of assault-rifle automatic fire, halted the advance of those who were getting close to the wounded flier.

In the meantime Yefimov put his ship into a rapid descent and touched down. His crew chief helped the pilot clamber aboard. The helicopter darted skyward.

...They put down onto a helicopter pad next to the military hospital. Jumping to the ground, Boykov and Khnykov ran over to the wingman. Captain Yefimov and his comrades removed the wounded pilot from the helicopter.

"Be careful, guys, he's holding a grenade," the crew chief warned.

The unconscious pilot was tightly clenching a black, ribbed oval object in his right hand. The pin had already been removed; if he were to unclench his fingers....

"Unfortunately I never saw this young lad again," Boykov related to me, recalling his tour of duty in Afghanistan. "I never even learned his name. We safely disposed of the grenade and got the pilot into the hospital. That evening we were visited by his comrades, who had come to thank us for rescuing him. There was no need to thank us. We were just doing our duty...."

Boikov had quite a few experiences during his tour of duty in Afghanistan. His selfless labor was rewarded with a combat decoration—the Order of the Red Star. But our story about this pilot would be incomplete if we failed to mention one additional item. He and his crew took part in handling the emergency at the Chernobyl nuclear power station. Aleksandr spent about a month and a half in the restricted zone. Every day was for him and his fellow soldiers a test of courage, fortitude, and professional skill.

"Things were probably easier in Afghanistan," related Aleksandr Nikolayevich. "There you could see the enemy. An invisible danger lurked at Chernobyl. But there as well the fellows performed selflessly, dumping payloads onto the damaged reactor."

Aleksandr Boykov logged about 90 flying hours at Chernobyl. And the conditions in which they had to work! The experience he had gained in Afghanistan served him in good stead. He recalls with pride the days spent at Chernobyl. He is proud of his helicopter crewman comrades, of the chemical warfare personnel, of the combat engineers, of everybody involved in the successful fight to quell the disaster.

Presently deputy commander of a helicopter squadron, Military Pilot 1st Class Maj Aleksandr Boykov devotes all his energies and knowledge to training and indoctrination of skilled air warriors.

This man is writing not only his own biography but the country's as well. The journey of our contemporary and the link between today, the past and the future can be traced through the events, facts, and dates which have involved A. Boykov as an eyewitness and participant. Today the biography of the homeland is being written by such people as Maj Aleksandr Boykov.

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**Officer Students at Military Political Academy
Prepare for Line-Unit Tour of Duty**
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[Article, published under the heading "Military Educational Institution Affairs," by Maj Gen Avn P. Vyalikov, candidate of historical sciences, head of Air Forces Faculty, Military Political Academy imeni V. I. Lenin: "Today—Tour of Duty as Officer in Training, Tomorrow—Regular Duty Assignment"]

[Text] The curriculum at service academies includes a tour of duty in line units for enrolled personnel, during which they put themselves to the test, testing their ability and personal readiness subsequently to function in a regular duty assignment. But in order for such a test to take place, the individual line unit tour of duty tasking outline specifies a great deal: acquisition, reinforcement

and improvement of skills in organization of party political work in a military aviation unit; comprehensive study of advanced know-how in political, military, moral and legal indoctrination and education of personnel; mastery of modern forms of party-political support to ensure constant vigilance and combat readiness, excellent level of professional competence and proficiency, and absolute flight operations safety; acquisition of full knowledge of the moral-psychological climate within the collective; gathering of factual material for writing a term paper in one's area of specialization. This is the program the officer in training must accomplish.

He personally carries out the assignment plan-schedule for his tour of duty in a line unit during his stay in the aviation regiment. At the same time the pilot reestablishes his level of flying proficiency: from the first solo flight to advanced combat maneuvering.

The time allocated for the tour of duty in a line unit is indeed tightly scheduled.

Preparation for students' tour of duty in a line unit begins long before completion of the course of training on theory. In fact during the entire school year the officer amasses the knowledge of theory with which he will report for his tour of duty in a line unit. This preliminary work is performed in a planned and systematic manner not only by the faculty in which he is enrolled but also by the principal departments.

For example, flying skills are continuously maintained with flight simulator sessions. The department headed by Maj Gen Avn P. Novitskiy does everything possible to ensure that the students enrolled in the faculty are familiar with the documents which govern flight operations and are kept current on the latest developments in the area of flight training and flight safety.

The officers of this department study in detail the students' level of proficiency and work out with them individual flight training programs and schedules for reestablishing flying skills.

The faculty subject teaching methods group headed by Col I. Zaynyshev concerns itself with ensuring that, prior to leaving for their tour of duty in a line unit, the officers not only possess thorough knowledge of the most important CPSU documents but also become imbued with their ideas, spirit, and an endeavor to communicate to military aviation collectives that which is presently acquiring determining significance for reliable accomplishment of revolutionary renewal.

Preparation for the tour of duty in a line unit culminates with a two-week teaching methods course which brings everything together and adds final touches.

During the entire period of training, as well as during the final training methods course, officials from the Main Political Directorate of the Soviet Army and Navy,

representatives from the political directorates and main staffs of the Air Forces and Air Defense Forces, as well as commanders and political workers from line units get together with the student-officers. In the 1986-1987 academic year, for example, genuinely useful and practical professional-level get-togethers were held in our faculty by Mar Avn P. Kirsanov, Col Gen Avn L. Batekhin, Lt Gen Avn Yu. Fotinov, Maj Gens Avn Ye. Kabanov, K. Kazeykin, and M. Prokudin, Cols Ye. Shilin, P. Korchemnyy, A. Vozov, V. Kozlov, and many others. These get-togethers not only put the final touches on preparation for the tour of duty in line units but also constituted a first step in carrying out all that had been planned and conceived. The goal of all our work is as follows: an enrolled student, after a one-year break in flying and regular active duty, is to reach a level of proficiency and preparedness in his work performance as if he had only yesterday stopped flying his combat fixed-wing or rotary-wing aircraft and only yesterday had left his unit.

One of the specific features of the tour of duty in line units by the students of our faculty is the exceptionally broad geography they encompass. This of course is a very good thing. In the fall we receive a great many interesting reports on how our students are performing their tour of duty, how their daily living and working routine is going, and how they are accomplishing perestroika in units and subunits in every part of our country.

But there are some difficulties here as well. For example, it is no easy matter to organize effective supervision of the tour of duty in line units and to monitor progress and quality of performance of everything prescribed by the work assignment schedule. The academy, the faculty, and the specialized departments do a great deal of work connected with ensuring that the tour of duty in line units is not a mere routine instructional activity but constitutes a genuine school for development of an Air Force political worker. Nevertheless, a great deal depends on the command element and political sections of those units in which a student undergoes this unique practical learning experience.

We should note that the majority of regimental commanders and their deputy commanders for political affairs closely examine the student's level of knowledge of theory and flying proficiency and endeavor objectively and comprehensively to evaluate his professional, moral-political, and psychological qualities. They provide active assistance in adjusting and concretizing the individual work assignment plan on the basis of local conditions. They arrange for students to take the tests for pilot flight certification without delay or a lip-service approach. They promptly assign experienced, conscientious individual instructors.

In this atmosphere a student is very soon flying solo. And this immediately fills him with enthusiasm, creates a fine mood to work, and creates an active desire not only to complete the student tour of duty program but also to be useful in performing regimental missions.

The students and administrators of our faculty remember with gratitude the commanders and political workers of the air forces of the Order of Lenin Leningrad Military District, the Red-Banner Siberian Military District, and of Air Defense Forces aviation. Lt Cols S. Stefanov and V. Pankratyev, and Maj V. Pakhomov and A. Balakin have many good things to say about the wise and attentive mentors who helped them in the course of their military service.

Lt Col S. Stefanov, for example, will never forget the way he was treated during his line-unit tour of duty. Maj Gen Avn A. Vasilyev, deputy commander of air forces of the Leningrad Military District, examined this student's work assignment schedule, helped him draw up a highly efficient timetable for accomplishing breaking-in and orientation, and went up on several check rides with him. And he assigned to this officer an experienced methods specialist, district air forces senior inspector officer V. Sokirko.

Maj V. Pakhomov has many nice things to say about Lt Col N. Miroshnichenko, head of the political section at the Orenburg Higher Military Aviation School for Pilots, who discussed with the student officer the specific peculiarities of local flying conditions, discussed the overall local environment and situation, gave him valuable practical advice, and personally introduced the newly-arrived officer to the command and staff personnel as well as the political workers of the unit in which he would be serving his tour of duty. But Col N. Miroshnichenko did not leave it at that. They got together on many occasions, and the colonel always displayed keen interest, support, solicitude, and offered counsel and advice.

Unfortunately we do not everywhere sense such a kindly attitude and an understanding of the complexity of those problems which our students must face during their line-unit tour of duty. Maj V. Mironov, for example, did not get beyond introducing himself to political worker Lt Col V. Nikiforov. No detailed conversation ensued, because the lieutenant colonel essentially brushed the student aside. It was only later, following an earnest entreaty by the latter, that he was able to talk about his forthcoming activities.

We sometimes hear critical comments from military council member district air forces political section chiefs to the effect that our graduates are insufficiently prepared for practical duties. While not denying any burden of responsibility, I feel that academy officers are entitled to mention that well-known saying: as you sow, so shall you reap. This is particularly applicable in the case at hand, inasmuch as the tour of duty in line units is an important time for acquiring work experience.

I must also mention another item which is of acute importance to the students of our faculty. Pursuant to an order issued by the USSR Minister of Defense, enrolled officer-pilots are supposed to log a specific number of

hours in the air. Failure to log this time diminishes an officer's combat readiness, makes more difficult the process of break-in and orientation during his tour of duty in a line unit or after graduating from the academy, undermines his morale, and very appreciably affects him financially. The fact is that if he fails to log the required flight hours, a student is assigned base pay for an entire year as a non-flight personnel status political worker. When this happens, the commanders and political workers who failed to display proper concern with the student tour-of-duty officer's practical flying, and who frequently would turn this officer's flying schedule into a reserve time slot for all kinds of things which might come up, contribute to creating unhealthy relations between student tour-of-duty officers and the regimental command element. There was a time when student officers would make phony entries in their pilot's logbook, and their superiors would place their stamp and signature with a clear conscience, certifying the phony figures. Although such things have not occurred during in last three years, it is unquestionably necessary to remind people about these shameful facts, in order to make sure that they do not recur in the future.

Of course there is an incomparably greater number of positive examples. The results of student tours of duty in line units on the whole are gratifying to the faculty and principal departments.

Last year, for example, almost half of the students serving a tour of duty in line units received commendations from their unit commanders, and 13 of them were awarded certificates of achievement. Maj V. Smirnov and K. Untilov, faced with an emergency situation, displayed not only excellent flying ability but courage, self-control, and decisiveness as well. These in-flight emergencies did not catch them napping. Maj A. Smirnov safely brought his helicopter down onto an emergency landing site, while Maj K. Untilov, who was flying with his instructor, successfully accomplished a very difficult airfield approach and landing. These officers received a commendation from their unit commanding officer and received valuable awards by order of the academy commanding officer.

I believe that the principal component in these successful performances is the exceptionally favorable attitude toward the tour of duty in line units by the students themselves. In the process of perestroika people change literally before one's very eyes. I believe I am correct in stating that the very time in which we are living and serving is the main reason for such a renewal. Revolutionary restructuring requires genuine commissars. The students understand this fact. It is the task of our faculty's administrative personnel to impart a material force to this mood and attitude. We therefore consider everything which would help raise the level of all our pedagogic activities.

I should note that this year the academy has taken an appreciable qualitative step forward in the instructional process. This enables us to enrich the content of the

line-unit tour of duty work assignment schedules, to make the practical tour of duty more self-dependent, purposeful, and responsible. The student becomes not only an accumulator of practical experience and know-how but also a shaper of such experience and know-how.

Faculty administrative personnel feel that it would be extremely beneficial to assign the student officer to his pregraduation practical tour of duty with that unit to which he will be assigned one year hence. Of course this is not a simple matter, but it is certainly attainable.

Student officer complete independence in performing the duties of unit political worker would be highly beneficial. In my opinion this would not be difficult to accomplish. As a rule everybody knows how long the line-unit tour of duty will be. Therefore it is sufficient to schedule things so that the first half of the line-unit tour of duty proceeds under the supervision of an experienced colleague. Then the regular full-time political worker would go on leave, and the student officer, designated by official order as his temporary replacement, remains one-on-one with the daily affairs of the Air Force collective. I am confident that our officers are prepared to implement such a principle, for in only one year's time they will in fact be performing such a duty assignment.

I would like responses and comments by unit command authorities pertaining to the results of the student tour of duty to be more substantial and content-filled, for we know the student-officers primarily from what they do at school. The tour of duty in a line unit reveals a person's abilities much more deeply.

Achievements and problems exist side by side—this is a dialectic pattern of life. One of the principles we follow today in our work is to develop and further deepen positive experience and know-how and not to brush aside problems but to hammer and shape them into achievements.

June of each year is the time at which students enrolled at service academies serve a practical tour of duty in line units. I should like once more to remind commanders and political workers that the student's line-unit tour of duty is not one more annoying responsibility but rather an activity of national importance.

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Troop Lift Helicopters in Afghanistan Air Assault Action

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[Article, published under the heading "Continuous Combat Readiness," by Military Pilot 1st Class Lt Col S. Dovzhenko, bearer of the Order of the Red Banner and Order of the Red Star, squadron commander: "Air Assault Operation in Mountain Terrain"; first paragraph is AVIATSIYA I KOSMONAVTIKA introduction]

[Text] An air assault in mountain terrain. An organic blending of the skill of pilots and courage of assault

troopers. It would seem that no force could withstand their swift assault. The element of surprise, offensive shock action, precise planning and timing distinguish this type of combat action. Many engagements have ended in success precisely thanks to the prompt and timely engagement of air assault subunits. Airmen bear a large part of the load in executing this important mission.

Prior to our arrival in the Republic of Afghanistan to carry out our internationalist duty, my comrades and I had for the most part flown on flatland terrain. We had virtually no experience in heliborne assaults in mountain terrain, unless you count the brief familiarization we were given in making mountain landings at high elevations on the eve of our departure for Afghanistan. To be quite honest, these practice flights could not be called tough. We could reify the approach, take our time analyzing any mistakes we made, and shoot another practice approach and landing. It is probably for this reason that I kept asking myself the same questions. How would my men respond in a combat situation? Would their flying skill suffice to carry out a combat mission?

I noticed the first changes in their behavior on the day we were looking over and familiarizing ourselves with the equipment we would be flying. Many of the helicopters bore marks of battle, patched up by the skilled hands of our maintenance crews. I have to admit that these experienced pilots gazed at the helicopters, which had received their baptism of fire, like new conscripts gazing at veteran combat soldiers. I noted that the men immediately turned more serious and became more deeply immersed in thought. Even when we began flying training sorties, the men refrained from unnecessary relaxation of demands. They realized that orders for a real combat mission could arrive at any moment.

Finally we received our first combat mission: we were to fly immediately to the Kandahar area as part of an assault airlift force and land an air assault force. Together with squadron deputy commander for political affairs Maj A. Grigoryev, we carefully selected the aircrews. There were many who wanted to fly this mission, but it was a highly critical mission, and we therefore selected the most proficient combat pilots. We subsequently flew many missions of various kinds, but I shall never forget the preparations for this first one.

I prepared with particular thoroughness for the mission briefing of my men. I realized that if I failed to consider some item, one of my men might pay with his life, particularly since there were many things here to which they were not yet accustomed. I studied the proposed assault landing site from intelligence obtained through ground and air reconnaissance, as well as with mission plotting photomaps. I endeavored precisely to determine the landing site's actual elevation above sea level and the disposition of the rebels' weapon positions. I then

fleshed out possible variations of assault force approach to and movement from the objective. After this I instructed each aircrew to calculate their helicopter's maximum gross takeoff weight taking the ship's performance capabilities into account.

My officers worked smoothly and with enthusiasm. We determined takeoff sequence, enroute formation, and coordinating signals with the escort element. In preparing for the mission, we drew up two operational variations: landing the troops and, if terrain conditions did not permit us to land, dropping the troops from a hover.

The latter variation is more difficult, requiring a high degree of flying skill and self-control on the part of the aircrews. It is by no means child's play to hold a heavy helicopter at a height of 2 to 3 meters from the ground, above high-elevation terrain, and under hostile fire. In addition, troop delivery time should be minimal, for otherwise the helicopter would become a sitting duck. It is not surprising that we devoted particular attention to preparation of the latter variation.

At the designated time our helicopters appeared over the Hindu Kush. The snow-covered peaks rose practically to our flight altitude of 5000 meters. Out forward I could see a number of helicopters—our escort. A similar element took up position behind us. I asked my navigator, Capt A. Kulakov, over the intercom: "How is our wingman doing?" Looking out the side glazing, he gave me a thumbs up sign—everything was fine.

For some time we flew above a highway. At one point we saw a fuel tanker truck burning on the shoulder of the road; armored personnel carriers had stopped by it. Yes, the roads of Afghanistan were not at all tranquil. Successfully completing our flight, we landed at the staging and troop pickup field. The assault troops were ready and waiting. We went through a detailed mission briefing with the commander of the assault troops subunit. We proceeded to load troops on board. Prior to departure we once again went through the coordination procedures with Maj N. Malyshev, commander of the escort element. Not only the success of the mission but the lives of our comrades in arms depended on our mutual understanding.

Takeoff. My navigator, Captain Kulakov, riveted his attention to the force's movement. The force was to reach the landing area at a precisely specified time. Late arrival, just as early arrival, was fraught with serious consequences. I heard the navigator's voice in my headphones: "Approaching the landing area, skipper." We could see shellbursts out ahead. The escort element had engaged. Orbiting above the landing area, the attack helicopters were sweeping the area around the landing zone with fire. Completing the job, the element leader radioed the landing conditions to us: wind direction, landing approach heading, and location of dushman [Afghan rebel] antiaircraft weapons.

We began our descent—the most dangerous phase of the mission. Crew chief Capt N. Anokhin manned the machinegun. Protection of crew and assault troopers was now in his hands. The escort element was also positioned to protect the troop lift helicopters. The landing zone lay ahead. Now they had to devote full attention to the landing. The crew chief reported height above ground. The navigator closely watched main rotor rpm. Everyone was tense. Touchdown! Captain Anokhin quickly emptied the helicopter of troops and returned to his place manning the machinegun. We took off. Our wingman, Capt V. Karmanovskiy, followed us in.

Having disgorged their troops, the troop lift helicopters joined up and headed home, again accompanied by the attack-helicopter escort. It was later, as we flew other missions, that we truly gained an understanding of the courage of these fellows. They would be the first to engage the enemy and the first to come to the aid of aircrews in trouble. Exposing themselves to danger, they make every effort to make things safe for their comrades. I shall never forget escort element commanders Lt Col A. Volkov and Maj I. Dudarev—bearers of the Order of the Red Banner and Order of the Red Star. I am proud of the fact that I flew with Hero of the Soviet Union Maj N. Malyshev. Our friendship can be defined only by a single expression—brotherhood in arms.

...Mission accomplished. Our heads were filled with visual impressions. When the men calmed down somewhat, I gathered my flight personnel together for an after-action review. This was not the customary post-mission critique, where the commander as a rule himself does the job of analyzing his men's mistakes. The men themselves, seizing the initiative, frankly discussed their miscalculations and errors. Optimal variations of combat actions took shape in the course of the analysis, and advanced know-how was determined.

That First air assault troop lift mission provided the men a lot of benefit. The main thing was that they gained faith in themselves and surmounted that psychological barrier erected by the peacetime training environment and its unrealistic simulation. At the same time it pointed up a great many deficiencies in methods of training and preparing flight personnel to operate in combat conditions. Only down there in Afghanistan did we gain a genuine understanding of the cost of unnecessary situation simplification in combat training. This cost is measured in human lives.

For example, training of aircrews to fly missions involving putting down at an unfamiliar landing site. Aircrews thoroughly eyeball-study them in advance, and only after a check flight do aircrews go out on their own. This excessive caution leads to a situation where helicopter crewmen have no idea how to prepare for a mission on the basis of photomaps and other intelligence. In a

combat situation a pilot frequently has only this kind of information available. This is why we had to put in immediate and priority effort on mastering this new method.

Another serious deficiency was a lack of close contact between air and ground commanders. There has long been discussion of having motorized riflemen, for example, be present together with flight personnel at a general mission briefing, with the commander of the assault force subunit working up the specific missions with the commander of the helicopter force. This would make it possible to discuss in advance such important elements as loading plan variations, distribution of personnel among troop lift helicopters, etc. But at best such get-togethers take place only immediately prior to mission departure. This results in lack of coordination in actions between aircrews and assault troops.

Prior to our departure for the Republic of Afghanistan we had no experience in coordination with an escort element. We also had to assimilate this subject in haste.

Of course in peacetime training the most important thing is to conduct training operations without air mishaps. This is a most laudable approach. Flight operations without mishaps, however, should be a consequence of a high degree of pilot proficiency, not a result of unnecessary situation simplification in training.

Another outstanding quality of Soviet pilots was revealed in the difficult conditions of combat—readiness and willingness to come to the aid of one's comrade at all times.

During combat operations against the forces of Ahmed Shah in Kunduz province, we were assigned the mission of transporting an assault force of Afghan soldiers to a battle area and to evacuate wounded. My helicopter sustained damage just as I was landing: the hydraulic system malfunctioned, and one engine shut down. I succeeded in landing the ship with great difficulty, but I was unable to take off again. We prepared to fight alongside the assault troops. Suddenly I spotted my wingman, Capt V. Karmanovskiy, coming in for a landing. His crew chief, Capt M. Gusarov, placed suppressive

machinegun fire on a dushman weapon position. The pilot landed, took wounded soldiers and my crew aboard, and took off. Captain Karmanovskiy was awarded the Order of the Red Star for acts of valor in combat.

Having performed our internationalist duty, we returned to the homeland. We now look at many things in a different light. Combat experience confirms that unnecessary situation simplification in routine combat training lessens the vigorous alertness of attitude on the part of flight personnel and makes one accustomed to unoriginal thinking. Nobody should ever forget this fact.

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Flying an Airstrike

91440072i Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 6, Jun 88 (signed to press
6 May 88) pp 24-25

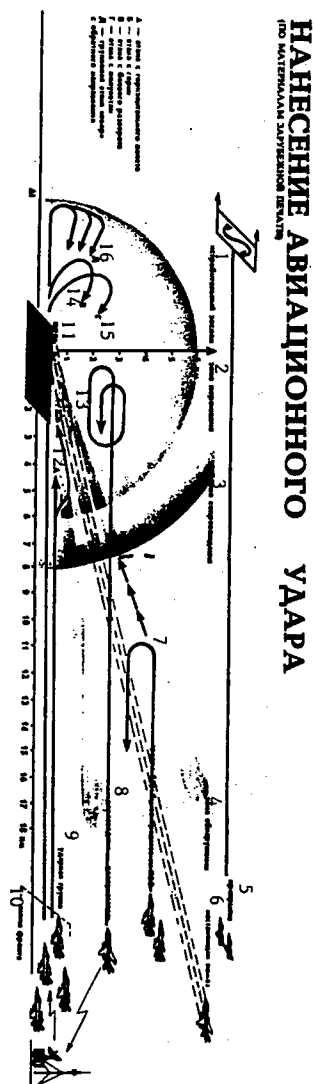
[Unattributed Article: "Delivering an Airstrike"; based on materials published in the foreign press]

[Text] Sequence of Actions With Employment of All Combat Support Assets:

1. Aircraft flying final prestrike reconnaissance precisely determine target location, provide intelligence to the command and control agency, and force (in this variation) the radars of the SAM system protecting the target to switch on;
2. Air defense suppression element attacks radars with antiradar missiles from stand-off range beyond the SAM envelope;
3. Fighter escort moves out ahead and forms a screen close to the strike objective;
4. Strike elements proceed toward objective;
5. As strike elements come into hostile search radar detection range, the ECM aircraft commences jamming.

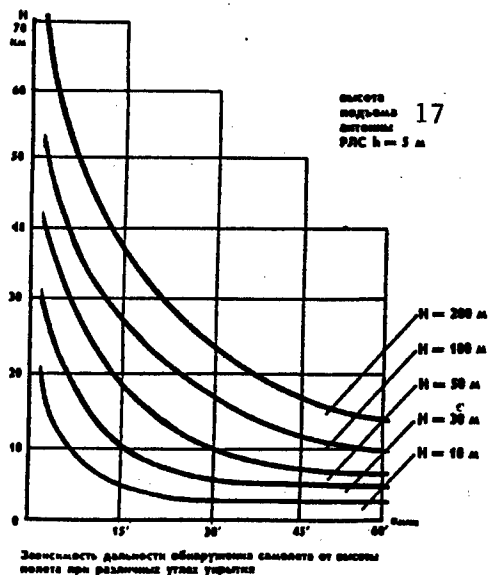
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Diagram 1.



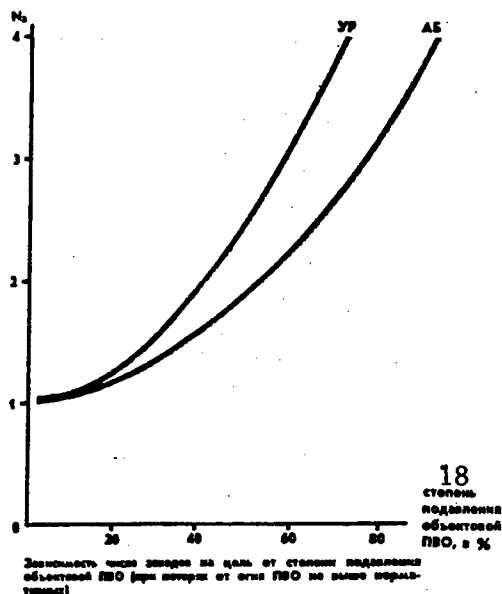
- Key:
1. Fighter screen
 2. SAM envelope
 3. Ground radar tracking zone
 4. Ground radar detection zone
 5. Fighter escort
 6. EMC aircraft
 7. Air defense suppression element
 8. Aircraft flying final prestrike reconnaissance and target designator aircraft
 9. Strike force
 10. Forward line of troops
 11. Target
 12. Attack from level flight
 13. Attack from abrupt, steep climb
 14. Attack from chandelle
 15. Attack from Immelman
 16. Multi-aircraft "fan" attack from target rear

Diagram 2. Relationship Between Aircraft Detection Range and Flight Altitude at Various Angles of Crest Clearance



- Key:
17. Radar antenna height, $h = 5$ m

Diagram 3. Relationship Between Number of Runs on the Target and Degree of Suppression of Local Air Defense (with losses to air defense fire not above standard)



- Key:
18. Degree of suppression of local air defense, percent mark

Improving Pilot Performance With Flight Data Recorder Tape Analysis

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in Russian No 6, Jun 88 (signed to press
6 May 88) pp 28-29

[Article, published under the heading "Flight Safety: Experience, Analysis, Problems," by Lt Col A. Filippov and Lt Col (Res) V. Shishkin, candidate of military sciences: "Capabilities of Objective Monitoring of Pilot Performance"]

[Text] Utilization of means of objective monitoring of performance (SOK) [flight data recorder tapes, cockpit voice recorder tapes, plus video cameras, tape recorders, etc used on ground to monitor pilot performance] in analyzing, critiquing and rating aircrew performance in the air opens up extensive possibilities for improving the process of military aviator training and indoctrination. It is important that not only Air Force commanders but pilots as well rely on SOK materials. Pilots need solid skills in independent analysis of their flight performance. Comparing the tracks on flight data recorder tapes and other data recorder tapes, graphs, and visual information obtained by movie-camera and videotape recording with their own impressions, airmen should be able promptly and efficiently to spot and correct their mistakes. Working properly with SOK provides stimulus for active, innovative pilot thinking and increases the effectiveness and efficiency of pilot training.

Modern flight data recorder equipment such as the Luch system provide capability to analyze virtually all types of flights performed in the process of flight operations shifts. But this does not exhaust their capabilities. Thanks to systems with mass data storage, one can synthesize data on quality of performance of flight assignments carried out by a pilot during a specified period of time. Analysis of this data (secondary processing of flight data) makes it possible to grade not only the actual level of cockpit reliability of a combat pilot but also trends indicating change in the attained level, and consequently to predict and forestall the accumulation of potential errors and dangerous performance failures in combat training. One can state with assurance that extensive practical adoption of flight data recorder equipment has provided the prerequisites not only to organize a system of predicting and preventing aircraft equipment malfunctions but also for establishing a system of foreseeing and preventing air mishaps through the fault of personnel.

The experience of military aviation units indicates that not all the data recorded by onboard systems is used for analysis of quality of flight performance with the aid of Luch type systems. The main reason for this lies in shortcomings pertaining to flight data processing software, as well as in the way the data is recorded. So-called quick processing mode, with data output in the form of graphs, fails to provide the required promptness and efficiency of analysis, since a graph must be interpreted

manually with pencil and template. It takes up to 40-50 minutes, for example, to analyze the recorded data tapes for a 14-minute flight. Using another mode—quick analysis with data output on a blank form as a text report—fails to provide an evaluation of flying technique, navigation and weapons delivery, since this text output is intended primarily for evaluation of aircraft condition and status and for verification of adherence to operating rules and regulations.

Another reason for poor utilization of SOK materials lies in the fact that primarily a document method is employed in devising verification algorithms: the algorithm developer takes a certain point in the aircraft operating manual and, using symbols and a set of constants, forms a partial verification algorithm. There is clearly a lack of input data when forming logical variables. This also has its minus points.

Overall capabilities of the flight data recorder system are quite substantial. At the present time, however, the list of recorded analog and discrete parameters on heavy aircraft is poor from the standpoint of evaluating basic kinds of flight training and flying proficiency. No more than 15

of the total volume of recorded data, for example, can be used to rate flying technique. The situation is worse as regards rating navigation, combat flying and weapons delivery, and elements of pilot tactical training. Data recorded on magnetic tape during flight is hanging in the air both literally and figuratively, since there is virtually no tie-in to the ground surface. This creates considerable difficulties in evaluating crew performance during complex phases of a training sortie—on a weapons delivery run, during the landing approach, during combat maneuvering, etc.

The onboard system fails to record such parameters as the aircraft's current position coordinates, groundspeed, drift angle, as well as the aircraft's position relative to fixed points on the Earth's surface (runway threshold, point of aim, etc). For this reason Air Force units extensively employ a method of combined utilization of airborne and ground monitoring systems data with data tie-in to Universal Time.

With a computer, of course, one can determine not only gross deviations from prescribed flight parameters, attesting to pilot errors, but also typical (standard) errors in flying technique.

To date a fair amount of experience has been amassed in developing algorithms designed precisely to reveal typical mistakes. Serving as the basis for such algorithms are the results of examining the activities of the instructor pilot in "manual" analysis of data recorder tapes pertaining to a specific flight situation, as well as the results of analysis of statistical data on typical pilot errors

during complex phases of flight taking into account the conditions in which they were made (headwind and crosswind components, visibility, intensity of runway lighting, etc).

The total number of such algorithms and corresponding text messages is small at present. The vocabulary of the computer which is a component of the Luch system is limited. It can "communicate" with the instructor with the aid of several dozen phrases. Even this small number of phrases, however, is very helpful in determining the most dangerous and repeating errors in flying technique.

In what form does the commander receive processed data? What is the content of the quick analysis form? This is of considerable significance. We feel that the form should contain discrete information on the actual values of flight parameters at monitoring points in the flight path and current information in the form of text messages on events (pilot errors). The output document could assume the following form. First information is printed on conditions of the flight phase by phase, followed by the actual values of principal flight parameters at monitoring points with tie-in to a time line. The tabular or diagram part of the form would be followed by text messages reporting errors made flight phase by phase, indicating Universal Time and the extreme value of the principal parameter. The message code would be in the form of a three-digit number. The first digit indicates flight phase number, while the second and third represent a serial number. This kind of coding is essential for purposes of secondary information processing by computer.

The quick analysis form is to be used by senior flight personnel as well as by pilots for independent analysis of flight performance. The tabular portion makes it possible quickly to determine deviations from prescribed parameters at monitoring points, since impressions from completed flights are still fresh in the minds of instructors and pilots, and they clearly remember the prescribed values of these parameters.

For ease of analysis, parameter values are distributed along the longitudinal (altitude, airspeed, pitch attitude, vertical acceleration load factor) and lateral (bank angle, heading, lateral load factor) aircraft control channel. From 3 to 7 flight parameter values are printed on each line, corresponding to a specific monitoring point. This approach seeks to facilitate interpreting and understanding the data. Nor is it necessary to record the values of all enumerated parameters at all monitoring points.

Practical flight training experience indicates that an excessive amount of information is just as harmful as not enough information. The following facts are of primary interest to the Air Force commander: completeness and quality of execution of a training sortie, deviations during the flight which exceed the standard for a mark of satisfactory, and typical pilot errors during each phase of a flight.

Discrete information in the form of freeze frames at monitoring points along the flight path, text messages on typical pilot errors, and data on flight conditions during each phase (environment parameters) comprise in our opinion precisely that information which is essential to the Air Force commander to analyze the process of functioning of the complex "pilot-aircraft-environment" system.

A commander possessing experience, knowledge and the essential methods skills should handle the final stage of the analysis. The hopes of those flight training methodologists who believe that "smart machines" will be developed which can analyze and evaluate quality of flight performance are without foundation. Existing means of processing flight information (even promising future means) will not provide total automation of the process of evaluating all categories of flight training. We believe that at any level of development of these devices, the instructor (commander) will retain the functions of evaluating a pilot's proficiency. Only man, not a computer, can make the final diagnosis. But one must bear in mind a number of specific features in this connection.

Some instructor pilots do not take the trouble objectively to evaluate quality of flying technique in conformity with requirements, basing their judgment on a general impression of flight performance.

The existing form of recording checking of flying technique in pilots' logbooks fails to reflect a pilot's individual peculiarities, as well as strong and weak points in his training. It is difficult to see the specific individual behind all the abstract marks of excellent and good, as well as the extremely rare satisfactory, and it is difficult to determine to what degree he has developed the ability to foresee possible complications during flight, what typical errors he makes and in what phases he makes them, and how he corrects them. As a rule a non-objective evaluation of a pilot's level of proficiency has a negative effect on flight safety.

Extensive use of data obtained from regular performance analysis helps avoid mistakes to a certain degree. By comparing his impressions with SOK data, the instructor is able to focus the attention of his charges on shortcomings. Prompt performance analysis enables him to concentrate on evaluating a pilot's intellectual performance and frees him from the need to perform many routine operations in rating accuracy of maintaining prescribed flight parameters.

Augmenting the Luch system with a display and a disk drive (NMD) or using a newer version of this system expands the capabilities of SOK. A disk drive will provide capability to accumulate, process, and store information characterizing the level of pilot reliability of a specific individual. This requires standardization and conversion of data into a form convenient for computer processing. For automated recording and processing of

typical pilot errors it is important that they be recorded in the computer not as abstract facts but in a specific linkage with actual flight conditions and flight phase.

When shooting night approaches and landings with a transport aircraft, pilots most frequently allow their airspeed to drop after crossing the middle marker, prematurely retard the engine throttles or thrust levers to idle, and touch down in close proximity to the runway threshold (short of the precision touchdown area). During daylight approaches they most frequently fly their approach descent at excessive airspeed, are late in throttling back to idle, are high on glidepath, and overshoot the precision touchdown area. Pilots frequently make dangerous mistakes at night when landing on an unlighted runway. Computers make it possible not only to determine and record such occurrences but also to obtain data on the total number of errors during a specified period of time, on the ratio of mistakes to the number of sorties flown, number of errors and repetition of errors broken down by flight phases, etc. A flight information secondary processing program (long-term analysis) would be meaningless without such data.

Automation of the analysis process makes it possible substantially to reduce the volume of records documentation pertaining to flight training, to reduce time expenditures, and to create the essential conditions for increasing the effectiveness of preventive efforts aimed at ensuring flight safety. Such an analysis makes it possible not only to determine bottlenecks in pilot training but also to train pilots in a purposeful manner to perform in difficult flight situations, thus broadening their professional capabilities.

Thus fullest utilization of the MSRP ("Tester")-Luch system on the basis of improving software for automated processing of flight information, as well as use of computers for secondary processing of regular performance analysis data will make it possible to predict and prevent many dangerous pilot errors, to take an important step toward transitioning to "paperless management" of flight training, and to determine the direction to take in efforts to organize a system of prediction and prevention of air mishaps through the fault of personnel.

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Soviet Paraplane Experiments Described

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6 May 88) p 33

[Article, published under the heading "Innovators Seek Better Ways," by V. Petrov: "Takeoff... With Parachute"]

[Text] A contraption reminiscent of a tricycle on a parachute skittered across the airfield to the accompaniment of the popping clatter of its little motorcycle

engine. Four young lads were running behind it, holding a parachute canopy, which the headwind was gradually inflating. It was the maiden flight of a paraplane, a highly exotic flying machine.

Ultralight buffs first became acquainted with this craft and its designers—a team of enthusiasts led by G. Kovalev—at the SLA-84 2nd All-Union Ultralight Aircraft Review Competition at Koktebel. They did not see it get off the ground, however. It taxied at length with canopy inflated, but it failed to lift off.

According to the competition rules, the designers and volunteer test pilots were not allowed to take part in flying the craft. The test pilots frankly admitted that the craft was too unconventional and would be too dangerous for them actually to fly. Nevertheless the competition judges awarded a special prize for the craft's unique design. This inspired G. Kovalev and his colleagues. They succeeded in substantially improving their invention.

Originally the device consisted of a fuselage—a carriage fabricated of lightweight duralumin tubing—on which they mounted a pilot's seat and parachute suspension line control levers. At the rear of the craft they mounted a motor with propeller, like a propeller-driven sledge. But the most interesting thing about the design is the unusual wing, which comprises the rectangular canopy of a competition-type high glide-ratio parachute. At a certain angle of attack it generates lift quite sufficient to lift the paraplane into the air.

The road from conception to implementation of the paraplane idea was not an easy one. There was no literature on the subject. Now many of the difficulties are behind them. The current craft is the third version. The craft gives a pleasing appearance with its gleaming nickel fuselage and the mirror-like luster of its polished propellers.

It is a biplane-paraplane. They doubled the PO-9 parachute canopy and made the top canopy controllable. They mounted a second motor. The powerplant turns two coaxially mounted propellers via a vee-belt drive and also fills the parachute canopies. Using a vee-belt drive instead of mechanical reduction gearing made it possible to reduce the weight of the propulsion unit, while thrust has been increased by 25 percent over previous versions, producing 120 kg of power. Incidentally, 40 kg is sufficient for level flight. The three-fold power reserve is needed to ensure takeoff and rapid climbout.

How does this strange machine, which radically alters notions about modern aircraft, fly? It always takes off into the wind. A short, fast ground roll—and the two multihued canopies sweep aloft the fuselage frame and pilot. After reaching altitude the pilot, pulling on the paraplane suspension lines with special control levers, performs a unique aerial slalom, executing banked turns

to the right and left. The craft incorporates combined foot and hand controls. The hand controls are used when aloft, with the foot controls used primarily during take-off, to keep the craft heading straight on its takeoff roll.

With a headwind the craft can climb at a rate of 4 meters per second, and calculations indicate that the craft can reach an altitude of up to 3,000 meters. The gasoline supply (6 liters) is usually sufficient to fly 35-40 minutes.

...The flight was nearing an end. Descending, the paraplane circled and entered a landing approach upwind. The pilot throttled back, the fuselage and canopy hovered for a moment, and then the craft touched down. Speed at touchdown was practically zero. The airstream from the propellers continued to fill the parachute canopies, but finally they collapsed—the flight was over.

Mountain parachuting enthusiasts are successfully developing the idea of a flying parachute, an idea which was born in our country. Incidentally, the French—experts at mountain parachuting—call their devices parapentes, from the Greek word para—against—and the French word pente—slope—a device which flies above a slope.

"The jumping technique is simple," relates WO Nikolay Zazulya from Alma-Ata, the first person in the Soviet Union to make such a jump from an elevation of 6,100 meters. "The parachute opens as the mountain jumper is running down a slope. The canopy is held by one of his companions. Picking up speed, the canopy lifts the parachutist off the slope. From this point on it is a matter of parachute jumping technique."

The first amateur mountain parachute jumping took place in the Pamirs. A team of mountaineers from the Transbaykal Military District had set up camp at the foot of Lenin Peak (which rises to 7,134 meters). The soldiers were busy readying their gear for the forthcoming climb to the top, but their gaze was drawn more frequently than usual to the brooding summit. They were informed by radio from base camp that Nikolay Zazulya (Alma-Ata) and Sergey Kalabukhov (Moscow) would be attempting a parachute jump from the summit.

"We had doubts that such a thing was possible," related S. Belomestnov, a member of the Transbaykal Military District elite mountain-climbing team. "How could they run at that altitude? At a high elevation even the simple task of tying one's shoelace requires great physical exertion. We saw the mountain jumpers the next day, as we were making the ascent. Suddenly a figure appeared on the col below the summit (at an elevation of more than 6,000 meters). He took off running downslope—suddenly we saw a parachute moving along the slope, not a parachute as one usually pictures, but a paraplane—a competition-type high glide-ratio parachute, as USSR Mountain Climbing Master of Sport International Class Bozhukov, who was in charge of the parachute jumping, called it. In the meantime another parachute canopy flashed into view above the col. Failing to gain a solid

liftoff, however, the jumper collapsed onto the slope. Recovering from his unsuccessful attempt, he took another run at it. Another failure. The parachute dragged him across the hard snow and sharp rock projections. We were about 500 meters below the downed jumper, about a five-hour climb. We were about to head out to assist the jumper when he (it was Sergey Kalabukhov) got up and, swaying unsteadily, began stuffing the parachute into his backpack.

The jumpers had expended a great deal of energy on the climb. They had been forced to cross deep snow. Their backpacks, in addition to your customary mountain climber's gear, contained their parachutes, motion-picture and still-camera gear. As bad luck would have it, winds were dead calm at the summit. They waited for a long time for an upslope wind, which would help produce lift for the jump. Their heads ached from lack of oxygen, and they felt nauseous. And the longer they waited, the more their strength ebbed away. Nevertheless they decided to make the jump. N. Zazulya made a successful jump from an elevation of 6,100 meters. A. S. Kalabukhov did not make it this time. But he later climbed Lenin Peak once again and jumped from an elevation of 6,900 meters. Lift was insufficient, however, and he made a forced landing at 6,750 meters.

There will be more mountain parachute jumping expeditions. There are plans to climb all 7,000 meter peaks and jump from their summits. The following parachutists will take part in these expeditions: Honored Master of Sport USSR N. Ushmayev, a senior warrant officer serving with the air forces of the Transbaykal Military District, the only one of these parachutists who has twice been world champion; Masters of Sport USSR WOs N. Zazulya and S. Kalabukhov; mountain climbers—Masters of Sport USSR national champions V. Lavrukhin, V. Belyntsev and others. Preliminary training camps are to be held in the Caucasus to teach the mountain climbers parachute jumping and to teach the parachutists the rudiments of mountaineering.

As we can see, these unique experiments will continue.

But what is the purpose of these jumps? Are these athletes not risking their lives merely for the sake of thrillseeking? Do paraplanes have a future? These are not easy questions to answer. Building and testing these unusual flying machines is such a new and pioneering area of activity that even the amateur builders—a skilled, intrepid lot (not to mention the parachutists and mountaineers, for whom danger and risk are a natural part of their daily activities)—approach it with caution. Nevertheless paraplanes appear to have a future.

S. Belomestnov asserts: "For example, this could be a way to perform one of the most difficult tasks of mountaineering—bringing injured or sick persons down from

high elevations. This would require not days spent at elevations which are harmful to the victim's state of health but just a few minutes flight under a paraplane canopy."

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Soviet Combat Aircraft Maintenance Difficulties in Afghanistan

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[Article, published under the heading "Know-How of the Best Into the Combat Arsenal," by Maj V. Kozoliy: "Under the Skies of Afghanistan"]

[Text] Our airmen are not often called upon to fly difficult training missions far from settled areas. It is for this reason that we should devote particular attention to the experience amassed by the engineers and technicians of the squadron in which Maj V. Pavlushchenko serves as deputy commander for aviation engineer service.

I remember the conditions under which squadron maintenance personnel had to work at an unfamiliar airfield in the Republic of Afghanistan. This was a major test of professional skill, ideological and intellectual maturity, moral qualities and physical energy for each and every technician, flight technical maintenance unit chief, servicing and maintenance group chief, and aviation engineer service supervisor.

This group of airmen was redeployed to a new field. Many mechanics, technicians, technical maintenance unit chiefs, and specialist personnel of the various services were taking part in their first redeployment maneuver of this kind. They lacked experience. The difficulties they experienced are understandable.

There were many problems. First of all one should bear in mind that operation and maintenance of combat aircraft at an unfamiliar field, located on high-elevation mountain terrain to boot, differs considerably from operations at our permanent bases. The thin air, sharp temperature fluctuations, and low barometric pressures exert an appreciable effect on equipment operation and maintenance and on personnel practices. During the day, for example, one can get a serious sunburn on unprotected skin, while at night one must wear warm, insulated clothing.

The redeployment was preceded by a great deal of preparations and considerable organizational effort by aviation engineer service supervisor personnel. A detailed schedule was drawn up. It included a large number of measures which had to be carried out by engineer and technician personnel. It specified what was to be done, when it was to be done, and specified those persons responsible for carrying out prescribed measures.

The squadron's engineers and aviation engineer service supervisors checked the status and condition of all aircraft. Under their supervision the technicians and mechanics performed practice drills and rehearsed the sequence of inspection and adjustment procedures on engines, automatic fuel system assemblies, and on other systems. On some aircraft, for example, it was necessary to replace items whose specified service life had been reached. It was necessary to re-engine other aircraft. Maintenance personnel expended considerable time and effort on adjustment and checking mission readiness of bombsight and weapons aiming systems, as well as bombs and rockets.

Not much time was allocated to carrying out these labor-intensive activities. During those busy days the level of intensity of flight training at the base did not slacken off. It was necessary to become fully prepared to carry out the tough job the command authorities had given them.

During this period officers G. Panikhidkin, V. Parfenovich, V. Gvozdev, A. Iovenko, and others showed themselves to be skilled organizers. They assembled in advance all ground equipment, tools, and test gear, to ensure that they would have at hand everything they needed for successful maintenance and operation of combat aircraft in an unaccustomed environment.

They devoted considerable attention to preparing the men, their mood and attitude to ensure exemplary performance of an important assignment. They took pains to ensure that each servicing and maintenance crew, each group and shift had a highly-skilled specialist present. This increased the technical potential and job capabilities of aviation engineer service personnel and subsequently had a positive effect on the work mobility of servicing and maintenance crews and groups.

An important role at the morale and psychological level was played by exchange of know-how with those who had carried out their internationalist duty in the Republic of Afghanistan. For example, Maj V. Pavlushchenko, bearer of the Order of the Red Star and the Order for Service to the Homeland in the USSR Armed Forces, 3rd Class, and Maj V. Abramov, who has been awarded the Order for Service to the Homeland in the USSR Armed Forces, 3rd Class, demonstrated with specific examples that when operating and maintaining equipment in hot-climate conditions with considerable dust in the air it is necessary to keep a very close watch on the state and condition of equipment as well as personnel. For example, working efficiency diminished in some of the men and some developed physical ailments due to failure to observe prescribed conditions and practices. This resulted in failure to maintain smooth rhythm of readying combat aircraft for flight operations. Advice and recommendations by vanguard officers helped avoid many unpleasant incidents and complications.

Aviation engineer service supervisors impressed upon the men that when handling flight operations shifts each man should precisely observe all prescribed precautionary measures, wear the prescribed clothing, and adhere to technical discipline standards. In particular, since in the mountains the wind can suddenly pick up and just as suddenly die down, they kept a close watch to ensure that maintenance personnel properly covered the cockpit canopies and protected air intakes against entry of dust, pebbles and other foreign objects. They focused particular attention on maintaining calmness and composure.

For example, it is necessary to inspect particularly thoroughly after each sortie those systems containing rubber seals and gaskets. These components are susceptible to temperature fluctuations and immediately "signal" deterioration with tiny fluid or air leaks. Additional training sessions were held in the subunit to teach the men to detect and quickly correct such problems, and a series of practice drills was organized. The best methods specialists were enlisted to conduct these training drills. They reminded the engineers and technicians that in conditions of high-elevation mountains, heat and considerable dust in the air, engines frequently operate with reduced intake of air. This leads to certain consequences, including increased fuel consumption. Substantial changes are observed in engine thrust performance. This unquestionably affects the overall duration of a flight.

How can undesirable phenomena be prevented? This is discussed in detail in operating and maintenance manuals and in the specialized literature. At the same time practical experience can be very helpful. Every crew chief should be aware of advanced know-how, especially pertaining to powerplants. We endeavored to show with graphic diagrams the manner and procedures of engine operation on the ground and in the air.

The aviation engineer service supervisor was concerned by a broad range of problems. A prominent place among these matters was occupied by the problem of maintaining combat equipment in constant and continuous mission readiness, as well as rapid repair and return to service of combat aircraft damaged by dushman [Afghan rebel] fire.

The aviation engineer service and technical maintenance unit personnel who performed this work were well acquainted with the methods and techniques of repair and recovery of aircraft during the Great Patriotic War. This was very helpful to them.

Once a fighter-bomber, bearing fuselage number 25, was damaged while flying a combat mission. A burst of machinegun fire pierced the skin at the cockpit. This caused cockpit depressurization and damaged engine compressor blades and wiring harness.

The pilot was able to get his aircraft down safely. Now a great deal depended on the maintenance people. The maintenance team was headed by Sr Lt S. Pernyavskiy.

The aircraft was repaired in three stages. In the first phase they replaced damaged wiring harness and fluid lines and performed engine repairs. In the second phase they repaired the cockpit, using airtight plastic film. In the final phase they painted the damaged fuselage sections and operationally tested aircraft systems. The men returned the aircraft to service in minimum time.

We could also cite other examples confirming the selflessness, initiative and innovativeness of the aviation engineer service personnel.

For example, a great deal of time and effort was required to repair and adjust radar altimeters. Maintenance personnel lacked the proper equipment. But the situation demanded that they find a solution, and they did. The avionics maintenance group soon mastered the complicated operations. This was achieved by smooth, well-organized efforts and the men's high degree of technical proficiency. They worked at full effort, skipping days off, and frequently worked at night as well.

Those men who distinguished themselves maintaining equipment at an unfamiliar airfield included specialists 1st class Sr Lts Yu. Karavatskiy, V. Pichnenko, Capt A. Shanin, and Sr WO A. Mitrokhin.

In discussing aircraft maintenance and mission-readying aircraft, we should particularly stress the job done by the aircraft powerplant maintenance group. Squadron combat readiness and the squadron's ability successfully to carry out assigned missions also depend to a considerable degree on the quality of performance of this job. In our subunit this group contained the top maintenance personnel: two master-rated maintenance specialists, a senior aircraft mechanic 1st class, and a mechanic 2nd class, plus three additional specialist personnel. The group was reduced in size after they mastered engine replacement procedures.

Not only were the men's professional capabilities revealed during this period, but their moral-ethical qualities as well. An important role was played by the psychological factor. No adversities or deprivations could shake the spirit and morale of these airmen, who were performing their internationalist duty. They stinted neither time nor energy in the interests of maintaining the aircraft in a high state of combat readiness. The men just of the above-mentioned group replaced several aircraft engines for various reasons. For the most part this complex operation was performed because the engines had reached their designated service-life limit, with some cases a result of combat damage.

In Afghanistan the men were really put to the test. Our airmen showed themselves to be genuine internationalists. Frequently they had to operate under extreme conditions, under heavy dushman fire. But nothing could sway their self-control and composure. They carried out their duties just as is required by military duty and the military oath of allegiance.

They had all kinds of situations. Time and again harsh reality tested the professional skill and ideological maturity of the aviation engineer service people. And always, regardless of difficulties, our enlisted men, NCOs, warrant officers and officers endeavored to do the very best job in carrying out their assigned missions.

I recall the following incident. Once a cooling turbine had to be replaced on one of the aircraft, and at night. Even during daylight skilled specialist personnel cannot always accomplish such a complicated job with dispatch. But Sr WO S. Yakimenko was able to do the job. The engineers were amazed when they learned that, working under unaccustomed conditions, he quickly replaced the unit, for it was very hard to get at the cooling turbine, requiring a great deal of effort.

Aviation engineer service personnel displayed a great deal of innovation and initiative in setting up special areas and other facilities! In particular, in very short order they built an engineer command post at the airfield. Party members B. Modenov, L. Makhnov, and V. Sidorov distinguished themselves during the construction of this facility.

The military labor of a number of officers and warrant officers has been honored with government decorations. Those accorded this high honor include Maj V. Abramov, Capt V. Parfenovich, Sr WOs A. Bondarenko and V. Sidorov, and others.

Experience in operation and maintenance of combat equipment acquired while carrying out their international duty in the Republic of Afghanistan has been a fine school of combat proficiency for our airmen.

Having successfully completed the winter period of training, our military airmen, competing to honor the 19th All-Union Party Conference in a worthy manner, seek to build upon past achievements and reach new and higher levels of performance during these days of intensive summer training.

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Romanenko Describes 326-Day Soyuz TM-2 Mission

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[Article, published under the heading "Implementing the Decisions of the 27th CPSU Congress," by twice Hero of the Soviet Union Col Yu. Romanenko, Pilot-Cosmonaut USSR: "326 Days in Orbit"; part two of two-part article (see No 5, 1988)]

[Text] During the orbital mission, just as always, we were under constant medical observation. The doctors monitored not only our state of health but also performance of a large program of medical research and experiments.

The doctors calculated that A. Laveykin, A. Aleksandrov and I were subjected to 34 kinds of various medical investigations, and since many of them were performed more than once, the total number ran about 170.

As is always the case on extended missions, considerable attention was devoted to studying the functions of the cardiovascular system using the Gamma-1, Rheograph, and Ultrasonic Cardiograph equipment. These investigations were performed both in a state of rest and under precisely-determined work loads.

Considerable time was devoted to studying our system's metabolic processes. It was necessary to determine what takes place in the organs, tissues, and blood during such an extended period of weightlessness. This included biochemical investigations, study of the acidity of the gastric juice, and study of oxygen conditions of the tissues. In addition we investigated the visual analyzer, dynamics of body mass, tibia volume, growth, etc.

During the mission we performed 95 different types of experiments, conducted approximately 1,500 scientific research sessions, as well as 300 operations involving servicing scientific apparatus. The overall volume of scientific research increased significantly. In the past we worked on scientific experiments during 3 to 4 revolutions in a 24-hour period, while today, thanks to efficient planning and scheduling of orientation conditions as well as employment of automatic scientific equipment operating conditions—we have increased this to 10-12 revolutions in a 24-hour period.

Operation of the Quantum astrophysical module and the manufacturing equipment required an increase in onboard electrical power system output. For this reason individual component parts of a third solar panel were delivered to the Mir space station. Installation of this equipment required two EVAs, running 2 hours and 3 hours 15 minutes. We increased onboard power output by almost one third.

During the EVAs the crew mounted holders on the station exterior containing specimens of various structural and insulation materials. This procedure, which has become traditional on EVAs, is done for the purpose of further studying the effect of space on these materials.

Crew members felt fine during preparations for and execution of the EVAs, and working efficiency remained at a high level.

Joint work activities with the visiting Soviet-Syrian crew of A. Viktorenko and M. Faris, as well as A. Aleksandrov, who came with them to remain on board, was an important event for us. Welcome guests always bring a great deal of joy and a great deal of additional work. We helped them settle in, become accustomed to weightlessness, and carry out the scheduled list of experiments. An atmosphere of friendships and complete mutual understanding reigned all week on board the orbital complex.

It was too bad that the doctors insisted on Laveykin's early return to Earth. As far as his morale and willpower were concerned, he was ready to complete the entire orbital mission. Aleksandrov, his replacement, quickly became thoroughly familiarized with the station and did a fine job of handling his assigned task.

Now a few words about what we do to counter the adverse effects of weightlessness. The program includes a rational, reasonable work and rest cycle, psychological support, a balanced diet and water intake, wearing the weight suit on a regular basis, and going through conditioning sessions wearing the Chibis vacuum suit during the final phase of the mission. As we know, the program is based principally on physical exercises performed on special devices—an exercise bicycle and treadmill. The doctors calculated that we "biked" and "ran" hundreds of kilometers each month in orbit. These exercises continue to be complicated, monotonous, and rather difficult, in spite of improvement in the equipment and playing music and video tapes during the exercise sessions. They are absolutely essential, however. As our post-mission state and period of readaptation indicate, there are definite benefits gained by conscientiously following the doctors' recommendations.

In my opinion there exists a strong interlinkage between correctness of selection of physical exercise regimen and work load and quality of performance of physical exercise activities by the cosmonaut in orbit. Of course, just as in any other activity, there is additional potential for improvement. In my opinion extended space travel is possible if one uses the developed physical deterioration prevention system and rigorously adheres to the thoroughly developed methods. Observing the proper regimen makes it possible to maintain health and work fitness at the level required for such missions and rapidly to restore health and fitness. Of course we are still faced with weightlessness, and in space weightlessness cannot be avoided. But one can successfully counter the negative effects of weightlessness on the human organism, and quite successfully at that.

Handing over the orbital complex to the relief crew was a specific feature of the final phase of our mission. In the past we would hand over the space station only figuratively, switching over to unmanned mode. This would cause a great many complications and took a great deal of time on the part of both crews for preparation and study of documentation, mothballing and demothballing the station. In a week of joint work activities the new crew not only became thoroughly familiarized with the complex. We jointly conducted a number of biological, biotechnical, and technical experiments, which unquestionably helped increase the new crew's working efficiency.

Our crew returned to Earth on 29 December 1987. The landing was nominal; we exited the recovery capsule with the assistance of search and rescue service specialist personnel. Cosmonaut-scientist A. Levchenko was quite busy during this period. He immediately proceeded with a flight experiment.

A. Aleksandrov and I naturally felt the effects of protracted weightlessness, but we felt comparatively good, and the process of readaptation to terrestrial conditions proceeded fairly rapidly. This process was fostered both by the aggregate of health and recuperative measures and by those excellent conditions which were created for us from the moment of our return. We were able to personally greet our wives, children, and friends immediately after landing. This is of no little importance and promotes rapid recovery following an extended orbital mission.

We are sincerely grateful to that large team of scientists, engineers, and workers who took part in designing and building the space hardware, to the specialist personnel at the Cosmonaut Training Center imeni Yu. A. Gagarin, who prepared us for the mission, and to the people at the space launch facility, at mission control, the space command, control and telemetry people and the search and rescue people, who ensured the success of our mission and gave us a warm welcome on our return to Earth.

We are proud to have made a contribution to the cause of international cooperation in space exploration.

Our mission took place during the year of the 70th anniversary of the Great October Socialist Revolution, and we are pleased to have been awarded coveted government decorations for our work. Such reward for our labors evokes a feeling of profound gratitude to the party and Soviet Government and inspires us to further tireless work in training and preparing for our next space flights.

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History of Crimean Space Communications Center Outlined

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[Article, published under the heading "Space Flight Support," by Hero of Socialist Labor Professor I. Meshcheryakov, doctor of technical sciences: "Long-Range Space Communications Center"]

[Text] Its history is inseparable from the history of investigation of the Moon and the planets of the Solar System by means of space vehicles. First mention of the Center dates from 1959 when, following launch of the Luna 1 station, TASS reported that scientific telemetry stations were monitoring the flight. These included a facility located near Simeiz in the Crimea, which was serving as temporary mission control center for unmanned lunar probes. The history of the Long-Range Space Communications Center (TsDKS) begins with this facility.

Just as other facilities of the space command, control and telemetry system (KIK), the Simeiz facility was operating equipment mounted in vans and trailers. But this did not keep the personnel manning the facility from maintaining uninterrupted radio communications with the first lunar probe for more than 62 hours. The probe, flying past the Moon at a distance of several thousand kilometers, entered a heliocentric orbit and became the first man-made body in solar orbit. Communications were not lost until it reached a distance of 500,000 kilometers. This was an unparalleled radio communications distance record at the time.

At 2 minutes and 24 seconds after midnight Moscow Time on 14 September of that same year, equipment in the Crimea recorded the landing on the lunar surface, in the Sea of Serenity, of the first messenger from the Earth, Luna 2. Telemetry provided the first data on interplanetary and circumlunar space as well as information on operation of probe onboard systems.

The third lunar mission was the object of a great deal of scientist attention, for this mission was to photograph and transmit back to Earth TV images of the far side of our planet's companion. This historic event took place in October 1959. After circling behind the Moon and photographing its far side, the probe approached the Earth to a distance of 40,000 kilometers, after which the Luna 3 - Simeiz radio bridge was switched on, bringing radio signals carrying information on the far side of the Moon. These images appeared in the newspapers on 27 October.

Academician S. Vernov, an exceptionally conscientious individual, during this mission literally did not leave the side of the mission controllers and persistently reminded them not to forget to fire up transmission of data on the radiation environment in space along the flight path.

Thus ended the first and shortest phase, but an extremely important phase of operation of the Long-Range Space Communications Center.

The second phase was marked by construction in 1960 of what was essentially a new complex of permanent buildings and structures for the Center on the Crimean coastal plain near Yevpatoriya. Three space command, control and telemetry systems comprised the original nucleus of the Center: two receiving systems and one transmitting system, located several kilometers from one another. The antenna systems had an effective surface area of about 1,000 square meters. Maximum transmitter radiated power was 120 kilowatts, and radio communications range extended out to 300 million kilometers.

On 12 February 1961 the Long-Range Space Communications Center proceeded to control the flight of the world's first interplanetary probe, Venera 1, launched that day from Baykonur.

"The space communications facility in the Crimea," wrote Professor W. Lowell, director of the world-famous Jodrell Bank radio astronomy observatory in England, following his return from Yevpatoriya in July 1963, "is the most remarkable radio observatory in the Soviet Union. At that facility I saw antennas and an abundance of electronic equipment which you won't find in any other country. The receiving equipment, which uses cooled parametric amplifiers and masers, is outstanding. We will not have such amplifiers at Jodrell Bank before the end of this year. And, what is even more remarkable, the facility was apparently built in just one year, in 1960. I feel a special sense of pride at being the first representative of the West to visit this facility."

Subsequent missions would include landing on the surface of the Moon by a lunar lander and bringing of lunar soil back to Earth, with the landing accomplished in the preselected target area and a landing on Soviet soil following the return to Earth. In connection with this, new, high-precision equipment was developed within a short period of time under the direction of M. Ryazanskiy.

Control of these missions was preceded by thorough adjustment and calibration of the ground-based systems using the calibration orbit method proposed by A. Brykov and me. The fact is that the precision of the unique radio equipment we had designed was several orders of magnitude greater than that of previous equipment. It was necessary to find a method of dividing errors, to determine their components, and to submit proposals on figuring in systematic errors and reducing instrument errors.

For this purpose we launched a special calibration satellite—Molniya Yu, the orbit of which was chosen on the basis of ensuring minimal influence of forces which could not be taken into account. Both currently operational equipment and equipment to be calibrated was carried on the satellite. With the aid of protracted observations and calculations we were able to obtain a fairly accurate "calibration" orbit, on the basis of which new systems were adjusted and calibrated.

Control of space vehicles on missions to the Moon and the planets is characterized by the fact that each communications session is unique, and equipment malfunctions at this time can lead to failure of the entire mission. Malfunctions occurred, but smooth, well-coordinated teamwork by radio operators B. Chaplinskiy, V. Korobkin, Ye. Okishev and V. Smashnyy and trajectory experts P. Elyasberg, A. Brykov, I. Bazhinov, D. Okhotsimskiy, T. Eneyev, E. Akim, V. Sidorov, N. Barabanov, and V. Yastrebov made it possible to solve the problem of tracking and to predict the reentry capsule's landing point with an error of only 8 kilometers.

The Lunokhod lunar rovers, designed under the direction of chief designer Hero of Socialist Labor and Lenin

Prize recipient USSR Academy of Sciences corresponding member G. Babakin, constituted a fundamentally new stage in selenographic investigation. As he put it, this was not merely new equipment but the very latest equipment.

Activities pertaining to controlling the Lunokhods was directed by experienced specialist personnel at KIK and the design office at which this equipment was developed. The two units operated on the lunar surface more than 1 year between them, traveling approximately 48 kilometers across the trackless lunar surface. TsDKS received back from these vehicles 286 panoramic TV images, several tens of thousands of separate pictures, and the results of analysis of lunar soil samples taken at hundreds of points ranging from several meters to tens of kilometers from one another.

Many years of experience in controlling unmanned interplanetary probes and operating long-range communications equipment, and advances made in electronics, information science, radio engineering, machine building, computer mathematics and other areas of science and technology have made it possible to design and build an unparalleled experimental scientific research system—the RT-70 radio telescope. It boasts the world's first and at the present time the world's only fully-rotatable multiband quasiparabolic dual-reflector receiving and transmitting antenna system.

The large-scale project to develop the RT-70, which involved the participation of many scientific research institutes, design offices, factories, construction and other organizations, was directed by the radio systems chief designer Hero of Socialist Labor and Lenin and USSR State Prize recipient USSR Academy of Sciences corresponding member M. Ryazanskiy, who had also made a large contribution toward the development of earlier long-range space communications equipment.

The latest unique design solutions and scientific developments were employed in the design of the RT-70, which made it possible substantially to increase the range and telemetric accuracy in comparison with all presently existing long-range space communications equipment. It consists of 3 main components: a reinforced concrete pylon tower 16 meters tall, leveled with an accuracy to plus or minus 0.1 mm; a highly complex support and rotating device; and the antenna proper, with a 70 meter diameter reflector.

The specifications and performance capabilities of the RT-70 are astounding: an enormous main reflector effective surface area of 2,500 square meters, virtually instantaneous switching from one waveband to another across a very broad range, a high-power transmitting device and a highly-sensitive, low-noise receiving device, and a high overall antenna utilization factor of 0.8. All this provides this unique system with multipurpose utilization capability. It can communicate and exchange all kinds of data with unmanned interplanetary probes anywhere in the

Solar System. It can also be used as a radio telescope to study very distant objects in the universe. And, finally, the RT-70 constitutes the technical foundation of a new planetary radar, the potential of which is 50 times greater than that of the previous model. The potential of the Earth-Venus radio link has increased (depending on waveband) by a factor of 10-20 times in comparison with the equipment put into operation at TsDKS prior to 1978, while signal sensitivity and rate of signal receiving have increased by a factor of 10-35.

In 1980, when the RT-70 took radar distance measurements of Venus and Mars, highly-accurate measurements were obtained which, together with the results of earlier radar measurements, became the basis for constructing a unified theory of motion of the inner planets of the Solar System.

And these are only the first lines in the "biography" of this system. It was greatly assisted by the Moscow radio telescope, with a reflector diameter of 64 meters and an effective surface area of 1,500 sq m. It was created at the design office of the Moscow Power Engineering Institute together with other organizations, under the direction of Hero of Socialist Labor and Lenin and USSR State Prize recipient USSR Academy of Sciences academician A. Bogomolov, who made an enormous contribution to the development of equipment for the space command, control and telemetry complex.

The Long-Range Space Communications Center at Yevpatoriya is supported by outlying systems in its activities pertaining to control of and receiving of data from unmanned probes launched to the Moon and the planets. These systems are essential for expanding radio line-of-sight coverage and for ensuring accuracy in determining the paths of space objects.

It might happen that an unmanned interplanetary probe would be line-of-sight from Soviet soil only from control and telemetry facilities located in the Far East, or even in the Western Hemisphere. This is why systems have been established in the eastern part of our country—in Ussuriysk, while radio communications coverage in the Western Hemisphere is provided by the control and telemetry ships "Kosmonavt Vladimir Komarov," "Kosmonavt Yuriy Gagarin," and "Akademik Sergey Korolev."

At great distances of hundreds of thousands and millions of kilometers, the required accuracies of measurement of the position of an unmanned probe in space are obtained by interferometric methods. Telemetry systems are located on the Earth's surface in such a manner as to form a triangle. For example, the western interferometric triangle consists of stations at Yevpatoriya, at Baykonur, and near Moscow, while the points of the eastern triangle are at Ussuriysk, on Kamchatka, and at Baykonur. In each triangle one of the systems (with high radio link energy potential) operates as the master, while the two other systems serve as followers. In connection with this,

a high-powered system has also been constructed at Ussuriysk, with an RT-70 antenna with an effective reflecting surface of 2,500 sq m.

KIK has entered its fourth decade of intensive around-the-clock work which does not cease for a single moment. It is essential to every space mission—Earth-orbital or interplanetary, unmanned or manned, short or extended. Receiving more and more additional data on the Earth and the universe from man-made celestial bodies, the space command, control and telemetry complex is making this data available to science, the economy, and culture.

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Viktorenko Sketches Cosmonaut Career, TM-3 Mission

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[Article, published under the heading "Cosmonaut's Notes," by Hero of the Soviet Union Col A. Viktorenko, Pilot-Cosmonaut USSR: "Cherished Profession"]

[Text] One of the traditional questions asked at get-togethers is the following: "How did you become a cosmonaut?" It is difficult to give a simple, concise answer to this question. A long, interesting and difficult journey leads to this highly-esteemed profession. And he who has taken this journey will be fortunate enough to view Earth from orbit and will have the opportunity to work in space. For me this journey began with a most cherished, memorable encounter.

In 1965 Yuriy Alekseyevich Gagarin came to the Orenburg Higher Military Aviation School for Pilots, where I was taking the entrance examinations. Seeing Gagarin and hearing him speak was a dream come true for us fresh high-school graduates. We sat in the auditorium and listened excitedly to his every word. Many years have passed since that day, but even today I can remember that face-to-face encounter down to the tiniest details. I believe every single person left that auditorium on an emotional high and that every one of us pledged to be like the world's first cosmonaut. As far as I myself am concerned, a dream, seemingly a quite modest one, was born in the innermost depths of my heart: to work in space.

The years of study and training passed swiftly. Service school became home for us. We grew, matured, and gained wings at school. Now we were about to receive our officer's commission and begin our flying career for real. Ahead lay a new experience, an experience to which we looked forward: service in line units. Nevertheless bidding farewell to the people who had given us our profession and to our school was a sad occasion.

A group of lieutenants who had been assigned to naval aviation duty with the Twice Red-Banner Baltic Fleet gathered at headquarters. Col Gen Avn S. Gulyayev, commander of Twice Red-Banner Baltic Fleet aviation, gave us fatherly words of encouragement before we dispersed to our assigned units. A hero of the Great Patriotic War and a high proficiency-rating pilot, he became for us a model example of attitude toward flying and a model to emulate.

Today I recall with gratitude my first instructors and mentors, outstanding pilots and comrades-in-arms, who devoted a great deal of time and energy to ensuring that we young pilots gained faith in ourselves and in the equipment entrusted to us by our country.

Service in military aviation is an important and responsible job. It demands a total effort, maximum attention and composure during flight operations. If one does not constantly keep this fact in mind, the sky teaches a severe lesson. We experienced bitter emotions of grief at the loss of comrades. Such moments force one to rethink and reexamine one's attitude toward events, toward one's own proficiency, and toward flying technique.

The Il-28 aircraft is dear to my heart. We are both about the same age. I enjoyed flying this aircraft with regimental commander Col D. Yermakov, a man who loved flying. He flew a great deal, especially with the young pilots. He was familiar with the individual characteristics and capabilities of each. The regimental commander did a great deal to ensure that we became first-class specialists.

I also have warm recollections of my squadron commander, Maj Yu. Stropilov. He was an outstanding pilot, a genuine air ace. A modest, tactful individual. His calmness and self-control were reassuring. We endeavored to emulate him in all things. Later, after I became an instructor, I would repeatedly catch myself emulating his example as I gave check rides and dual instruction. But these qualities came in particularly handy in mastering heavy supersonic aircraft.

A flight commander is directly responsible for his subordinates and knows his men better than anybody else, teaches and instructs them, and protects them against mistakes and chance mishaps. Maj V. Skiba possesses all these human and commander qualities. A born methods expert, from my very first flight he enabled me to have faith in my own ability and in the aircraft. After we fully completed the novice-pilot break-in period, I flew training sorties with him. It was on these flights that I gained a real sense of how dedicated he is to his job!

I recall the following incident. Night flight operations were in progress. Maj V. Skiba and I went up in a two-seater. As we completed the training mission, it began raining heavily. Visibility dropped to minimums. We were low on fuel; we could not afford a missed approach.

Flying strictly by the gauges, I brought the heavy supersonic aircraft down. We taxied off the runway. Driving rain heavily pelted the canopy. At that point I realized how much self-control the instructor had and how much confidence he had in me, because in such a difficult situation he would have been entirely justified in taking over the controls.

In May 1977 we were visited by Pilot-Cosmonaut USSR A. Nikolayev. Several of the younger pilots, including me, were invited to meet and talk with him. In the course of the conversation I realized what they were offering us. Quite frankly, I did not have very high hopes that I would be accepted. But I did want to see Zvezdnyy Gorodok and the cosmonauts. After being passed by the medical examining board, N. Grekov and I were enrolled in the cosmonaut corps. We wanted to proceed immediately with training and study of space hardware. But first we had to take test pilot training. Only after graduating from the test pilot course did we commence actual cosmonaut training.

Many people are aware that not all pilots like parachute jumping. We had to go through an extensive course of parachute training, during which, in addition to jumping, we had to undergo various training involving free fall and parachute descent procedures. I was always fortunate enough to have fine people and dedicated experts as instructors. V. Krylov, S. Kiselev, I Solovyev and others revealed to us the secrets of their expertise and endeavored to pass it on to us. I made more than 150 jumps during those years. This was a very important, interesting type of training.

Cosmonauts on a manned mission can encounter various situations, including landing outside the designated target area. For this reason the training program included practice drills involving crew procedures in case of a landing on water, in the desert, forest, tundra, and mountains. We had to learn how to survive with only the gear and supplies carried on board the recovery capsule.

Before training the cosmonauts, Col I. Davydov and his team worked out and tested methods in all geographic and climatic zones and drew up recommendations. This helped us in our training drills and inspired confidence when we flew manned missions. I recall the words uttered by cosmonauts from the Syrian Arab Republic after a splashdown training drill: "This is real man's work."

Methods experts A. Manyukhin, A. Belozarov, V. Petrov, D. Churkin, I. Sukhorukov, V. Cherkashin, O. Yezhov, and many others devoted a great deal of time and effort to our training. And consider the amount of skill and expertise demanded of those who designed and built the spacecraft and scientific instrumentation!

Finally it was time to bid farewell to Zvezdnyy Gorodok, our relatives, loved ones, friends and colleagues. It was a rainy morning, 13 July 1987.... Brief minutes of farewell—and the buses set out, carrying the crews to their aircraft. There would be 10 days of preparation at the space launch facility....

Cosmonauts, scientists, and journalists, recalling the first space flight made by Yu. Gagarin, would talk about the night preceding the launch. For us it was a day. A day with its concerns and hopes. I would say that it was harder on the others than those who were about to be launched into space. I know from my own experience that it is very difficult to see others off, especially for members of the backup crew. After your friends are launched it is like you have lost something. Things return to normal only later, when you get back to work.

After supper buses carried us out to the launch pad. On the way we listened to music. Suddenly it stopped, and I heard my wife's voice wishing us a job well done and a safe return home to Earth. Our friends had prepared such a surprise for each crew member.

The pre-launch routine takes quite some time: bidding farewell, reminiscences, and breakfast together with our backup crew. I like this tradition very much. No Russian will ever let a friend, relative, or acquaintance set out on a long journey without setting him down at the table and feeding him.

It did not take us long to put on our spacesuits and check them for airtightness. We then reported ready to the chairman of the State Commission. This was a very important and serious moment. The kind eyes of our friends, the people who had designed, built and readied the spacecraft, gazed at us. You want very badly to live up to their hopes and confidence, for the labor of many work teams would be judged by our performance in orbit.

We were surrounded by the darkness of night. Off in the distance we could see the beautiful floodlight-illuminated silvery rocket, venting wisps of vapor.

A. Leonov would see cosmonauts off and greet them on their return. His words of farewell as we headed toward the launch vehicle had a strong effect on us. We saw that the people around us were somewhat nervous, but they spoke reassuring words.

A rocket launch is a very beautiful and impressive sight. I had seen it as a bystander, and now I myself was about to be boosted into orbit. Seated in the spacecraft, one does not have the feeling that one is doing anything special. Normal procedure, somewhat like a training drill. We performed all operations according to the launch procedures checklist, without any delays or problems.

Finally the command came: "Launch." Shortly thereafter the booster, commencing to quiver, smoothly lifted off the launch pad. We knew that a sea of flames was raging down below, but up here it was relatively quiet, with only the increase in G forces and vibration indicating that we were in motion.

How would initial weightlessness feel? And although we knew spacecraft-booster separation time, it took us somewhat by surprise. Quiet ensued. The only thing we could hear was the sound of the fans blowing air into our spacesuits. We shook each other's hand to congratulate one another on our successful boost into orbit, and we commenced our work activities. We had to check airtightness of the spacecraft's compartments, check out all systems, and then make an orbital path correction. This would be followed by a period of rest.

When we were preparing for the mission, we talked with our comrades who had already been in space. Everything seemed quite clear, but... I could not picture how I would sleep in weightlessness. Everything worked out fine, however. We deployed our sleeping bags and floated our way into them. Sleep came quickly: I shut my eyes and fell asleep. Wide-awake and refreshed after our sleep, we proceeded with our work activities.

We prepared particularly carefully and thoroughly for our docking with the space station. A jolt, and we were docked as an element of the Mir-Kvant - Soyuz TM-2 - Soyuz TM-3 orbital complex. We established communication with Yu. Romanenko and A. Laveykin. One can understand our impatience to proceed to board the station and embrace our space brothers. But the procedures checklist prescribed rigorous observance of the sequence of requisite operations to check the airtightness of the docking assembly.

Finally the hatches were opened. First Faris, and then Aleksandrov and I were embraced by Yura and Sasha. It was hard to say who had become more anxious for company: them or us.

Our 6-day stay on board the orbital laboratory began. The readers have already learned about our activities from articles in this journal. I merely want to say that Yu. Romanenko and A. Laveykin were very helpful to us. These orbital old-timers were thoroughly familiar with the space station, the location of cargo and instruments, and we constantly felt their concern and solicitude.

They were a remarkably harmonious and smoothly-functioning crew. And after 6 months in orbit, it was time to say farewell. I can understand how difficult this was, but circumstances take precedence over feelings.

Cargo transfer was completed. We closed the hatches and undocked. We backed away from the station, circled and photographed it. A gleaming beauty, it soared majestically above our planet. We could see the faces of

Romanenko and Aleksandrov in the viewport. The station gradually drifted away from us. We remained only in radio contact with our comrades.

At the prescribed time we fired up the engine for the de-orbit burn. The minutes passed slowly. It was remarkably silent all around us. G forces began to build, light penetrated through the viewports, and soon engine flame was raging out there. The craft was decelerating.

We were waiting in anticipation for the parachute to open. A jerk—and the spacecraft, decelerating, slowly descended toward the Earth.

Somewhere out there in the distance our dear friends Yuriy Romanenko and Aleksandr Aleksandrov were continuing to stand space watch, clicking off the orbital revolutions....

Almost a year has passed since then. During this time I have traveled all over our country, reporting to Soviet citizens about our mission. I have also visited Syria.

I have just begun a Soviet-French training program and hope very much I can once again have the opportunity to work in space.

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U.S. ASAT Weapon System Described
91440072p Moscow AVIATSIYA I KOSMONAVTIKA
in Russian No 6, Jun 88 (signed to press
6 May 88) pp 46-47

[Article by Lt Col V. Yefimov, candidate of technical sciences: "Under the Pretext of Modernization"; based on materials published in the foreign press; first two paragraphs are AVIATSIYA I KOSMONAVTIKA introduction]

[Text] Capt I. Ivanov writes the editors: "It has been reported in the Soviet and foreign press that the United States is engaged in the development of new aerospace plane and rocket-satellite systems, including under SDI." Military personnel O. Abramov, G. Borodin, and K. Vyalin have requested that this journal discuss the ASAT antisatellite system.

The editors asked Candidate of Technical Sciences Lt Col V. Yefimov to respond to these questions.

* * *

Signing of the Treaty between the USSR and the United States on reduction of intermediate-range and shorter-range missiles is viewed throughout the world as an event of enormous historic importance and inspires hope for the possibility of preventing a nuclear holocaust. Yes, a substantial step has been taken toward a nuclear-free world. But something else is concerning the people of our planet. Troubling news is coming from

across the sea, at a time when it would seem that people could be less troubled about their lives and the safety of future generations. The Americans are attempting to replace the eliminated [sokrashchayemye] missiles with new, even more powerful and sophisticated ones.

In particular, it has been reported in the foreign press that the U.S. Department of Defense and NASA are planning joint development of a new, powerful launch vehicle. It should be operational not later than 1998. Development of this booster, as reported by the American wire service UPI, has been approved by President Reagan.

The new launch vehicle, designated ALS, is to be based on the latest technology. For this reason military experts as well as NASA officials are placing high hopes on it. They believe, for example, that the ALS will be capable of lifting into low orbit a payload weighing almost twice that which can be placed into orbit by the space shuttle or U.S. Titan IV booster. Foreign media sources estimate that development of this rocket "represents another step toward implementation of the U.S. military space program."

There are many other examples as well. It has been reported, for example, that U.S. companies have begun, on the basis of contracts awarded by the U.S. Air Force, development of the new Midgetman lightweight, land-based ICBM. Just what are the capabilities of this missile? Its specifications and performance characteristics are rather impressive. This three-stage solid-propellant missile has a launch weight of 16.8 tons and a length of 13.8 meters. It carries a single 0.6 megaton warhead and has a self-contained inertial guidance system which should give it an accuracy (circular error probable) of 150 meters.

In order to give it a high degree of combat survivability and operational mobility, it is proposed to deploy the missile on a transporter-launcher (TPU). It will be capable of traveling at highway speeds up to 95 km/h, as well as off roads. It is projected that Midgetman will become operational at the beginning of the 1990's.

The United States is working on similar programs for the other branches of service. Addressing the National Press Club at the beginning of this year, the U.S. Secretary of Defense advocated a further buildup of U.S. naval forces. "Our place in the world, especially in this century, will be guaranteed by our naval power," he stressed. "Naval forces are capable of deploying rapidly, remaining at sea as long as necessary, and effectively influencing events in the world. Our Navy meets these demands."

Of course the development of new weapons and military equipment has not been a success across the board. A recent (the second this year) test of the Trident II submarine-launched ICBM, for example, was a failure. A serious malfunction occurred in the missile's onboard systems 2 minutes 43 seconds after launch, and the

missile was destroyed by ground command. Finally a third launch, at the end of February of this year, was successful. A total of approximately 20 launches are scheduled, to test nuclear first-strike missiles.

The United States is actively engaged in the development of new, more sophisticated weaponry which will be substantially superior in combat performance characteristics to existing nuclear missile weapons.

The Pentagon is counting particularly heavily on SDI. In recent years the United States has developed and is carrying out a special military space program. It is not difficult to grasp its true content or the specific objectives it pursues. It is obvious to anyone with common sense that the United States seeks to disrupt the existing parity between our two countries and to achieve military superiority over the USSR. This program did not appear spontaneously. It is solidly interwoven with the well-known 1982 presidential directive on national policy regarding utilization of space. The United States is developing new missile and military space systems in the militaristic spirit of this directive.

One of these is the F-15/ASAT aircraft-launched antisatellite missile system (ARPK). It is designed to kill satellites in orbits between 185 and 1,850 kilometers in altitude and consists of an F-15 launch aircraft, an antisatellite missile, command, control and ground operations and maintenance center. The ASAT missile is two-stage and carries an MHV satellite interceptor vehicle. Onboard equipment includes a microprocessor, an inertial guidance system which operates during the boost phase, a cooling system, and a device to spin the MHV interceptor vehicle up to 20 rpm prior to separation. The principal specifications and performance characteristics of the ASAT missile are as follows: overall length—5.4 m; maximum diameter—0.5 m; launch weight—1,200 kg; launch altitude—15,000-24,000 m; slant range capability when launched between these altitudes—1,450 km; length of interceptor vehicle—0.46 m; diameter—0.3 m; weight—14-16 kg; velocity at missile separation—13.7 km/s.

The guidance system contains 8 cryogenically-cooled multielement long-wave infrared sensors which detect the target's thermal radiation and determine any target deviation from the intercept course.

The ASAT missile is mounted on a belly pylon under an F-15 aircraft, equipped with a microprocessor, aircraft-missile communications system, self-contained power unit, and a missile explosive release device.

How is the system supposed to function in combat? After orders have been received from the command authority, the data required to make the satellite intercept is transmitted to the system control center. It issues the order for the ASAT-carrying aircraft to take off. After takeoff, the aircraft establishes contact with a ground command and control station, which tracks the target

and aircraft up to the moment of missile launch. Data on angles of climb and exact computed missile launch time are continuously transmitted to the aircraft, as well as continuously updated data on the target to be fed into the missile's inertial guidance system prior to missile separation from the launch platform. As it approaches the missile release point, the aircraft enters an abrupt, steep climb at an altitude of 15,000-24,000 meters. Following missile separation, its inertial guidance system guides it to the computed point at which the target is locked on by the infrared sensors of the interceptor vehicle, which does not carry a nuclear warhead but is designed to impact directly into the target and destroy it by kinetic energy.

The only successful test of the F-15/ASAT weapon was conducted on 13 September 1985. A retired U.S. Air Force P78-1 907 kilogram satellite, launched in 1979 into a 550 km orbit, served as target. The ASAT missile was launched from an F-15 aircraft at an altitude of 10,700-12,000 meters. The interceptor vehicle destroyed the satellite with a direct hit.

Recently reports have appeared regularly in the foreign press that the U.S. Congress has cut appropriations for continuing development of the F-15/ASAT system and has forbidden further tests in space against actual targets.

As a result in mid-February Defense Secretary Frank Carlucci announced that he was forced to halt further work on development of the F-15/ASAT antisatellite weapon system. Typically there was not the slightest mention of an intelligent approach to the problem of disarmament as being a factor in the decision. They simply came up short on appropriations....

Nevertheless the United States is continuing active efforts to develop new weapons. Under the pretext of modernizing the Air Force and Navy, the U.S. Defense Department is seeking to obtain in coming years totally new weapons of various designation, including nuclear. The very review conducted in the U.S. Senate of the INF Treaty showed that extreme right-wing ultraconservative circles were ignoring the obvious advantages of the treaty and the mood of the majority of Americans. These elements waged a fierce campaign against the treaty and attempted to introduce a great many treaty revisions and stipulations. They sought to convince the Americans that the treaty would not at all destroy nuclear warheads and would not lead to military budget cuts but, on the contrary, would cause an increase in defense expenditures and that the agreed-upon procedures of verification of treaty compliance contained many flaws. And the tactics and strategy of opposition to the INF Treaty had been devised by the conservatives in advance—a week before the treaty was signed. This took place at a meeting of 25 leaders of right-wing organizations representing a total membership of 2 million persons.

The newspaper NEW YORK TIMES reported: "Thwarting ratification of the INF Treaty is only the conservatives' immediate task. Their main objective is to prevent any progress in relations with the Soviet Union, in particular signing of a strategic arms reduction agreement."

The President, however, while pointing to the genuine possibility of concluding (as a supplement to the INF Treaty) "an even more important agreement on strategic arms reduction, which would call for cutting back U.S. and Soviet long-range missiles or strategic arsenals by one half," again praised the Administration's efforts to advance the Star Wars program. "SDI," stated President Reagan, "pursues the same mission and the same goals as does arms reduction. It lessens the danger of war and the threat presented by nuclear weapons to all mankind."

But it is obvious to any person of common sense that implementation of the "Star Wars" program is directed first and foremost toward militarization of space, which not only would not promote reduction, let alone elimination of nuclear weapons, but would create the conditions for and therefore would lead to a qualitatively new round of escalation in the arms race. This is what continues to concern all of peace-seeking mankind.

In addition, the President demanded that Congress reverse the current trend toward an end to increase in U.S. military expenditures. He stated: "We should honestly assess the consequences of this negative trend and proclaim necessary stability of defense expenditures to be an important task for this year and subsequent years."

NATO military circles are acting in unison with the U.S. President. The leaders of this aggressive bloc are planning to deploy in Western Europe at least two times as many nuclear warheads in place of the eliminated Pershings. This was reported by the British newspaper THE OBSERVER, with reference to a report issued by the Anglo-American Information Council on Security Issues.

Judging from this document, NATO strategists intend substantially to increase the European nuclear potential of this bloc within the framework of a "modernization program." By the mid-1990's, for example, NATO's European nuclear potential is to include 1,300 air-launched ballistic missiles, 600 land-based ballistic missiles, and 400 nuclear artillery shells.

The near future will show the true intentions and true countenance of the ruling circles of present-day America, and the degree of realism in their approaches to solving complex problems connected with reducing nuclear missile arms. And yet everybody who holds dear the interests of preserving peace on our planet is waiting in anticipation and aspiring for nuclear arms reduction. And there are millions of such people in the world!

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**Articles Not Translated from AVIATSIYA I
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