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# USSR Report

MILITARY AFFAIRS

AVIATION AND COSMONAUTICS

No 5, May 1985

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15 August 1985

USSR REPORT  
MILITARY AFFAIRS

AVIATION AND COSMONAUTICS

No. 5, May 1985

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

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## AIR FORCES COMMANDER IN CHIEF LAUDS FIGHTING TRADITIONS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 5, May 85 (signed to press 2 Apr 85) pp 1-3

[Article by twice Hero of the Soviet Union Mar Avn Aleksandr Nikolayevich Yefimov, commander in chief of the Air Forces and deputy minister of defense USSR: "Great Exploit of the Homeland of the October Revolution"]

[Text] There are important events in world history the memory of which is preserved through the ages. Mankind remembers them, and the further they recede into the past, the more brightly and fully their enormous significance is illuminated. The victory of the Soviet Union in the Great Patriotic War of 1941-1945 is precisely such an event. Time has no power over the magnificence of this exploit of the Soviet people.

Forty years have passed since the scarlet banner of our Great Victory was raised above the vanquished Reichstag. The road to that victory was incredibly difficult, long and thorny. The war forced upon the Soviet nation by German fascism was the most severe, most difficult ordeal ever experienced by our homeland.

Supported by abundant help by U.S. and British monopolies and a shortsighted policy of encouraging German aggression by the bourgeois governments of the Western countries, fascist Germany built up a vast military-economic potential. Breaching a nonaggression treaty and utilizing the element of surprise offered by a treacherous sneak-attack invasion, it hit the troops of our border districts with a blow of dreadful force.

At the cost of maximum exertion of all the country's spiritual and material resources, in fierce one-on-one combat with the war machine of Hitlerite Germany, the homeland of the Great October Revolution accomplished a great feat and won a brilliant victory. Thousands upon thousands of kilometers of flaming battlefront roads running in blood, days and nights of intense, selfless labor at industrial plants and factories, on kolkhoz and sovkhoz fields, in scientific laboratories and design offices -- this is what the Great Patriotic War was for our heroic people!

The history of mankind has never before experienced the grave ordeal which fell to the lot of Soviet citizens in the harsh years of the Great Patriotic

War. Nor has it experienced other such examples of unsurpassed valor, courage, mass heroism and will to win, which were displayed every day on the fields of battle and on the home front. The Soviet people and its heroic Armed Forces, under the guidance of the Leninist Communist Party, dealt a devastating defeat on fascist Germany and its satellites, defended the freedom and independence of our socialist homeland, honorably carried out the great liberation mission and fulfilled in a worthy manner their internationalist and patriotic duty to freedom-loving mankind.

During that grim time the mighty Soviet Nation proved to be the principal force capable of blocking fascism's road to world domination.

Making preparations in the strictest secrecy for a sneak attack on the Soviet Union, the Wehrmacht concentrated enormous invasion forces. The enemy force totaled 5.5 million men, approximately 4,300 tanks, 47,200 guns and mortars, 4,980 combat aircraft, and 192 warships. The enemy deployed all this manpower and equipment on three strategic axes.

In the war against the USSR the fascist leadership aimed to demolish the social and political system in our country, to destroy the independent nationhood of the multinational family of Soviet peoples and to turn them into slaves of German masters, as well as to seize the riches of the Soviet Union. In addition, German fascism viewed defeat of the USSR as a most important stage on the road toward gaining world supremacy.

The Communist Party and Soviet Government foresaw the possibility of an armed conflict with the forces of imperialism. Therefore during the years of peacetime construction they took the necessary measures to strengthen the country's defense capability, to build up its economic potential, and to increase the combat power of the Armed Forces.

In the 1930's our party and the Soviet Government undertook a number of measures aimed at further increasing the combat efficiency of the Air Forces. Manpower was increased, and new units and combined units were formed. The Air Forces were reoutfitted with aircraft of new types, the organizational structure was improved, and the airfield network was expanded. By the spring of 1941 the number of aircraft in our Air Forces had more than doubled over the 1939 figure. The number of aviation regiments had almost doubled.

In the first half of the last prewar year the Soviet aircraft industry produced approximately 2,000 fighters, 458 bombers, and 249 ground-attack aircraft. On the eve of the war this country's Air Forces contained a total of approximately 2,740 new aircraft.

Unfortunately not all planned material-technical and organizational measures were fully accomplished by the beginning of fascist aggression. On the whole, however, measures taken on the eve of the war toward strengthening and development of the Air Forces created the essential preconditions for successful conduct of combat operations by the Soviet Air Forces.

The road to victory over fascism was hard and long. Fighting was waged on a vast front stretching from the Barents to the Black Sea and continued 1,418

days and nights without surcease. During the first period of the war our people were forced both to put out an enormous exertion of all their energies and resources and to experience the bitterness of retreats and setbacks, when the raging foe reached the very walls of Moscow and Leningrad, and was driving toward the banks of the Volga and foothills of the Caucasus. Experiencing incredibly difficult conditions, Soviet citizens across the board displayed courage, mass heroism, tenacity, and an unbending will to win. "Our cause is just! The enemy will be defeated! Victory will be ours!" This slogan of the Leninist Party united and inspired the fighting men of the battlefield and the workers on the home front to selfless exploits in the name of defense of the independence of the socialist homeland.

During this difficult period our army was wearing down the enemy's elite divisions in bloody battles, destroying his men and equipment, tenaciously defending and mounting counterthrusts. The Soviet troops were acquiring combat experience, growing stronger and tougher, and mastering the complex science of winning.

The Hitlerite plan of blitzkrieg was buried in the Battle of Moscow, and the myth of the invincibility of the fascist army was debunked before the entire world, marking the beginning of a radical turning point in the course of the war.

The victory at Stalingrad abruptly shifted the situation on the Soviet-German front in our favor. It made an enormous contribution toward achieving a decisive turning point in the war. From this time forward the Soviet Army firmly seized the strategic initiative and held it right up to the final surrender of fascist Germany.

The Hitlerites' defeats at Kursk, in the Ukraine and at Leningrad, in Belorussia and in the Baltic, liberation of the peoples of Europe from the fascist yoke, the enemy's crushing defeat in his own lair and the raising of the Red Banner over the Reichstag -- these are the most important heroic milestones on the journey to victory trod by the Soviet people and their Armed Forces.

The Great Patriotic War constituted a severe ordeal for the Soviet people and their Armed Forces. This difficult test was passed with flying colors. Once again there was confirmation of V. I. Lenin's conclusion: "Victory in war is won by he who has greater reserves, greater sources of strength, greater staying power within the masses."

Our glorious Air Forces also made a worthy contribution to the defeat of the fascist invaders. Working in close coordination with the Ground Forces, the Navy, and independently, they hit the enemy on the ground and in the air in all battles, on all fronts. And the force of the blows dealt by Soviet military aviation steadily grew. Not a single operation was fought without the participation of Soviet aviation. Air combat operations exerted a considerable influence on the course and outcome of the armed struggle.

The main efforts of the Air Forces were aimed toward gaining air supremacy, supporting ground troops and naval forces, air reconnaissance, as well as

toward flying systematic strikes against targets deep behind enemy lines. In the course of the Great Patriotic War frontal aviation and long-range bombers flew more than 3 million sorties in performing these combat missions.

Our Air Forces won their first major victory in the fall of 1941, in the Battle of Moscow. Pilots inflicted heavy enemy aircraft losses and gained operational air superiority in the defensive period, which helped thwart the fascist forces' offensive drive on Moscow and contributed to their subsequent defeat in detail.

The Battle of Stalingrad was the second major stage in gaining strategic air supremacy and made an enormous contribution to the development of Air Forces operational art and air tactics. Initiative in the air shifted over entirely to the Soviet pilots at the very beginning of our forces' counteroffensive. In the course of fierce air engagements and strikes on enemy airfields, they destroyed 5,100 aircraft.

The air battles on the Kuban in the spring of 1943, in which fascist air forces sustained irreplaceable losses, proved to be a decisive stage in the struggle for strategic air supremacy. A total of 1,100 aircraft were destroyed, including more than 800 in air-to-air combat.

Soviet pilots destroyed more than 3,700 fascist aircraft as a result of air battles on the Kursk Salient in the summer of 1943, battles which were unprecedented in scale, intensity, and ferocity. The Battle of Kursk proved to be the decisive stage in gaining strategic air supremacy, which was firmly maintained right up to the final defeat of Nazi Germany.

Thanks to this, the Soviet rear areas were freed once and for all from enemy air bombing attacks. Favorable conditions were created for the Armed Forces, and particularly for ground forces, to mount successful large-scale offensive operations, while the Air Forces were able to conduct more aggressive and determined combat operations.

Soviet air forces also performed with good effect in the Berlin Operation. Fighter pilots alone fought 1,317 air engagements, downing 1,132 enemy aircraft.

The following figures eloquently attest to the growing combat power of the Soviet Air Forces during the war years. Approximately 800 combat aircraft took part in the counteroffensive at Moscow, while the figure was 5,000 in the Battle of Kursk, approximately 6,000 in the liberation of Belorussia, and 7,500 combat aircraft in the Berlin Operation.

In the course of the Great Patriotic War Soviet air forces destroyed 57,000 enemy aircraft, that is, two thirds of the total number of aircraft produced by fascist Germany's aircraft industry in World War II.

Soviet aviators displayed in combat against the enemy unsurpassed examples of courage, bravery, consummate military valor, and added bright pages to the heroic chronicle of the homeland. On more than 500 occasions they aerial-rammed fascist aircraft. And more than 300 pilots and aircrews repeated the

immortal deed of the crew of Capt N. Gastello, who aimed his damaged aircraft into a concentration of enemy personnel and equipment.

The homeland fittingly honored the feats of our intrepid falcons -- more than 200,000 Soviet aviators were awarded medals and decorations, 2,420 pilots were awarded the title Hero of the Soviet Union, 65 persons were twice awarded this title, while A. Pokryshkin and I. Kozhedub were awarded the title three times.

Many aviation units and combined units were awarded USSR decorations and awarded the guards appellation for taking part in carrying out combat missions pertaining to crushing the fascist invaders; 708 of them were awarded honorary name designations.

The victory of our people and their valiant Armed Forces in the Great Patriotic War constitutes a great triumph of the Soviet societal and governmental system, engendered by the October Revolution, a triumph of the socialist economy, the ideology of Marxism-Leninism, and the moral-political unity of Soviet citizens.

The magnificence of our victory is deathless. Going through the gravest of ordeals, Soviet citizens defended the honor and independence of the homeland.

The Leninist Communist Party was the inspiring force behind and the organizer of victory. It raised up the Soviet people to fight a holy war in defense of the achievements of the Great October Revolution and was itself a truly militant, fighting party. Up to 60 percent of the total party membership, a substantial percentage of the party Central Committee, and many thousands of ranking party officials served in the Army, Air Forces, and Navy.

Our victory proved to be a historic milestone in the destiny of all mankind. The crushing defeat of fascism raised up a mighty wave of sociopolitical changes, which flooded over the entire planet and led to strengthening and consolidation of the forces of peace and progress. A world socialist system arose. Disintegration of the imperialist colonial system began.

The fighting men of the regular military combined units, partisan armies and detachments of Czechoslovakia, Bulgaria, Yugoslavia, and Poland, patriots of Romania, Albania, and Hungary, and participants in the Resistance Movement and the antifascist underground fought selflessly against the fascist invaders. The peoples and armed forces of the United States, Great Britain, and the other nations of the anti-Hitler coalition also made a certain contribution to the achievement of victory in World War II.

A decisive role in the victorious conclusion of World War II, however, contrary to the fabrications of bourgeois falsifiers of history, was played by the Soviet Union. From 92 to 95 percent of the ground forces of fascist Germany and its satellites were fighting on the Soviet-German front up to the summer of 1944, and subsequently from 74 to 65 percent. It was here where the enemy sustained three fourths of all his casualties and where were destroyed two thirds of all the aircraft he produced in World War II.

The victory of the Soviet Union in the Great Patriotic War is a stern warning to reactionary imperialist forces and to all modern-day aggressors and fanciers of others' property.

Unfortunately the utter, crushing defeat of fascist Germany and its allies in aggression taught little to the ruling circles in the imperialist nations. Attempting to resist the objective laws of development of society and progressive changes in the world, the imperialists continue today seeing militarism as the principal guarantee of the future existence of the capitalist system.

U.S. and NATO bloc reactionary imperialist circles are attempting to achieve military superiority over the USSR and its allies, are escalating the arms race without restraint, and are endeavoring to dictate their will to sovereign nations from a position of strength. A serious nuclear threat has been created by the deployment of U.S. medium-range missiles in Western Europe. U.S. militarism also intends to turn space into a theater of military operations.

Under these conditions the Communist Party of the Soviet Union is forced to take necessary measures to ensure that the organization and equipment of the Soviet Armed Forces, the level of preparation, training and political indoctrination of personnel meet today's demands. "In a complex international situation," it was emphasized at the special March (1985) CPSU Central Committee Plenum, "it is more important than ever before to maintain the defense capability of our homeland at a level whereby potential aggressors will be clearly aware that any encroachment on the security of the Soviet Union and its allies, on the peaceful lives of Soviet citizens will be met with a devastating response blow. Our glorious Armed Forces will continue in the future to have at their disposal everything necessary to accomplish this."

In recent years the countenance of our military aviation has changed unrecognizably, thanks to unabating attention and concern on the part of the CPSU and Soviet Government as well as persistent labor on the part of scientists, designers, engineers, technicians, and workers. Increasingly more sophisticated combat systems and modern means of command, control, and flight operations support are entering service with Air Forces units. Today the Air Forces are a formidable, powerful branch of the Armed Forces, called upon to carry out -- both independently and jointly with other branches of service -- missions both in continental and maritime theaters. The hardware with which all air components are equipped is in full conformity with the interests of reliable defense of our homeland's airspace.

With all the colossal military-technical capabilities of the Air Forces, their main strength consists of the people in whose hands this formidable weaponry is wielded. The CPSU constantly performs enormous work aimed at instilling in Soviet military personnel a sense of pride in their homeland, their people and its great accomplishments in building communism, as well as a high degree of civic responsibility for defending the socialist homeland.

The Soviet people and their fighting men are celebrating an important national holiday -- the 40th anniversary of the Great Victory -- in an atmosphere of

great political and labor enthusiasm. With their selfless labor they are strengthening the homeland's economic and defensive might and are persistently campaigning for implementation of the decisions of the 26th CPSU Congress and successful fulfillment of 1985 plan targets and the targets of the 11th Five-Year Plan as a whole. Socialist competition to honor in a worthy manner the 27th Congress of our Leninist Party is assuming an ever increasing scope.

Socialist competition, launched on a large scale in the Air Forces under the slogan "Our Selfless Military Labor in Honor of the 40th Anniversary of the Great Victory and the 27th CPSU Congress!", is an important factor in achieving further improvement of combat and political training.

The overwhelming majority of military collectives, having thrown their support behind the undertaking of the initiators of socialist competition in the Air Forces -- the men of the Red-Banner guards bomber regiment under the command of Gds Col A. Tsarkov, have achieved excellent results in combat and political training. These include the units and subunits under the command of officers V. Grachev, V. Kudryavtsev, V. Pismenny, P. Tarasevich, and N. Filippov.

The air proficiency of flying personnel has increased, as has the number of excellent-rated individuals, subunits and units, pilots and navigators who are experts at combat employment and expert marksmen, as a result of hard work by commanders, political workers, staffs, party and Komsomol organizations. The present generation of military aviators is preserving and further building upon the revolutionary, combat and labor traditions of their people and the military fame of the heroes of the Great Patriotic War. The names of Heroes of the Soviet Union V. Gaynutdinov, G. Yeliseyev, Ye. Zelnyakov, V. Kot, V. Pavlov, P. Ruban, Yu. Churilov, F. Shagaleyev, V. Shcherbakov and others today stand shoulder to shoulder with the names of the famed war aces.

Entering the summer period of training, each and every member of the Air Forces is clearly aware that this year, 1985, is a year of active preparations for the 27th CPSU Congress, a year of intensive, shock-work labor, a year of further growth in the qualitative indices of combat proficiency. Our most important task is to achieve a high degree of flying proficiency and combat readiness of the Air Forces as a whole and of each individual member of the Air Forces, sure and effective mastery of modern aircraft and weapons. For this reason commanders, political agencies, headquarters staffs, party and Komsomol organizations should concentrate all their efforts on seeking out reserve potential even more aggressively, intelligently utilizing training time and facilities, strengthening discipline and organization, and increasing political vigilance.

Aggressive, purposeful party-political work with personnel is of enormous importance in mobilizing aviation personnel to achieve additional successes in combat and political training and in strengthening the combat readiness of units and subunits. This is a powerful, never-aging weapon of a special kind.

With their flawless performance of duty, unremitting vigilance, and constant combat readiness, Air Forces personnel are making a worthy contribution toward strengthening the defensive might of the homeland of the October Revolution.

The winged guards of the homeland, solidly ranked behind the Communist Party and its Leninist Central Committee, standing shoulder to shoulder with all the fighting men of the Armed Forces and in a fighting alliance with the armies of the brother socialist nations, are ready and willing at all times to carry out with honor their patriotic and internationalist duty to defend the achievements of socialism.

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## SCRAMBLE-READY FIGHTERS STAND ALERT DUTY

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 5, May 85 (signed to press 2 Apr 85) pp 4-5

[Article, published under the heading "Be Alert, In a Continuous State of Combat Readiness," by Military Pilot 1st Class Lt Col N. Karev, commander of a fighter regiment: "Aircrews on Alert Duty"]

[Text] It was an early spring morning. There was a cold, gusty wind blowing over the airfield, carrying the slightly bitter aroma of jet-fuel exhaust: engine check run-ups had just been completed. Fighters stood motionless on the concrete surface, ready to take off at any moment. Air-to-air missiles gleamed ominously under their wings.

Aircrews were lined up in the assembly area next to the ready room. A command rang out: "Commence alert duty to ensure the security of our homeland, the Union of Soviet Socialist Republics!"

There was a particular solemnity on the faces of military pilots 1st class Maj A. Kozlov, Capt Ye. Kutepov, aircraft technicians Sr Lts G. Gaynutdinov and A. Dobryanskiy, and the other aviation personnel who were coming on alert duty. Be alert at all times, keep your powder dry -- this is the conclusion reached by the men of our unit, assessing the great complexity of the present international situation, which has become sharply aggravated through the fault of aggressive circles in the imperialist countries, particularly the United States. Each and every officer, warrant officer, enlisted man, and noncommissioned officer endeavors to carry out adopted socialist pledges honorably and to make their contribution toward increasing the combat readiness of the outfit. Military aviation personnel work tirelessly to improve their flying and tactical skills, their technical proficiency, maintaining the aircraft and weapons entrusted to them in a continuous state of combat readiness. They demonstrate excellent professional, moral-political and psychological qualities.

Recently our unit was awarded, in a solemn ceremony, a USSR Minister of Defense Pennant for courage and military valor. This award obliges each and every one of our aviation personnel to be more disciplined, ready for immediate action in defense of the interests of the homeland, to guard even more vigilantly and reliably the productive labor of the Soviet people. And

the men of the regiment endeavor to perform their duties in an exemplary fashion, from aircraft servicing, maintenance and security on the flight line to performance of complex missions in the air.

Alert duty.... This signifies first and foremost a state of aviator readiness immediately to repulse an enemy attack in any situation, to perform with smoothness, swiftness and precision. Those aviation personnel standing alert duty are that fraction of our Air Forces which has been placed on the front line, on the line of direct contact with the potential adversary. Alert duty means for each and every one of us the highest degree of readiness for immediate action to block intrusion into Soviet airspace. Alert-duty aircrews are ready at a moment's notice to engage the enemy, to counter any unexpected surprise with tenacity, self-control, and courage, to find and effectively apply a tactic which will guarantee successful accomplishment of the combat mission and, if necessary, to take extreme measures and to carry out their military duty to the end.

Officer Gennadiy Yeliseyev, for example, who had recently been assigned to our unit, had scrambled to intercept an air target and found himself in a very difficult situation. This intrepid pilot sacrificed his own life, but he prevented the intruder aircraft from penetrating deep into Soviet territory. For this feat he was awarded the title Hero of the Soviet Union.

The combat arsenal of the unit's aviators contains the invaluable experience and know-how of our regiment's heroes. Studying alert duty practices during the years of the Great Patriotic War and in peacetime, the men work persistently to perfect their professional skills and constantly surpass performance standards pertaining to making alert-duty aircraft combat-ready.

Alert duty is a serious test and at the same time a fine school for personnel. Accomplishment of this combat task imposes heightened demands on the men's proficiency, psychological staunchness, their ability accurately to assess a situation and promptly to make optimal decisions and take effective measures to destroy the target.

The pilot is the central figure of the alert-duty subunit. Prior to going on alert duty, aircrews work tirelessly in the course of scheduled training sorties to improve their flying technique, learn unerringly to spot air targets, to score a hit on the first pass, with the first missile, and to operate with confidence in conditions of electronic countermeasures. Here too, as practical experience shows, optimal results are achieved when training sorties are flown without unnecessary relaxation of demands or unnecessary situation simplification, when mock combat missions are continuously made more complex, taking into account the actions of a strong and aggressive adversary. We attach great importance to specialized aviator training, study of the combat capabilities of the potential adversary's offensive air weaponry, and the ability successfully to detect and identify targets and to destroy them with the first missile fired at optimal ranges.

Preparation of command post personnel to stand alert duty is a focus of particular effort on our part. First of all staff officers and political workers instill in this category of military personnel a high degree of

responsibility for performance of job-related duties, improving tactical control methods, and ensuring failure-free operation of automated systems and communications gear. Considerable attention is devoted to training duty officers and tactical control officers. When testing combat readiness we endeavor not to ignore matters pertaining to organization of joint actions by fighters and anti-aircraft missile crews against air targets. A combined schedule has been drawn up for this purpose, for working on coordination by missile officers and aviation personnel, air traffic control team specialists and flight personnel.

In organizing alert duty the command authorities seek to ensure that good living conditions are provided in alert-duty quarters. Keeping the men in good spirits contributes greatly toward precision performance of duty, a high degree of organization and firm discipline, and makes the men more alert. And, finally, tactical air exercises are the highest form of personnel combat training and testing their readiness to carry out combat missions. Such exercises are conducted in conditions maximally approaching actual combat, against a complex tactical environment.

...Under the protection of radar jamming, the "aggressor" was attempting to penetrate through to a defended installation at close to maximum speed. A pair of aircraft led by Maj A. Kozlov was scrambled. At first the flight proceeded without complications. The pilots performed with confidence, precisely executing the tactical control officer's commands. At the culminating moment, however, when the "aggressor" was detected on the aircraft's radar sight scopes, the "aggressor" proceeded to employ intensive jamming. Now everything depended on the skill of the flight leader, his ability in the process of closing with the adversary to distinguish the target return on the scope and to set up conditions for the attack. The tactical control officer informed Major Kozlov on the approximate range to the target. It was rapidly decreasing. This forced the pilots to concentrate their mental efforts to an even greater degree, to prepare themselves for a resolute fight with a skilled, tactically sophisticated and daring "adversary." In conditions of heavy jamming and extremely little time remaining, the flight leader was able to distinguish the barely visible target blip. They were rapidly closing. They were close enough to lock on, but the pilot continued to close. A little more, a little more.... At the optimal range he pressed the lock-on button and, as he had repeatedly rehearsed on the simulator, adjusted heading toward the target.

Missile away! Kozlov did not hasten to break away, however. He was ready to fire additional missiles as well as his cannon armament. But this proved unnecessary.

"Target 'downed'!" the tactical control officer radioed.

The pilots had successfully brought to completion the labor of a large aviation team, for they were not the only ones being combat-tested. Each and every aviation specialist -- from mechanic to engineer -- had assumed responsibility for flawless operation of all aircraft systems and equipment. Aviation personnel had thoroughly mastered the rule: aircraft and weapons

should be not merely in proper working order but reliable to the highest degree.

Successful performance of alert-duty missions is inconceivable without effective party-political work, for the foundation stone of a high degree of vigilance consists in profound comprehension by all military personnel of their personal responsibility for defense of the homeland and for flawless performance of their job-related duties.

Subunit commanders and political workers, party and Komsomol organizations consider their primary task to be that of ensuring high-quality performance of alert duty, strengthening political influence on personnel with the aim of increasing vigilance of alert-duty shifts, and constantly shortening the time required to make equipment ready for immediate utilization.

Every day a political briefing is held in the unit for personnel about to go on alert duty. A topic schedule is drawn up for each month for the conduct of discussions with aviation personnel performing a combat mission. Regimental leader personnel are enlisted for this task. Talks are scheduled for each alert duty shift. Particular attention is devoted to instilling in personnel a strong feeling of responsibility for the assigned task, political vigilance, and an understanding of the complexity of the world military-political situation. The regimental command authorities and party committee have increased demandingness on the commanders of subunits responsible for readying personnel and aircraft to stand alert duty.

A plan-schedule of party-political work for the month with the personnel of an alert-duty flight is drawn up to ensure effective indoctrination of personnel, as well as a duty shift work schedule for the commander of an alert-duty flight. Prescribed activities are successfully carried out.

We attach great importance to an alert-duty job performance summary. Comprehensive analysis of the work performance of aviation personnel in performing this task is of great importance for achieving success in the future. Party and Komsomol activists widely disseminate advanced know-how, reveal unutilized reserve potential, and critique in a party-principled manner those who are guilty of errors. Operational newsheet editions as well as party and Komsomol meetings are dedicated to matters pertaining to vigilant performance of alert duty. The party members of the subunits, for example, recently examined at their party meetings the agenda item "On increasing the militance of party organizations and strengthening their influence on high-quality performance of alert-duty tasks." A substantive, specific discussion was held, which made it possible to see better our achievements and errors of omission and to map out ways to correct shortcomings.

The efforts of commanders, political workers, and party organizations are directed today toward ensuring that alert duty serves for the men as a serious school of instilling vigilance and heightens their feeling of responsibility for performance of military duty pertaining to guarding the sacred borders of the homeland.

The unit's aviation personnel, feeling pride in their socialist homeland and the heroic Soviet people, who are celebrating the 40th anniversary of the Great Victory with new achievements, are filled with resolve to honor the 27th CPSU Congress in a worthy manner. They are working persistently to improve their moral-political qualities, to master the complex combat equipment and modern weapons, and are vigilantly guarding the peaceful skies of the homeland.

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## USEFUL FIGHTER TACTICS LEARNED IN WORLD WAR II

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 5, May 85 (signed to press 2 Apr 85) pp 6, 8

[Article, published under the heading "Authors of Victory Speak," by three times Hero of the Soviet Union Mar Avn A. Pokryshkin: "They Reached Manhood in the Skies of War"]

[Text] The combat biography of three times Hero of the Soviet Union Mar Avn Aleksandr Ivanovich Pokryshkin is unusually rich in emotion-stirring events. From the very first days of the Great Patriotic War he proved himself to be a fearless combat pilot, a skilled combat organizer, and a gifted commander. In the course of the war he rose from squadron deputy commander to commander of a fighter division. He flew 560 combat missions and fought 156 air engagements, in which he personally downed 59 enemy aircraft. Possessing a consummate mastery of his aircraft, Pokryshkin acted with initiative, boldness and innovativeness. As a genuine innovator and inventive tactician, he devised the "altitude-speed-maneuver-fire" formula for air combat, and was among the first to employ the two-aircraft element as a nucleus in constructing fighter combat formations, and he was among the first to altitude-stack fighters. These and other modes and techniques of air combat were aggressively incorporated into the practices of Soviet fighter units and exerted appreciable influence on their achievement of air supremacy.

After the war A. I. Pokryshkin graduated from the Military Academy imeni M. V. Frunze and the General Staff Academy of the USSR Armed Forces imeni K. Ye. Voroshilov, and held a number of important positions in the Air Defense Forces. He served from 1972 to 1981 as chairman of the DOSAAF Central Committee. He is presently a member of the USSR Ministry of Defense Inspectors-General Group. He is a candidate member of the CPSU Central Committee.

Time moves inexorably forward. The war years, filled with drama and heroic spirit, are receding ever further into the past. Forty years ago the Soviet

people achieved a Great Victory in a battle, unprecedented in scale and ferocity, against the most reactionary shock force of imperialism -- Hitlerite fascism, which was pursuing the goal of destroying the world's first socialist state and establishing world domination.

It was a victory of the Soviet State, created by the Great Lenin, of the most vanguard societal system and of progressive Marxist-Leninist ideology. Profound ideological conviction and boundless faith in the righteousness of their cause served as an inexhaustible source of spiritual strength for the Soviet people, their moral-political unity and solidarity.

In this fierce fight against fascism, the men of the army and navy and our valiant Soviet aviators displayed selfless devotion to the party and people, love for the homeland, and mass heroism.

One still remembers a great deal even today. The first aircraft shot down bearing the spiderlike swastika, and the battle above the Kerch Strait, when our group of eight aircraft engaged 80 bombers and the dozen Messerschmitts flying escort, and missions taking off from the Breslau-Berlin Autobahn....

Not all of us fighter pilots who entered the war during its first days survived to May 1945. The ordeals which fell to our lot were too harsh to be able to get through them without casualties. But we remember those who died defending the homeland, and we remember their deeds.

My friend Vadim Fadeyev was killed in 1943, in unequal air combat on the Kuban. He took part in extremely savage combat. A powerful individual, almost 2 meters in height, a "Russian epic hero," as they called him in the regiment, he possessed enormous physical strength, endurance and unusual courage, and he was an expert at skilled maneuver, bold attack, and the sure hit. There were days when he would shoot down two or three enemy aircraft, and once he downed 10 aircraft in a single week. Hero of the Soviet Union V. Fadeyev shot down a total of 21 enemy aircraft.

Legend-like stories were told about our bearded giant. Once he landed his crippled aircraft on a strip of no-man's-land. Vadim succeeded, under fire, in reaching the first Soviet trench and led the men in an attack. The infantrymen seized a hill which was very important to the division, and Fadeyev saved his I-16, which he subsequently continued to fly and fight. He was awarded the Order of the Red Banner for this exploit.

Twice Hero of the Soviet Union Aleksandr Klubov.... He possessed masterful self-control and was always at the forefront in battle. He was credited with half a hundred downed Hitlerite pilots. He was killed in the fall of 1944.

These and other losses have left a permanent empty spot in my heart. I am confident that after the war each and every one of them would have continued to fly for a long time, like my fellow soldiers Vyacheslav Berezkin, Georgiy Golubev, Konstantin Sukhov, and many other comrades-in-arms who served long and well in military aviation, flying jet aircraft.

These war heroes, who by their deeds brought closer the day of the Great Victory, continue to do service to this very day. The experience of the war is a priceless asset. It was acquired at great cost, a cost involving mortal danger. Many pilot mistakes ended in tragedy. But even such grave lessons made it possible to reach conclusions and restructure combat activity.

I recall my first downed enemy aircraft. I took off in a two-aircraft element with Semenov to scout out crossing sites on the Prut River. The regimental commander added these parting words: "Do not engage in combat. Only reconnaissance!"

We approached the Prut with the morning sun at our backs. I could see German fighters west of the river: three at our altitude and two higher, off to the side. We really wanted to fight, but orders are orders. An order is more powerful than the thirst to do battle. We turned northward, along the river....

We failed to get away, however. Messerschmitts took up pursuit. We had to turn and fight. I put my aircraft into a maximum-performance turn to face the adversary. I went for them head-on. I opened fire. Enemy tracers also proceeded to streak in our direction. We headed for the Messerschmitt up to the last possible moment. I vigorously pulled the MiG into a steep climb and, reaching the top of the climb trajectory, dropped the aircraft into a right wingover. The three Messerschmitts were at 12 o'clock low. They followed the fascist pilots' habit of turning a chandelle left.

I went toward them on an attack pass and brought the leader into my sights. I had just opened fire when a string of machinegun tracers passed off my right wingtip. The higher-altitude pair of Me-109s had arrived on the scene. I climbed abruptly. My eyes dimmed from the g-load. Confident that the pair on my tail could not maneuver as tightly, I made a turn on top and spotted the Messerschmitts right where they should be. At this point I saw a white streamer trailing behind Semenov's aircraft. One of the three Messerschmitts had holed his fuel tank. "If they fly another attack pass, they'll surely set him on fire," the thought flashed through my mind. I immediately put my aircraft into a steep dive and, streaking past the wingmen, I headed for the leader. Because of the considerable altitude lost in pulling my aircraft out of the dive, I found myself below the Messerschmitt's altitude. I put it into a steep climb and opened fire. The Messerschmitt burst into flame.

Forgetting all caution, I watched it as it dropped groundward. I was immediately punished for this carelessness. I could feel machinegun bullets and cannon projectile fragments peppering my wings and tail. I succeeded in breaking away, however, and landing safely at my home field. Semenov also made it back.

We came to the following conclusion after this engagement: do not watch a downed enemy aircraft, but break off with a vigorous maneuver and look for a new target. I was henceforth guided by this rule and taught others to do likewise.

Of course practical experience brought adjustments. Once I spotted an enemy Henschel-126 reconnaissance aircraft about 600 meters above us, against a sky background. Aware of its high maneuverability, I decided to attack from below with the element of surprise. Approaching to a range of 70 meters, I squeezed the triggers. The flaming streams of tracers, bright against the dusk-darkening sky, knifed into the fuselage and engine from below. The fascist aircraft spiraled downward, trailing black smoke.

Determining that there was no threat in the air, I ventured to check down where the reconnaissance aircraft would be striking the ground. On this occasion my decision proved correct. The Henschel suddenly pulled out of the spiral just above the ground and, emitting smoke, headed westward. He must not get away! I put the MiG into a dive and put a burst through him from behind. He did not get away this time.

Our comrades-in-arms also gave us tips on aerial combat techniques and methods, and we learned from the legacy of creative achievement of great Russian pilot-innovators P. Nesterov and Ye. Kruten.

Soviet pilots were constantly learning and developing aviation theory and practice in the course of combat. This was a universal phenomenon. On the various fronts such outstanding fighting men as B. Safonov, S. Suprun, I. Polbin, I. Kozhedub, A. Yefimov, A. Koldunov, Ye. Savitskiy, and many others sought new techniques and methods of effective employment of aircraft. They comprised a fraternity of individuals united by a common cause, a common idea, by devotion to party and homeland.

Of course much of that which in the past could be determined on the basis of personal experience and simple calculations today requires more precise substantiation. Life moves forward. Combat hardware and the modes of its employment become improved, but the know-how and experience of combat veteran aviators contains a great deal of value and utility. One should not blindly copy it or seek ready recipes. One must think innovatively, go into the specific situation and conditions in which combat actions were fought, studying the factors which compelled one to employ precisely these rather than other methods and combat tactics. This approach to study of the combat experience of the war will help officers develop combat techniques which are most fully in conformity with today's conditions, equipment and weapons. I would like to see the aviators of the 1980's, seeking to equal the performance of the combat veterans, learn valor and love of the homeland from them, innovatively study the priceless experience and know-how of pilots who matured to manhood in the skies of the war, and put it into the service of a high degree of combat readiness.

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## KOZHEDUB REMINISCES ABOUT WORLD WAR II FIGHTER COMBAT

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 5, May 85 (signed to press 2 Apr 85) pp 7-8

[Article, published under the heading "Authors of Victory Speak," by three times Hero of the Soviet Union Col Gen Avn I. Kozhedub: "Not by Numbers But by Skill"]

[Text] Three times Hero of the Soviet Union Col Gen Avn Ivan Nikitovich Kozhedub made a worthy contribution toward defeating the Luftwaffe during the Great Patriotic War. This intrepid pilot flew 330 combat missions and took part in 120 aerial engagements, in which he downed 62 fascist aircraft.

This faithful son of the party and Soviet people, without regard for his own life, boldly engaged a numerically superior adversary and inflicted appreciable damage on him. He ended the war as deputy commander of a fighter regiment. After the war he graduated from the Air Force Academy (presently imeni Yu. A. Gagarin), the General Staff Academy of the USSR Armed Forces imeni K. Ye. Voroshilov, and held various command positions in the air forces of military districts and on the Air Forces central administrative staff. Since 1978 he has been a member of the USSR Ministry of Defense Inspectors-General Group.

Forty years ago one of the most savage and bloody wars in the history of mankind came to an end, a war which had been unleashed by German fascism -- the shock force of world imperialism and reaction. Dozens of countries, with their economy and manpower resources, were drawn into the vortex of military events, and hundreds of millions of people found themselves in a state of war.

For the Soviet people this was a patriotic war, a war for their freedom and independence, for the right to live and work in conditions independent of the whims of capital with its misanthropic laws and policies.

This struggle to the death lasted almost 4 years. It demanded an exertion of all the spiritual and physical energies of the fighting men in the army and navy and the toilers on the home front which no other armies and nations would have been able to endure.

We achieved the victory at the cost of enormous human casualties. The homeland lost 20 million of its sons and daughters in this war. And what is even more magnificent, this feat by the victor-people, who crushed the Hitlerite war machine, brought freedom to enslaved nations, establishing long-awaited peace in Europe.

Under the wise guidance of the Communist Party, the Soviet people are building new spiritual and material assets by hard, intensive labor, and are strengthening socialist societal relations. And each and every one of our toilers, citizens and patriots is clearly cognizant of the fact that peace on our land is not a gift of fate but a result of enormous work by the party to strengthen this country's defense capability and to increase the might of the Armed Forces -- an important factor which is restraining the aggressive aspirations of the NATO claimants to world domination.

Each time we celebrate Victory Day, a magnificent holiday for our people and all people of good will, one cannot help but look back at the road we have traveled, evaluating from the position of our current life and military experience our own deeds and actions and those of our comrades, with whom we fought the hated foe shoulder to shoulder, making that contribution which each of us was able to make to his final defeat.

I did not join the combat forces until the spring of 1943. Prior to that time I had been serving as an instructor at the Chuguyev Aviation School, training young pilots for the battlefield. At that time every instructor pilot considered it a matter of honor personally to take part in the fight against the fascist invaders. But numerous requests to be sent to the front were turned down. Usually it would be accompanied by a face-to-face conversation, in which the regimental commander or deputy commander for political affairs would patiently explain that it was no less honorable and important to teach flying skills to youth than to take part in combat, that somebody had to do the instructing, and that in the final analysis there are the oath, military regulations, and orders, which one must unwaveringly obey, that it is necessary to do with conscientiousness the job which one has been assigned.

Intellectually we understood this, but in our hearts we were there in the skies above the fields of battle, where the fate of our homeland was being directly determined. And we were plenty envious of those colleagues who received orders to report for duty to a line unit.

Finally my request was granted. In the 240th Fighter Regiment, after checking out my flying technique, I was placed on the active combat pilots roster and cleared to fly. Prior to commencement of the Battle of Kursk, we studied and toured the combat area, to ensure that at all times we could unerringly determine our location and head for our home field. Commanders devoted considerable attention to tactics and knowledge of the enemy's aircraft and the habits of the fascist pilots. We memorized like commandments the rules of conduct in air combat: strictly carry out your functions in the combat formation, in order to support a comrade at any moment; do not break away from your leader even when it seems that you can obtain an easy kill; do not break from combat if you run out of ammunition, but simulate an attack, in order to

disrupt the enemy's combat formation; break off combat on command by your group leader, regardless of who is where and in what situation, and head for home without rallying. Particular attention was devoted to knowledge and utilization of the capabilities of the Lavochkin, which was superior to the Messerschmitt in a number of performance characteristics.

The Hitlerite offensive began in July. The panzer and motorized-mechanized units were supported by armadas of bombers, under heavy fighter escort. Fierce battles blazed in the skies.

Our regiment's flying personnel, engineers and technicians, and aviation rear services specialists were operating under high stress. Returning aircraft would turn right around and head out on another sortie, six or seven times a day, from early morning to late evening. Our mission was to provide air cover to the defending troops and to prevent enemy bombers from hitting our defensive lines.

The young pilots quickly acquired combat experience and proficiency in these battles. It was also at this time that I shot down my first fascist aircraft. In the first battles in the skies above the Kursk Salient I realized how important it was to be familiar with the capabilities of the enemy's equipment and his tactics, in order to force one's own will on him. And the excellent flying qualities of the La-5, its excellent acceleration and powerful armament enabled us to smash the fascists with certitude.

The battle on the Kursk Salient made a special lasting imprint in my life. I was accepted to party membership at the height of the fighting, during a break between sorties. The lofty title of Communist obliged one to march in the front ranks at all times, to hit the hated enemy even more furiously, and at the same time imposed a great responsibility for one's actions and for the lives of those fighting by one's side. This particularly applied to the young pilots with whom one would fly on combat missions for the first time, breaking them in literally through fire and flame. Twice Hero of the Soviet Union K. Yevstigneyev, Heroes of the Soviet Union N. Olkhovskiy, F. Semenov, V. Mukhin, P. Bryzgalov, A. Amelin, A. Ternyuk, I. Sereda, V. Mudretsov, and others fought bravely in this regiment (subsequently the 178th Guards).

At the end of 1944 I fought in the famed 176th Guards Fighter Regiment together with such outstanding combat pilots as regimental commander Hero of the Soviet Union P. Chupikov (today colonel general aviation), Heroes of the Soviet Union A. Kumanichkin, Ye. Azarov, N. Rudenko, A. Basko, V. Gromakovskiy, I. Shcherbakov, A. Karasev, and other outstanding pilots.

The "free hunt" [roving fighter combat, sweep tactics] mode for the most part was employed in our regiment to combat fascist aircraft. Groups of smoothly-coordinated pairs of aircraft would be sent out on a sweep mission. Usually the pairs would take off at specified time intervals, and each would follow its own course into the designated area. The flight leaders would select altitude at their own discretion, but with the aim of establishing good airspace surveillance and adequate concealment. The group commander, the first to take off, would always know how many of his aircraft were currently in a designated area. If any of the pilots spotted the enemy, he would

immediately radio back his heading, altitude, time and a prominent landmark, and would engage the enemy regardless of number of aircraft involved.

Upon receiving information on enemy aircraft, all aircrews would proceed to the designated location. Thus our forces would continuously be building up during combat, while the enemy would be unable to determine the strength of the attacking fighters. Naturally flying and weapon proficiency were essential, as well as solid physical and psychological fitness, the ability quickly to assess a situation, initiative, discipline, and combat daring.

I shall cite another example. It was at the end of the war. On 17 April 1945 I went out in a two-aircraft flight with Dmitriy Titarenko on a sweep mission into the Berlin area. The other "hunter" pairs took off precisely on schedule. Fierce fighting was in progress on the ground. A thick gray haze hung in the air from the smoke and dust, making the hunt difficult. Suddenly we encountered at 12 o'clock, heading straight toward us, a large group of Focke-Wulf-190s carrying a bomb load. The enemy opened fire. We had to turn away sharply and climb in the direction of the setting sun.

I radioed the target's coordinates and strength. The group of Focke-Wulfs may have totaled 40 aircraft. Swinging back and gradually descending, we overtook the fascists and hit the aircraft bringing up the rear of the formation.

The enemy aircraft exploded from our heavy bursts of fire. The unexpected attack stunned the adversary. Several aircraft began releasing bombs (it was practically impossible to maneuver while carrying them). But then the fascists realized that there were only two of us, and proceeded to swing to the attack. Titarenko, delivering accurate fire, succeeded in stripping a Focke-Wulf off my tail. Engulfed in flames, the enemy aircraft plunged groundward.

Events took an undesirable turn, however. We were maneuvering at maximum g-loads and at maximum power, wringing out of our La-7s everything these magnificent machines were capable of. In any case, however, a single pair against several dozen fighters is far from equal combat.

Soon our comrades, who had been summoned by radio, arrived to the rescue, and we broke away. On the way back to our field I spotted a Focke-Wulf which had managed to break off and was heading in the direction of our forces. Spotting our pair, the fascist attempted to escape pursuit by diving, but as he was pulling out of his dive I caught him in my sights. This was my 62nd kill, and this was my last mission in the war.

Good knowledge of our own tactics and those of the enemy, equipment and weapons, the ability to predict the development of events and to calculate each and every action we took, as well as excellent flying technique helped us successfully accomplish our combat mission. And of course firm conviction in the righteousness of our cause, love of the homeland and faith in complete victory over a hated foe constituted a powerful force guiding our actions.

In the flame of battle our pilots were continuously learning, working persistently to adopt the combat experience and know-how of their senior comrades, devising new combat techniques and maneuvers and boldly employing them in battle. They hit the enemy not with numbers but with skill, sharpness of wit and expertise.

I travel on official business to various parts of our country, meet people of various ages and professions and see how, thanks to their selfless labor, the countenance of villages, towns and cities is becoming transformed literally before our very eyes and how the life of the Soviet people is becoming more interesting and richer. This is particularly noticeable to war veterans, since they have a basis for comparison. They saw with their own eyes how the fascist barbarians, chased by our troops, left behind grief and blood, ruins and ashes in the areas they had been temporarily occupying.

The Soviet people built everything anew from the ground up, and our land has become even more beautiful. But we shall never forget all the horrors of the war and those sacrifices which our people bore for the sake of victory. And I should like to say to our military aviators, who are guarding the peaceful skies of our homeland, that they should work persistently to study equipment and weapons, to master the techniques and methods of their combat employment, and to increase their vigilance and combat readiness, in order crushingly to repulse any aggressor at any time. A peaceful life is a blessing for which one must fight, which one must have the ability to defend with weapon in hand.

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## VETERAN OF AFGHANISTAN PRAISES SOVIET ROLE THERE

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 5, May 85 (signed to press 2 Apr 85) p 10

[Article, published under the heading "From an Afghan Notebook," by Hero of the Soviet Union Lt Col V. Shcherbakov: "Feeling of the Homeland"]

[Text] As a member of the limited contingent of Soviet forces, I was involved in rendering internationalist assistance to the toilers of friendly Afghanistan. It is a mountainous country. Many places, especially in winter, can be reached only by air. And our helicopter crews transported food, clothing, fuel -- in short, all the most essential items -- to remote villages and settlements. We saw with our own eyes the poverty and need of the common people and their age-old backwardness.

And at such moments we felt particularly acutely the magnificence of our Soviet homeland and perceived with pride how far it has advanced, for it began from zero after the civil war and foreign military intervention, having experienced total devastation. And what incalculable sufferings were inflicted upon our people by the devastating war unleashed by German fascism! But the Soviet Land healed its wounds, rose from the rubble, blossomed in its economic, scientific, and cultural development, and today marches in the vanguard of progressive mankind.

During our off-duty hours we frequently talked with Afghans, especially with young people. The boys and girls displayed a great interest in the life of our people. We related to them how Soviet citizens live and work, what our country has achieved in the economy, construction, and in development of science and culture. We would relate these achievements, and the hearts of all of us would fill with pride in our mighty homeland, with a feeling of filial love for it. This feeling helped us overcome difficulties and carry out with honor our difficult military duty.

Several years have now gone by, but I still do not cease to marvel at those with whom I flew in the skies over Afghanistan. They include my deputy Lev Tuktarev, squadron deputy commander for political affairs Vladimir Kopchikov, flight commanders Aleksandr Ustimenko and Vladimir Obolonin, helicopter commander Aleksandr Pakhomov, copilot-navigator Yuriy Lebedev, and others.

They were awarded lofty government decorations for exemplary performance of their internationalist duty and courage and heroism displayed thereby.

One might cite as an example helicopter squadron commander Maj Petr Lugovskiy, bearer of the Order of the Red Star. He went through a stern school of learning, assisting the friendly people of Afghanistan, and now is generously passing on his amassed experience and know-how to his subordinates. The outfit under his command achieved impressive success in the concluding phase of the winter training period. The majority of pilots and technicians in the squadron are highly proficiency-rated, and the ranks of excellent-rated individuals in combat and political training, category-rated athletes, and knowledgeable, well-trained specialists are growing. The squadron has taken a solid lead in socialist competition to honor the 27th CPSU Congress in a worthy manner. Definite credit for this must go to party member P. Lugovskiy and many other officers in the subunit.

We, Soviet servicemen, feel an acute sense of personal responsibility for ensuring the peace and security of our state and the countries of the socialist community. We love our Soviet homeland, are proud of its outstanding successes in building communism, and we shall do our part to ensure that the peaceful labor of our people is not disrupted.

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## THUMBNAIL SKETCH OF AIRCRAFT ENGINE DESIGNER MIKULIN

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 5, May 85 (signed to press 2 Apr 85) p 11

[Article, published under the heading "Soviet Aircraft Designers," by O. Favorskiy, corresponding member, USSR Academy of Sciences, and Doctor of Technical Sciences S. Kopelev: "Aircraft Engine Designer"]

[Text] In the very first year of the Second Five-Year Plan, the Communist Party Central Committee and the Soviet Government assigned scientists and aircraft designers the task of transitioning to faster, higher-flying, longer-range combat aircraft, and correspondingly to design new powerplants of improved types.

The AM-35A, AM-37, AM-38F, and AM-42 aircraft engines, first-rate in parameters and performance characteristics, were designed in the period 1936-1943 by the workforce of a nationally-renowned aircraft engine plant under the direction of Chief Designer A. Mikulin. They were installed on MiG fighters and Il ground-attack aircraft. During the Great Patriotic War Soviet pilots ravaged the hated foe with these aircraft, displaying unsurpassed models of courage, heroism, and military valor. More than 35,000 ground-attack aircraft powered by engines designed by A. Mikulin were built during the war years.

The vigorous, creative career of Hero of Socialist Labor Academician Aleksandr Aleksandrovich Mikulin began at the end of the 1920's. The powerful M-34 piston aircraft engine, designed under his direction, was installed on the ANT-25 aircraft, famed from the illustrious flights of V. Chkalov and M. Gromov. Novelty and distinctive originality, foresight and uniqueness -- all this typified the activities of the chief designer. Having formulated and substantiated the significance of a new problem in designing a new generation of aircraft engines, he actively exerted influence on the development of progressive and frequently fundamentally new manufacturing processes, methods of testing reliability and ensuring safety. Among new design solutions one can cite such items as adjustment of variable-incidence vane superchargers, development of two-speed superchargers, and high boost with air cooling at carburetor inlet.

The idea of scientists and designers about the priority development of aircraft powerplant engineering as the foundation of advance in aircraft

engineering was implemented in 1943. The first experimental aircraft engine plant was built in our country at that time. A. Mikulin was placed in charge of the plant, and Academician B. Stechkin, noted scientist and founder of theory of reaction-propulsion engines, was named his deputy. While continuing work on improving piston engines, the workforce was laying down a new scientific and experimental foundation for developing jet technology.

The party and government constantly devoted attention to the new enterprise. It was furnished with the most sophisticated machine building equipment; manufacturing-process and metallurgical shop complexes as well as research laboratories were established. This made it possible to proceed with developing jet engines. At first an experimental stage was designed and built, followed by an experimental model of an axial compressor. This method of so-called advance development and long-range assembly-by-assembly completion has undergone further development in our time.

Turbojet engines of unique design were developed under the direction of A. Mikulin. The first of these was the AM-3, which for a long time was the world's most powerful turbojet engine. It was built in large quantities and powered aircraft designed by A. Tupolev and V. Myasishchev. Versions of this engine still exist today. This powerplant incorporates excellent specific parameters with a high degree of dependability, simplicity and efficiency of design. The double-stage turbine contains blades with specially-designed, unique profiles, ensuring high efficiency. Thanks to a substantial increase in stage pressures, high compressor parameters for the time were achieved.

The next stage in the activities of the experimental design office was investigation of the influence of gas-dynamic parameters on the weight per horsepower of a turbojet engine. This resulted in the development of the AM-5 and RD-9B family of engines, producing a thrust of 2,000-4,000 kg and a weight per horsepower two thirds that of Soviet and foreign engines of the 1950's. For the first time in world jet engineering practice, they incorporated a compressor with a supersonic stage. Its first stage had a small relative hub diameter, and the turbine was highly efficient. A high degree of thrust boost was achieved by afterburning fuel. An additional supersonic ("zero") stage was placed upstream of the compressor subsonic stage to increase thrust. This direction in the evolution and modernization of gas-turbine engines was adopted in world propulsion engineering and is being used to this day both in this country and abroad. It made it possible to build more powerful turbojet engines, and much faster and cheaper than designing a new model. Engines of the AM-5 and RD-9B family powered fighter aircraft and pilotless vehicles.

Our country's first twin-shaft engine, the R-11, was designed under the supervision of A. Mikulin. Its compressor was designed without a forward case and with stages of unequal pressures. The first wheel was arm-mounted to the rotor, which made it possible to reduce compressor weight. This innovation made it possible to eliminate the anti-icing system. In case of damage during operation, the rotor wheel could easily be replaced, while retaining the other compressor stages. The engine was designed to power the MiG-21 supersonic aircraft as well as the Yak-28 Frontal-Aviation bomber, which required formulation of basic principles of control for turbojet engines employing a twin-shaft arrangement. They formed the basis of development of all

subsequent engines of this type. The R-11 had a low weight-horsepower ratio, was small in size, and highly reliable. Versions of this engine are still today being used to power many aircraft.

Selection, indoctrination and placement of cadres was a special concern which the chief designer never ignored, selection not only of designers, theory and computation people, and experimenters, but also production people -- shop supervisors, supervisory personnel of the various services, chief specialists, and even highly-skilled workers. No member of the workforce was a matter of indifference to him.

Aleksandr Aleksandrovich would not tolerate a passive attitude. If he felt that a designer was capable of more, he would be more demanding on him and frequently ask: "What's new with you?" Thus he would compel the individual constantly to think about his work, present and develop new ideas. It is therefore not surprising that, alongside the development of first-rate engines, a team of purposeful, energetic supervisors, designers and scientists of initiative was formed at the experimental design office.

Soviet pilots set many world records with aircraft powered by engines designed by A. Mikulin. In the postwar years the successes of the experimental design office headed by A. A. Mikulin were honored with Lenin and State prizes. The plant was awarded the Order of Lenin.

Soviet engine builders are successfully adding to the experience and know-how amassed in the process of designing and developing aircraft engines.

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## EXAMPLES FROM WORLD WAR II HELP IN TODAY'S MAINTENANCE PRACTICES

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 5, May 85 (signed to press 2 Apr 85) pp 12-13

[Article, published under the heading "From Party-Political Work Experience," by Candidate of Historical Sciences Lt Col A. Balakayev and Lt Col V. Sharun: "Examples From the Battlefield"]

[Text] During the years of the Great Patriotic War the personnel of the aviation engineer service performed a great deal of work pertaining to supporting Air Forces combat operations. A high level of party-political work made a large contribution to the success achieved by aviation personnel. Much of the combat experience and know-how from the war has retained its significance and can be utilized in present-day conditions. Today there has been a substantial increase in the role of officer-Communists and aviation engineer service supervisor personnel in ideological and mass-political work. One of the most important conditions for its effectiveness is to arm aviation engineers with the priceless experience and know-how of ideological indoctrination of aviation engineer service personnel in conditions approximating actual combat. We should like to relate one typical example from the Great Patriotic War which confirms this idea.

At the end of 1942 the 291st Ground-Attack Aviation Division was assigned the task, among others, of supporting the Soviet offensive at Stalingrad. Accomplishment of this task demanded of all aviation personnel a high degree of organization and discipline, profound knowledge of the tactical and maintenance features of the ground-attack aircraft, as well as comradely mutual assistance in the course of readying aircraft for combat missions. Personnel had not yet amassed by that time sufficient experience in operating and maintaining ground-attack aircraft in winter conditions. Preflighting procedures were dragging out too long on many of the aircraft. This was bringing accomplishment of the combat mission into question.

It was then that they decided to hold a flying-technical conference, according to the party-political measures plan, on the topic "Experience in maintaining the Il-2 aircraft in winter conditions," and to synthesize at this conference

the experience and know-how of the finest pilots, technicians, and mechanics, in order subsequently to render practical assistance to activists in creating in the men an excellent patriotic mood and to instill in them hatred toward the enemy and faith in victory. The conference was directed by division commander Hero of the Soviet Union Lt Col A. Vitruk.

Senior Engineer Lyubomudrov presented advanced know-how and experience in Il-2 maintenance. He discussed in detail the specific features of operating ground-attack aircraft at low ambient air temperatures and analyzed in detail aircraft equipment malfunctions through the fault of flight personnel which are most frequently encountered in these conditions, the causes of these equipment failures, and stated tasks pertaining to further, deeper study of the aircraft's design and construction, operation and maintenance rules and procedures. The presentation was illustrated by diagrams of the physical layout and operation of various components and systems of airframe, powerplant, aircraft armament, as well as with charts and diagrams.

The division political section chief then described in detail the situation at the front, related fascist atrocities on occupied territory, and called upon aviation personnel to put even more pressure on the hated enemy.

Many pilots and technicians took part in discussing the report presentation. The conference armed flight and engineer-technician personnel not only with advanced know-how but also instilled optimism and confidence in their abilities and in victory over the enemy. Party activists synthesized conference results and communicated them to all division personnel.

During that same period the political section, jointly with the command authorities and supervisory engineer-technician personnel of the units, implemented party measures to mobilize aviation personnel to carry out the order issued by the homeland -- to crush the fascists at Stalingrad. A meeting of party activists was held, at which shortcomings hindering precision combat performance, fast and high-quality turnaround procedures for readying an aircraft to go out on another sortie were analyzed in detail. Criticism was leveled at those squadron and flight aviation engineer service supervisors who sometimes worked without a specific plan or schedule, who supervised with inadequate specificity work on aircraft by the maintenance specialists, and sometimes themselves readied ground-attack aircraft for missions instead of organizing skilled teamwork and coordination by airframe and powerplant mechanics and armorers. Party-political work being conducted with technician personnel in the course of readying aircraft for combat sorties in night conditions was still inadequate. By decision of the body of activists, political workers synthesized the work experience of the best technicians and airframe mechanics, armorers and powerplant mechanics, who readied aircraft for combat missions with excellent quality, and publicized them in wall newspapers, operational news sheets, and other visual agitation materials. Party activists organized talks by the best aircraft maintenance specialists and agitators.

A differentiated approach to the conduct of mass-political work with aviation engineer service personnel made it possible more specifically to grasp the tasks facing aviation personnel. As a result each individual felt personal

responsibility for his assigned area of work and felt a measure of his own participation in the common cause. For example, following a talk with aircraft armament maintenance specialists on how to ensure smooth, failure-free operation of ground-attack aircraft weapons, many mechanics made valuable suggestions on equipment maintenance, on setting up training facilities, and on procedures for correcting weapon malfunctions in the process of combat operation.

A strong impression was made on aircraft maintenance specialists by talks by pilots who were experts at aerial combat and precision strikes on ground targets. They related their combat activities and the difficult conditions in which it was sometimes necessary to perform combat missions and the potential consequences of engine, cannon, and machinegun failure in battle. These talks compelled aircraft maintenance specialists to gain a more acute sense of personal responsibility for ensuring a successful offensive by Soviet forces and to do a better and faster job of readying aircraft for combat missions.

A demonstration by experienced maintenance specialists of readying a ground-attack aircraft for a combat mission in conditions of low ambient temperatures, organized by political workers and engineers, proved to be exceptionally useful.

The question of party-political work among technician personnel readying aircraft at night was also rearticulated. Commanders and political workers placed party and Komsomol activists and agitators in the most critical areas. They inspired their fellow soldiers by word and personal example. At the suggestion of party members, for example, in order to shorten the time required to make aircraft combat-ready, airframe and powerplant mechanics, under the supervision of engineers, first took part in fueling ground-attack aircraft, in adding engine oil, and in inspecting components and systems. Then, working with armament specialists, they mounted bombs and projectiles.

The number of combat aircraft sorties almost doubled as a result of these measures. The average time to ready a ground-attack aircraft was reduced to 40 minutes (instead of 2 hours). And the most experienced aviation engineer service specialists were able to improve even on this time.

The work experience of commanders, political agencies and party organizations in mobilizing aviation engineer service personnel for prompt and high-quality support of air combat operations during the war years has retained its importance to the present day. But it must be analyzed and evaluated on the basis of what we know today, taking all useful items, filling them with new content, and innovatively employing this know-how in practical training and indoctrination of personnel taking into account the present level of development of the Air Forces.

Many forms and methods are actively utilized in party-political work with engineer-technician personnel in the process of mastering modern aircraft systems: party and Komsomol meetings, flight-technical conferences, individual indoctrination work, visual agitation, dissemination of advanced know-how, etc.

In the unit in which officer V. Basov serves, for example, a party meeting was held with the agenda "On Increasing the Personal Responsibility of Communists for the Quality of Practical Mastering of an Aircraft System and Unswerving Observance of Documents Governing Mishap-Free Flight Operations." The Communists who spoke at this meeting devoted considerable attention to strengthening the effectiveness of party-political work among engineer-technician personnel. They spoke about increasing sense of responsibility on the part of CPSU members and probationary members for the quality of preflight preparation of combat aircraft, for improving the job-related training of engineers and technicians, for improving training facilities, and rendering of effective assistance to junior aircraft maintenance specialists in mastering aircraft equipment.

By decision of the meeting, the party committee examined matters pertaining to mobilizing Communists for rapid and high-quality mastering of aircraft systems. The specific forms and methods of this work were discussed at a seminar of party organization secretaries, at which they addressed in detail the specific features of aircraft maintenance and organization of party work with the various categories of personnel on days of preliminary preparation and during flight operations. Such an approach toward instructing party activists and participation in their work by unit leader personnel greatly helped liven up party-political work and strengthen its purposefulness.

Unit party activists also concerned themselves with visual agitation. Its content reflected today's demands and its materials revealed all new and progressive items engendered in the process of socialist competition. For example, the so-called paired drill has come into widespread use in the course of mastering modern aircraft. It consists essentially in the following: first a technician checks the pilot's cockpit procedures and tests his knowledge and skills, after which the pilot tests the technician. Then a special combined procedures card is prepared. The pilot's procedures from the moment he climbs into the cockpit until he instructs the aircraft technician to remove wheel chocks are written sequentially on one side. The technician's actions are specified across from each procedure. In the opinion of the command authorities, such a drill promotes more thorough study of the aircraft system, the job duties of pilot and technician, develops composure, strengthens friendship and fosters mutual assistance.

During the period of flight operations support, party and Komsomol activists in this regiment are distributed among the flight operations shifts, and they organize in a differentiated manner party-political work with the various categories of personnel. For example, party activist Maj B. Vorobyev works with aviation engineer service officers, while Maj V. Morozov and other members of the party committee work with warrant officers and compulsory-service enlisted personnel and NCOs. This makes it possible more fully to consider the individual features and job-proficiency level of specialist personnel serving aircraft. Talks are regularly held with aviation engineer service personnel, during which tasks for forthcoming flight operations and documents governing flight operations safety are explained. Special importance is attached to strengthening party influence on personnel when readying aircraft for a night training sortie.

In the last war, in the course of supporting combat sorties, in many units political workers and aviation engineer service supervisor personnel actively utilized such a form as the conference of combat activists, who included the most experienced and respected party members among the technicians, mechanics, armorers, and instrument maintenance technicians. As a rule valuable suggestions pertaining to improving the quality of readying aircraft for combat missions, rehabilitating and repairing aircraft would be discussed at such conferences.

We believe that this form could be adopted and actively utilized today as well. One must bear in mind that some young engineers have not yet fully mastered organizer skills, and yet the ability to organize one's own labor and that of one's subordinates in a scientific manner is an urgent demand of the times. It would also be a good idea to consider in party-political work the specific features of the work done by engineer-technician personnel in servicing aircraft of different types and to devote greater attention to psychological conditioning of those who bear primary responsibility for releasing aircraft for flight operations -- the aircraft technicians. Dissemination of the advanced know-how of the top flight technical maintenance unit and servicing group engineers, technicians, and chiefs also needs improvement. We believe that resolving these questions will help all officers, including aviation engineer service specialists, master modern aircraft systems in a high-quality manner, help them skillfully maintain these systems, work tirelessly to master organizer skills and the ability to work with others, to take active part in mass-political measures and innovatively to utilize amassed advanced know-how.

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## SOVIET WORLD WAR II FIGHTER TACTICS REVIEWED

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[Article, published under the heading "War Heroes on Air-Force Tactics," by Hero of the Soviet Union Honored Military Pilot USSR Col Gen Avn G. Dolnikov: "Soviet Fighters in Battles for the Homeland"; concluding part of a two-part article]

[Text] In the spring of 1943 large-scale air battles were fought over the Kuban. The fascist command authorities were figuring, with the assistance of air power, to thwart the Soviet offensive which was in preparation. They concentrated as many as 1,000 aircraft at airfields in that area and in the Crimea. Bombers comprised the nucleus of these air forces.

The air forces of the North Caucasus Front (Lt Gen Avn K. Vershinin, commanding) totaled approximately 600 aircraft. Inferior in numbers, they were also experiencing difficulties in basing. As a result at the beginning of April the enemy succeeded in seizing operational air superiority in this sector.

Three aviation corps and a fighter division were redeployed on an urgent basis to the North Caucasus Front. Our air forces gained a numerical superiority in fighters.

Following defeats in the first two battles (17-24 April and 29 April-10 May 1943), the fascists beefed up their air forces with units based at Crimean airfields. The intensity of the struggle in the air increased. From 26 May to 7 June up to 50 air engagements were fought each day in a limited airspace, with the participation of 50-80 aircraft on each side. Soviet fighters shot down 315 enemy fighters in the 12 days of the third air battle.

A total of 1,100 enemy aircraft were destroyed in all three air battles on the Kuban, and 835 of these were downed in air-to-air combat. Soviet fighters flew 11,999 sorties and lost 296 aircraft. Thus we lost one fighter for every 40 sorties, while the enemy lost an aircraft for every 14 sorties (the ratio of losses was 1:2.8).

What were the specific features of the tactics of this period?

First of all, all advances and experience of the preceding war years were utilized. The combat formation during air patrolling was constructed of two-aircraft elements, altitude-stacked both within groups and between groups of fighters. Yak-1 aircraft and aircraft equivalent to them in vertical maneuver as a rule would be positioned in the upper tiers and would handle the mission of engaging first of all enemy fighters, operating for the most part at altitudes of 3,000-5,000 meters, and sometimes higher. The slower I-16 and I-153 aircraft would usually patrol at the altitudes flown by enemy bombers (2,000-3,000 meters), with the mission of shooting them down.

Groups of fighters would be altitude-stacked as an "etazherka" [three-tier structure], shifted in relation to the requirements of mutual support. The difference in altitudes between individual patrols did not exceed the altitude gained by an aircraft in a single chandelle (800-1,000 meters). This enabled the upper-tier fighters continuously to monitor the actions of the lower-tier fighters and immediately to come to their assistance if necessary. The lower patrols could withdraw to the protection of the upper patrols at any time. In order to ensure an altitude advantage for our fighters, forward observation posts would report the air situation in advance to the commanders of groups approaching the line of contact.

Secondly, know-how on the basis of past experience was constantly being adjusted. For example, it had proven inadvisable to maintain large groups of fighters above the battlefield. When the adversary was not displaying much activity, individual pairs or four-aircraft flights would maintain patrol. A reserve force would be maintained on the airfields at this time, however, ready to scramble on orders from the aviation commander's command post.

When spotting individual pairs or small groups of enemy fighters over the battlefield, aircrews on patrol would not immediately engage them, for frequently they would be acting only as bait, to involve our fighters in combat just prior to the appearance of large forces of enemy bombers.

In encounters with composite groups of enemy aircraft the old mistakes were corrected once and for all, whereby our fighters would engage the escorting group in full force, ignoring the main target -- the bombers.

Thirdly, engagement of a patrol with a high energy level (excess speed) was secured. In conditions of aggressive enemy countermeasures, standing air patrol over the battlefield at economical airspeeds proved disadvantageous, especially when engaging fascist fighters. During airborne alert our pilots began flying at faster airspeeds (0.8-0.85 of maximum). This was achieved not so much by increasing engine output as with a slight loss of altitude and subsequent steep climb or chandelle ("swing" technique).

Fourth, the problem of increasing reliability of air cover for ground troops was successfully resolved. To accomplish prompt interception of enemy aircraft, especially during a period of aggressive enemy bomber operations, our fighters would usually patrol 10-15 kilometers beyond the line of contact, over enemy-held territory. In addition to these groups of fighters,

individual pairs of roving aircraft would be sent out to intercept enemy aircraft.

Fifth, effective measures were found for countering the new fascist FW-190 fighter. Shifting to vertical combat was considered the best way to achieve a positional advantage. After closing with a Focke-Wulf on a head-on course, a head-on attack pass was inadvisable, and therefore the pilot would "grab altitude" with an Immelmann, and then attack from above at short range, 200-50 meters. The main thing was to force the fascist to fight in disadvantageous conditions.

After the fighting on the Kuban in July 1943, the fascist command authorities undertook an attempt to regain their lost initiative in the air, concentrating more than 2,000 aircraft on the Kursk Salient. Fierce fighting raged in the skies. The battle for air supremacy was of a resolute character. The enemy lost his strategic supremacy in the period of the defensive operation and during the Soviet counteroffensive.

Radars began to be extensively employed from the latter half of 1943 in fighter aviation for long-range detection of enemy aircraft. Prompt detection of the enemy when fighters were on the ground was particularly important.

If radars were sited 10-15 kilometers from the battle line, the enemy would be detected 12-15 minutes before reaching the battlefield, which was quite sufficient for accomplishing prompt and timely intercept. Expansion of available information was immediately reflected in economical expenditure of resources. Engagement from an airfield ground alert status became the principal mode. Group-patrol sorties when providing air cover to friendly troops were considerably cut back. It was also now possible to determine in advance the direction of the main attack on a composite group of enemy aircraft and the sequence of engagement. Here is an actual example.

On 3 June 1944 a group of 12 aircraft took off to provide air cover to ground troops in the vicinity of Movileni. The strike group, led by Hero of the Soviet Union I. Babak, contained 8 aircraft, with 4 in the cover group. When airborne we were informed of the appearance of 50 Ju-87 bombers escorted by 10 Me-109s and 8 FW-190s. Our cover group, in which I was leader of the second pair, was the first to engage the enemy fighters. The attack from above, out of the sun, took them by surprise; the Messerschmitts and Focke-Wulfs had no time to prepare to repel the attack. We gained the advantage due to the element of tactical surprise, an advantage which we skillfully exploited, in spite of the adversary's numerical superiority. The enemy fighters, which themselves were heavily engaged, were unable to prevent the attack by our strike group. Hero of the Soviet Union D. Glinka (who was in the strike group) shot down 3 aircraft in this engagement, Babak shot down 2, I succeeded in destroying two Hitlerites, while pilots Petrov, Guchek, and Antonyev shot down one apiece. Ten downed enemy aircraft in a single engagement -- this figure reflected increased tactical proficiency, smooth group coordination, and a high degree of weapon proficiency on the part of our aircrews.

When the Soviet offensive began, massed bomber strikes on important enemy targets at tactical and operational depth began to be employed along the

entire front. In connection with this, special attention was focused on devising new methods of fighter escort cover. In the initial period of the war the most frequently employed method was direct escort of aircraft of other air components to and from the target. Experience indicated that bombers most frequently encountered the most intensive countermeasures and sustained losses to hostile fighter fire in the target area. Therefore enemy fighters began to be pushed out (clearing of airspace) just prior to arrival by the main group in the target area. The fighter-clearing group, which contained well-trained combat pilots, would be dispatched to the target area 10-15 minutes prior to beginning a strike, which would engage enemy fighters in the area, preventing them from approaching our bombers.

An increase in the number of fighters in the Soviet Air Forces and improved fighter combat capabilities made it possible to employ a combined mode of bomber support: fighter-clearing, blocking, direct escort, and reserve groups would operate on a uniform plan. In addition, protection along individual route segments would be organized -- patrol escort, whereby fighters would be assigned a zone in which to seek out the enemy and cut him off from our bombers. On 27 June 1944, for example, when delivering a 90-minute massed strike on an enemy troop column southeast of Bobruysk, 4 bomber and 4 ground-attack divisions of the 16th Air Army operated in regimental groups without fighter escort. But the entire strike area was isolated by fighters from 1900 to 2100 hours (screen method).

Having lost strategic air supremacy in the Battle of Kursk, fascist air activity declined appreciably. In 1944 the number of fighter sorties per combat loss was double the figure for 1943, while in 1945 it was four times the 1943 figure.

As a final tally, Soviet fighters destroyed approximately 40,000 enemy aircraft in air-to-air engagements in the Great Patriotic War and made a fundamental contribution toward gaining air supremacy.

Tactics -- a pilot's second weapon -- played a most important role in achieving these victorious results. The fundamental principles of aerial combat were formulated in the conflagration of war: combat activeness (aggressiveness); element of surprise (75 percent of downed enemy aircraft were destroyed in the first attack pass); linking of maneuver and fire; continuous control and close teamwork and coordination; full exploitation of one's own combat capabilities and the adversary's weak points; broad initiative and improvement of combat techniques.

These principles are still valid today, although they have been filled with new content. The principle of aggressiveness was clearly manifested during the first period of the war, when Soviet fighters, inferior to the enemy both in numbers and quality, succeeded in shifting from the defense to highly aggressive actions.

The principle of full exploitation of one's own combat capabilities and the adversary's weak points was manifested in the fact that air engagements were fought both aggressively and with calculation -- taking into account vulnerable points in fascist equipment and tactics. Our pilots were

encountering a specific adversary, who had no desire to yield the initiative. Identical techniques were not employed against Messerschmitts, Focke-Wulfs, and Junkers; an "individual approach" was observed, which is well known to every pilot. The popular Pokryshkin formula "altitude-speed-maneuver-fire" was universal, applicable to any engagement. The missions of each phase of air combat were accomplished with its aid: taking an initial position, closing, choosing an attack position, and the attack pass.

The author of this popular formula -- commander of our 9th Mariupol Fighter Division, Aleksandr Ivanovich Pokryshkin, writes: "Altitude superiority always ensured the initiative in battle, since it was a means of creating superiority in speed by descending. Our airplanes' powerful armament, in combination with maneuver, led to sure defeat of the enemy." Tactical principles and formulas, however, did not impede the search for innovation. "One of the most valuable traits of the Soviet pilot is innovativeness. A fighter pilot has the ability to employ at the proper moment not those hundred modes of combat he has learned by heart, which are fine in a given situation, but rather a new, 101st technique, which takes the enemy by surprise at an incisive moment of battle."

The principle of continuous command and control found expression in raising the level of tactical proficiency of commanders at all echelons and their acquisition of skills of directing subordinates in a complex air environment. A system of fighter control was created during the war years which was grounded initially on utilization of radio nets and subsequently radars as well. Every battle was played out at first mentally, and subsequently in action.

There was not only weapon teamwork and coordination but tactical as well. Each and every fighter pilot constantly was aware of a friend's presence and his willingness to give support and help, even at the cost of his own life.

This article is devoted to the last principle -- continuous improvement of air combat tactics and techniques. This is merely an attempt to show how changes have taken place in methods used by fighters to accomplish their principal missions: gain air superiority; provide protective cover to friendly forces; support other components of Frontal Aviation.

As we know, new aircraft and armament exert decisive influence on the evolution of tactics. Each new generation of aviators in turn, starting from the foundation of the experience and know-how of the past, makes its own progressive contribution, meeting the demands of the time and circumstances. The strength of the succession of generations of Soviet fighter pilots is embodied precisely in this.

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## IMPORTANCE OF COMPETENT TACTICAL CONTROL OFFICER STRESSED

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[Article, published under the heading "Be Alert, In a Continuous State of Combat Readiness," by Honored Military Pilot USSR Col Gen Avn P. Belonozhko, first deputy chief of the Air Forces Main Staff: "Effectiveness of Tactical Control"]

[Text] The tactical exercise had reached a high level of intensity when the "aggressor," following artillery preparation, committed tank subunits. The tankers were unsuccessful, however, in their attempts to break through the tactical zone of defense. Encountering a heavy wall of fire, they were forced to halt the advance and withdraw back to their initial positions. It became clear that the assistance of tactical air was essential.

After being final-briefed and analyzing the current situation, aviation commander officer I. Grishalevich decided to put a group of fighters into the air and to intercept the "aggressor" aircraft before they reached the "line of contact." Capt V. Melnik was assigned the task of monitoring the aircrews' actions in the air and engaging them. Thoroughly familiar with the situation, the terrain and weather, the tactical control officer determined the most probable avenues of approach by the "aggressor" to the target, radioed the fighter group leader and communicated to him the essential data for heading for the airborne alert zone and seeking out the "aggressor" airplanes (helicopters).

A few minutes later Melnik spotted two target blips on the PPI scope. Judging from their size, the "aggressor" was proceeding in close-packed formations. He guessed that on approaching the engagement zone of the tactical air defense assets the group would disperse and would hit the artillery positions from different directions. There was also another possible scenario: another group might be proceeding at low level, as yet unseen by the radars, a group assigned the principal mission.

After making his preliminary calculations to determine the points at which he would engage his fighters and the points at which the fighters and "aggressor" would meet, Melnik proceeded to observe closely. One of the radar returns, while maintaining heading, had begun to lose altitude. Soon the other blip

abruptly altered heading and, maintaining altitude, proceeded along the boundary of the engagement zone of the antiaircraft missile system. The officer was now sure: this group was tasked with diverting the attention of air defense assets. And it was proceeding in a direction opposite to that in which the local topography made it possible to cross the "battle line" undetected. This meant that there was a third group, which presented the greatest threat.

The tactical control officer reported the situation to his superior and, receiving permission, scrambled his reinforcement fighters. He gave orders to the pairs standing by in the airborne alert zones to proceed with their plan of action. One headed to intercept the low-level target which was proceeding straight in, while the other was ordered to head for the potential location area of the "aggressor" who had not yet been detected.

Everything took place just as Captain Melnik had figured. Within a few minutes the aircrews began reporting in turn that they had spotted and were attacking their targets. The "aggressor's" scheme had been discovered in time, and the plan to deliver a bomber strike with the element of surprise had failed.

There is no question about the fact that they had succeeded in repulsing the attack and in providing reliable air cover to the defending troops because the commanding officer had thoroughly examined and analyzed the situation, had predicted the development of events and had correctly tasked his men. This tactical control officer displayed a high degree of professional competence. After being briefed, he made a mental picture of the "aggressor" on the actual terrain, his possible alternative courses of action, and devised response measures in rough form. Subsequently, digesting the radar information, he figured out the "aggressor's" tactical move and promptly distributed fighter efforts. The pilots in turn, instantly comprehending what was required of them, displayed a high degree of flying and weapons skill, purposefulness and a will to win. All these elements together predetermined a successful combat outcome.

This is merely one episode from the multifaceted activities of aviation personnel. Through joint efforts flying personnel and command post officers are improving and perfecting air tactics and combat employment of aircraft, organization of teamwork and coordination, and are resolving problems of air navigation and flight safety.

As a component part of troop command and control, tactical control pursues the aim of providing continuous monitoring of airspace with the aid of radar facilities, of creating for airborne aircrews and groups of aircraft the most advantageous conditions for achieving victory over the adversary, and of giving assistance in proceeding to the designated mission area and to the destination airfield. In other words, in view of the broad spatial scope and highly-dynamic nature of air combat, operating in bad weather and at night, with a flow of the most diversified information and with time of the essence, command post assistance is indispensable to the pilot.

If a pilot fails to see the adversary, it makes no sense whatsoever to talk about a successful attack, even when the aircraft carries the most modern long-range weapons. The well-known combat formula "He who sees the enemy first wins," which has played a decisive role through the ages, has taken on new features in present-day conditions. A command post equipped with means of airspace surveillance is able sooner and at greater range to detect a hostile aircraft, to estimate the situation, to make the decision to engage a fighter (especially on alert status), to provide the pilot with exhaustive information on range to the target, its altitude, course and airspeed, and to guide the fighter to the calculated point for detection and attack. Thus tactical control is a decisive factor in air combat, and the command post officer is a full and equal participant in this process.

But this is only one aspect of the activities of tactical control officers. Control of air actions directly over the battlefield is another, no less important aspect. Positioned in the ground troops formations, a forward air controller, with his communications gear, can offer real assistance to aircrews supporting ground subunits, in detecting and neutralizing specified ground targets, and when necessary retasking to execute a newly-arising mission.

The degree of success of aircrew actions against specified targets and the effectiveness of air combat activities as a whole depend to a significant degree on the professional competence and moral-psychological fitness of the tactical control officers. The question of their specialized training is assuming increasingly greater relevance in connection with this, for in order skillfully to utilize the radar facilities and electronic computer hardware at their disposal, in order successfully to accomplish operational-tactical missions, they must possess solid knowledge of applied mathematics, physics, aerodynamics, tactics, and other aviation subjects. An officer certainly acquires thorough knowledge of theory at service school. At the Voroshilovgrad Higher Military Aviation School for Navigators, for example, the school administration and faculty devote considerable attention to matters of tactics, command and control, and combat employment of aircraft. They skillfully utilize training facilities, and every officer cadet takes part in air traffic control, takes a tour of duty in a line unit, and acquires the necessary skills.

The process of professional development, however, continues in the line units. The young officers perfect their skills and deepen their knowledge of tactics, our equipment and that of the adversary, methods of tactical control and air traffic control. In the outfit commanded by Military Pilot 1st Class I. Grishalevich, for example, tactical training exercises and combined practice drills are regularly held for tactical control officers, at which they work on coordination and smoothness of performance by control facility teams, plus training exercises for officers, brief tactical drills, and work on the actual equipment and on simulators. When breaking in young tactical control officers, training activities for them are organized separately at first, on highly specific items, and later jointly with flying personnel. Air engagements and strikes on ground targets are simulated at these training classes, the men work on problems of organizing teamwork and coordination between command post and aircrews, between groups of different tactical

designation, guidance and target designation, plus work on smoothness and coordination in actions and mutual understanding. And this is very important for achieving success in the air.

Alongside active forms of training command post officers, independent training continues to be the principal and most effective method of acquiring profound, solid knowledge. Good results are produced, for example, by self-training by command post officers at their work stations. Many units have now set up special classrooms with communications gear for training command post teams. Combining theory with practice is particularly important when studying and mastering means of automatic command and control.

Computers and automated command and control systems make it possible to handle practically any guidance and target designation tasks. Maximum clarity and precision of commands is achieved with the aid of an automated command and control system, which naturally also determines security and secrecy of command and control. And this is a very important factor in achieving the element of offensive surprise. Thus it is a matter of honor for each and every command post officer to master all control modes and methods with the aid of automated systems. This requires constant and persistent study. Positive results are achieved if headquarters carefully ensures that classes are conducted strictly according to schedule, in a purposeful manner, with observance of proper learning sequence.

The experience gained at field exercises indicates that training of tactical control officers in the capacity of forward air controllers must be conducted in a more purposeful manner, for which one should make use of training sorties by fixed-wing and rotary-wing aircraft crews to tactical and gunnery ranges. Courses of instruction and practical training conducted in combined units, and special training courses at command posts are also highly beneficial in improving their job proficiency. At a recent course of training directed by officer A. Zubkov, for example, special attention was devoted to tactical control of aircraft over the battlefield. During this time specialist personnel became acquainted with new control methods and adopted from one another all the best working techniques. Headquarters staffs of aviation units and combined units should devote constant attention to dissemination of the advanced know-how of the finest command posts and tactical control officers. This is a matter of critical importance and requires certain initiative, innovativeness, and persistence.

In today's combat aircrews, command post teams, and all persons involved in flight operations direction and control are subjected to enormous nervous, emotional, and physical stresses. The emotional-volitional stability of military aviation personnel is formed and shaped by all means of teaching and indoctrination. An important role in this is played by Marxist-Leninist training and political self-education, as well as various sociopolitical measures, in the process of which officers master a dialectical-materialist understanding of events and phenomena taking place in the world, develop a correct understanding of the nature of contemporary war, and develop a faith in the power of our weapons and a burning hatred toward the enemies of the socialist homeland. Commanders, staffs and political workers, party and Komsomol organizations keep an unremitting watch on the Marxist-Leninist

training of tactical control officers and devote constant attention to growth in their ideological-theoretical level -- a most important factor of moral-combat potential.

Improvement of psychological fitness depends in large measure on the quality of organization and conduct of scheduled training classes and drills and on the degree to which they contain an abundance of complex and instructive scenario items which correspond to the dynamics of modern combat. An important place is occupied by preparation for tactical air exercises. The officers of the headquarters staff headed by Maj V. Pavlysh, for example, in preparing for an exercise thoroughly thought out and devised a schedule of training classes and drills for command post teams. Execution of this plan-schedule was rigorously monitored, and results were thoroughly analyzed and considered. In implementing the plan-schedule the executive officer displayed a high degree of demandingness not only toward the tactical control officers but also toward all chiefs of the services on which their preparation depended.

As a result the command post teams displayed a high degree of professional expertise at the exercise, the ability successfully to carry out complex missions in conditions of highly-fluid combat.

Alert duty plays a special role in developing in tactical control officers excellent moral-combat qualities and psychological stability. A situation of constant vigilance and a high degree of tension puts one in a more combative frame of mind and stimulates display of all physical and intellectual energies. Tactical control officers A. Poyda and Yu. Morozov perform their duties knowledgeably and with precision. Officers N. Shamshin and V. Petrov displayed presence of mind and exceptional skill when it became necessary to assist airborne aircrews and to get them to the destination field.

Well-organized socialist competition promotes achieving high performance results in the job training of tactical control officers. At the command post headed by Maj V. Tegibko, for example, every training class is replete with elements of competitiveness. The command post officer in charge devotes particular attention to organization of competition between officers during air traffic control and between teams when standing alert duty and at exercises, and to study, synthesis and practical adoption of the know-how of the top specialists. The veteran aviation personnel constantly assist the young men in acquiring the requisite knowledge and skills. It is not surprising that the officers of this command post enjoy the respect of fellow unit personnel.

As a command and control agency and primary assistant of the commanding officer, his staff is called upon precisely to organize and rigorously to monitor the course of combat training and support of the training process. Verification and monitoring as one of the forms of supervision of combat training, if it is carried out in a thoughtful manner, skillfully and systematically, and does not boil down to bare bureaucratic administration, recording of errors and deficiencies, becomes a powerful instrument in improving the job skills of aviation specialists and in increasing the combat readiness of subunits and units.

In the present complex international situation, military aviation personnel are assigned a noble and responsible mission -- to be alert, in a constant state of readiness to defend the homeland. It requires continuous improvement of pedagogic and indoctrinational work by commanders and staffs, organizational and psychological adjustment, innovative search, and practical adoption of advanced know-how, scientific and technological advances, and bold experiment.

Modern air combat operations represent not only rivalry between the latest equipment and weapons but also an intense, uncompromising struggle of intellects, flying and tactical skills of combat pilots and tactical control officers -- the pilots' closest assistants. Working in close coordination, they seek to achieve victory in the air and crown the labor of an enormous collective of specialists supporting a combat sortie. And it is very important that staunch, highly-skilled specialists are manning the aircraft cockpit and the control console, persons capable of responding with expertise in the most complex environment, fully carrying out their patriotic and constitutional duty to defend the socialist homeland.

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## INTREPID SOVIET HELICOPTER CREWS IN AFGHANISTAN

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 5, May 85 (signed to press 2 Apr 85) pp 32-33

[Article, published under the heading "From an Afghan Notebook," by Col Yu. Protasov: "Patriots and Internationalists"]

[Text] I heard many words of warmth spoken in Afghanistan about the aviators of the limited contingent of Soviet forces. People would say that there was perhaps not a single city, town or village in the republic where people had not seen helicopters with red stars on the fuselage. Regardless of winter fog or sweltering heat of summer, when a wall of dust rises dozens of meters in the incandescent air, airplanes and helicopters take to the air. They bring in food and medical supplies for the local population, and they carry out the sick and injured. Frequently aviators are called upon to fly to the assistance of Afghan army subunits and the civilian population in the villages. Their job is not easy.

When I arrived on assignment in the DRA, I was given the following advice: visit the helicopter crews. These are genuine heroes, experts at their job. I was time and again witness to pilots' virtuoso performance. I could see that these were expert pilots by the way they adjusted airspeed, altitude and heading as they flew over and between mountains and the way they landed their aircraft onto tiny spots of ground.

Of course I wanted to become more closely acquainted with aviation personnel. I met Military Pilot 1st Class officer Aleksandr Ivanovich Serebryakov. In our conversation he told me that there was not a single aviator undeserving of praise. Here in Afghanistan each and every one of them carries a heavy burden of responsibility. They fly many missions under the most difficult conditions, sometimes landing their craft where there would be no help available if anything happened, where they must rely on themselves alone. For this reason pilots and aircraft maintenance specialists endeavor to act with precision and flawlessly.

I should like to note the high degree of pilot psychological training. It is one thing to land on a normal helicopter pad and another thing altogether to land in the high mountains, on a projecting rock, for example, and in addition expecting to take a machinegun burst from behind some rock or from some

crevice. Strong nerves and considerable strength of will are needed in this situation. I shall state that our crews are distinguished precisely by these qualities.

Take, for example, officers Viktor Aleksandrovich Domnitskiy and Aleksandr Petrovich Yelistratov. They have been in all kinds of ticklish situations! And they have always returned to their home field having successfully accomplished their mission. They also perform expertly at tactical air exercises. They have demonstrated time and again expert marksmanship in hitting small targets. On one occasion officer Yelistratov was escorting a subunit of Soviet troops. Suddenly the troop column and his helicopter began to be peppered by bursts from dushman [bandit] machineguns. His comrades needed his assistance in suppressing this source of fire.

Our aviators also encounter many difficulties in the air. They must, for example, consider updrafts and downdrafts and have the ability to put a craft down onto a dusty site. Flying in operating conditions close to critical takes on particular significance. The air is thin high in the mountains and therefore the slightest mistake can cost dearly. It is essential to construct a maneuver in the air in a tactically knowledgeable manner in order not to come under fire from the bandits, whom their patrons are supplying heavy-caliber machineguns and other modern weaponry.

It is very difficult to maintain one's bearings in the mountains. One mountain looks like the next one, and at the present time there are insufficient ground electronic navigation facilities. It is therefore important to be thoroughly familiar with the area around one's airfield and with flying conditions. A high level of professional skill and solid knowledge of theory are required. Our pilots and navigators are well aware of this. They study hard, improving their knowledge and skills. This is why pilots perform expertly in the sky.

Once a helicopter flown by officer Vladimir Nikolayevich Kurilov, having completed a flight of several dozen kilometers above mountain terrain, was making a landing approach. On board were people who had to be put down on a tiny landing site. Just as they were approaching the ground, they took a burst of machinegun fire from behind a rock. One round hit the helicopter commander.

"Land the helicopter, Andrey, I can't...," Kurilov said to the copilot-navigator, speaking with difficulty.

Lieutenant Kukolev had never taken over as pilot in command in such a situation. But the young officer had prepared himself for every possible unexpected occurrence. This now came in handy. He landed his passengers and returned safely to his home field.

Many Afghan soldiers and civilians are acquainted with veteran pilot officer Aleksandr Yegorovich Korshunov. On numerous occasions he delivered food and medicine to villages. Often his helicopter would appear over the site of a combat engagement between Afghan subunits and bandits. His crew would evacuate wounded. Sometimes the pilot landed his helicopter in what seemed

incredible conditions. And he did a brilliant job of it. He also sometimes would return to his home field with holes in his helicopter pierced by bandit bullets. But the day would always be saved by his excellent flying proficiency, solid psychological conditioning, and flawless operation of the equipment, prepared by skilled aviation engineer service specialists.

When I was visiting the aviators I met many engineers, technicians, and mechanics who, working in incredible heat and cold, flight-ready the helicopters. They also have their difficulties. Major Gennadiy Nikolayevich Fedoseyev told me about them: "Lack of time is perhaps the greatest difficulty. A crew returns from one mission and often is immediately given a new one. Aviation engineer service specialists must quickly inspect the craft, refuel it and load requisite stores. A good knowledge of the equipment, mutual aid and assistance help us meet the tough timetables and surpass performance standards. Landings onto dusty sites affect powerplant operation. Therefore a primary task is to prevent the premature retirement of engines from service. And the maintenance specialists accomplish this task well. We do not send those helicopters with turbine blade wear close to the maximum allowable into highly-dusty landing sites. We also use dust-protection devices. We also devote considerable attention to the helicopter control system and by thorough inspection prevent potential malfunctions.

"We have good equipment, which operates very dependably," stressed Gennadiy Nikolayevich. "And a good deal of the credit for this must go to the aircraft maintenance specialists. I never cease to admire their selflessness, industrious nature, willingness to help out a comrade and, finally their willingness to perform heroic deeds. What can you call it other than a heroic deed when aviation personnel frequently have corrected aircraft malfunctions in a difficult situation, with bullets whistling overhead? One of these people is Sr Lt Viktor Koveshnikov, a party member and electronics technician. This officer wears a Distinguished Combat Service Medal."

As I listened to Gennadiy Nikolayevich, I thought to myself: "The strength of spirit of the Soviet soldier-internationalist is great indeed, and his conviction about the righteousness of the cause he serves is rock-solid."

Flight technical maintenance unit chief Capt Viktor Timofeyevich Kalinichenko has five brothers. Four of them are aviation technicians. Aleksandr served with the limited contingent of Soviet forces in Afghanistan. His valor and military skill earned him the Order of the Red Star. Vladimir is a helicopter flight technician and senior lieutenant. He is also presently serving in the DRA. Pavel is a supersonic fighter technician. His unit is stationed in the northern part of our homeland. Yuriy is enrolled at a military aviation-technical school. Aleksey is a civilian engineer. Great Patriotic War veteran Timofey Ignatyevich Kalinichenko, who also served in the Air Forces, brought them up to be genuine patriots of the homeland and soldier-internationalists.

Political worker officer V. Romenskiy said the following about his fellow soldier: "Party member Viktor Kalinichenko not only services aircraft equipment in a knowledgeable, prompt and timely manner and ably supervises his men. He is also active in community affairs. The comrades elected him deputy

chairman of the subunit party organization. This officer gives a great deal of help to his commanding officer and the political worker in indoctrinating aviation personnel and in conducting party-political work."

Party-political work is conducted with aviation personnel in a practical and effective manner. Exchange of the know-how of the best crews and continuous briefing of personnel on the international situation and the successes of the Soviet people in peacetime building have become a regular part of the routine. Pilots, navigators, engineers, technicians, and junior aviation specialists, thanks to the work done by party and Komsomol activists, constantly feel the breathing of the homeland, the pulse of its life.

Aviation personnel are also active in socialist competition under the slogan "Our selfless military labor in honor of the 40th anniversary of the Great Victory and the 27th CPSU Congress!" They are doing everything in order reliably to defend the achievements of socialism and to carry out their internationalist duty in a worthy fashion.

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## ROUND-TABLE DISCUSSION TO REMINISCE ABOUT WAR YEARS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 5, May 85 (signed to press 2 Apr 85) pp 34-35

[Round-table discussion sponsored by AVIATSIYA I KOSMONAVTIKA, published under the heading "'Round-Table' Get-Together": "Legacy of Courage"]

[Text] On the eve of the 40th anniversary of the Victory of the Soviet people in the Great Patriotic War, the editors of the journal AVIATSIYA I KOSMONAVTIKA held a round-table get-together. The journalists' guests included twice Hero of the Soviet Union Honored Military Pilot USSR Lt Gen Avn Vitaliy Ivanovich Popkov, head of a faculty at the Order of Lenin and Order of the October Revolution Red-Banner Air-Force Engineering Academy imeni Professor N. Ye. Zhukovskiy; Hero of the Soviet Union Maj Gen Avn Aleksandr Ivanovich Polunin, deputy chief of the Air Forces Personnel Directorate; Hero of the Soviet Union Military Pilot-Expert Marksman Maj Gen Avn Vitaliy Yegorovich Pavlov, enrolled at the Order of Lenin and Order of Suvorov General Staff Academy of the USSR Armed Forces imeni K. Ye. Voroshilov, holder of the Homeland's highest decoration in the postwar period; and Maj (Ret) Aleksandr Matveyevich Zhuravlev, former fighter pilot and regimental deputy commander for political affairs, twice recipient of the Order of the Red Banner, Order of the Red Banner of Labor, and the Badge of Honor.

The following is an abridged transcript of the discussion.

(Lt Gen Avn V. Popkov): It is somehow hard to believe that 40 years have passed since the Great Patriotic War came to an end. It seems just yesterday I was taking off in my fighter, engaging the enemy with my fellow pilots.... What was the most important thing for us? What did we dream about? About crushing the fascist viper, ending war forever. And we have been living in a situation of peace for four decades now. We paid dearly for this. The Soviet people lost 20 million human lives in the struggle against the shock forces of world imperialism -- German fascism. We shall never forget these sacrifices.

Of course most memorable to me are the combat operations of our aviators. Years have passed, but I still marvel at the courage and valor of my fellow soldiers and their self-sacrifice in the struggle against the hated foe.

I was 19 years old when the war broke out. I had already graduated from the Chuguyev Military Aviation School for Pilots. I had reported for duty to the 5th Guards Fighter Regiment. There were many genuine experts at air combat in this outfit.

Once pilots Laveykin, Yefremov, Zhurin, Peskov, and Dakhov encountered a large group of fascist aircraft. The enemy enjoyed a sixfold superiority. But our pilots fearlessly rushed to the attack. And the result? They shot down six enemy aircraft, while themselves returning home without losing a single man. I also remember another incident. Zhurin, Romanov, and Onufriyenko, who had taken off on a roving mission, spotted about 15 Junkers on their way to bomb Soviet positions. They were being escorted by Messerschmitts. They totaled 27 Hitlerite aircraft -- a ninefold superiority! This did not stop the Soviet aviators, however. They engaged boldly and resolutely. They shot down three fascist aircraft and drove off the remainder.

We young pilots had enormous respect for our older comrades -- party members Vasiliy Yefremov, Grigoriy Onufriyenko, Anatoliy Sokolov, Aleksandr Kondratyuk and others, learning from them courage, bravery, and faithfulness to duty.

I should like particularly to stress the role of the regimental commander and political worker in unifying a collective and in mobilizing the efforts of each and every pilot, technician, and engine mechanic to repulse the enemy. We loved and deeply respected our commanding officer, Vasiliy Aleksandrovich Zaytsev, and battalion commissar Viktor Petrovich Rulin. These were genuine, sensitive individuals. In spite of the difficulty of the situation, especially in the first period of the war, they showed exceptional attentiveness toward and concern for their men.

That experience has retained its significance. Healthy morale, fighting cohesiveness of a military collective, rigorous observance of instituted procedures, organization, a high degree of discipline and follow-through -- all these traits are taking on particular importance today for maintaining a high degree of vigilance and preparedness to repulse any aggressor with devastating effectiveness. In celebrating this important date, fighting men of the new generation not only offer the tribute of profound respect to those who brought to peoples peace and liberation from fascist tyranny, but also learn from the experience of the past, drawing for themselves definite conclusions for the future.

(Maj Gen Avn A. Polunin): Today, from the vantage point of the 40 years which have passed since the end of the war, one can see particularly clearly the magnificence of the exploit accomplished by the Soviet people. And yet this feat is inseparable from the multifaceted and purposeful activities of the Communist Party. It is precisely the party which unified tens of millions of people, organized them to repulse the enemy, and guided their energy, will and actions to achieve his crushing defeat.

What ensured our victory? First and foremost it was the indomitable moral-political and spiritual resources of the Soviet society, the fraternal friendship of peoples rising in defense of the socialist homeland, and the solid unity of Soviet citizens behind the Leninist Party. It is most appropriate to recall here the prophetic words of Vladimir Ilich Lenin to the effect that a people in which the majority of workers and peasants have learned, felt, and seen that they are defending their own, Soviet rule -- rule by the toilers -- will never be defeated.

I recall the war years at the front. After combat the commanding officer of our 118th Guards Ground-Attack Aviation Regiment, Lt Col Vladimir Nikolayevich Vereshchinskiy, would gather the pilots in a dugout shelter, would conduct a short after-action debriefing and critique, and then would unobtrusively begin talking about life. The majority of us were 19 or 20 years old at the time, and he was about 35. A mature individual, an expert at ground-attack strikes. We listened to him with interest. The commanding officer would relate to us how people lived under the tsars, how life had changed under Soviet rule, and what monstrous crimes fascism was inflicting on our people. The regimental commissar would enter the discussion. Pilots would share their impressions from the air engagements they had fought and would relate what the people from home were writing them. This really unified the outfit!

Regimental commissar Timofeyev knew the men and their moods well. He once asked me: "Aleksandr, how are things at home?" "Okay, tolerable," I replied. "What do you mean tolerable? I have heard that your younger brother and sister are without parental assistance. We shall give you several days leave. Make out the papers." I did not have far to travel. You can imagine how grateful I was to the commissar for his paternal concern.

The pilots would fly three or four and sometimes more combat missions a day. Often you would be flying a strike, and the enemy would be directing aimed fire at you from the ground. You couldn't flinch or waver. An enormous exertion of moral and physical energies was demanded of each and every one of us. Unbending courage and a high degree of flying expertise were demonstrated by my fellow soldiers Captain Poyushchev, who subsequently was named Hero of the Soviet Union, pilots Andreyuk, Kosmachev, Kostin, Kholkin, Odnobokov, and many others.

Engineers, technicians, and junior aviation specialists forged out victory together with the pilots. Day and night, in rain and bitter, freezing cold, they worked on readying ground-attack aircraft for combat sorties. And frequently they had to repair battle damage and patch aircraft skin. But they were able to complete the job on schedule. And after the IIs took off on a mission, they would wait anxiously for our return. A loudspeaker with an amplifier was installed at the regimental command post. As the pilots would be attacking the enemy, the engineers and technicians at the airfield, listening to the loudspeaker, would follow battle progress.

I recently had occasion to look through my service record. In the statement of nomination for the title Hero of the Soviet Union, my attention was drawn by the following sentence: "The pilots like to fly on combat missions with the squadron commander." They like to fly! How wonderful it is when pilots have

faith in their commander and follow him into combat! Strengthening of one-man command and instilling of love and respect for the commanding officer take on exceptional importance today, when aviators are handling immeasurably more powerful combat hardware.

(Maj (Ret) A. Zhuravlev): To add to everything that has been said about our Victory and our fine combat traditions, I should like to mention an incident which I believe fairly fully characterizes the unbending courage of the Soviet citizen.

It happened in 1943. Junior Lieutenant Davydov took off on a combat mission as half of a two-aircraft element, assigned to escort a group of Il-2s which were on their way to deliver a ground-attack airstrike on the Blue Line on the Kuban. Battle was joined. Aleksandr Davydov shot down one Messerschmitt, but soon his aircraft was also crippled. The flight leader was heavily engaged and was unable to help him. When the battle ended he decided to check and see what had happened to Davydov's aircraft. The fighter, which had gone down into a reed marsh, was a burning hulk, and the pilot was nowhere to be seen. He must have perished.

A month later we learned that Sasha was alive! It seems he had landed his aircraft in an area of no-man's-land. Our infantrymen had succeeded in dragging him out of the burning aircraft. He was in the hospital for 14 months and had 18 operations. He survived, but his arms were terribly crippled. How could he go on? His wife was a great support. After he had restored his strength somewhat, he took a job at a garment factory. He made a dedicated effort to get back the use of his hands. He taught himself to pick up needles and machine parts. In time he became a master craftsman.

A son was born to the Davydovs. His father's entire life, his staunchness and courage were an example for the son. Vladimir decided to become a military pilot. And he accomplished his goal! He is presently serving with the Group of Soviet forces in Germany. The command authorities have good things to say about him. As I think about Aleksandr Davydov and his son, I can say one thing: this is what the Soviet citizen is! He will overcome all obstacles, endure all hardships, but he will not bend or surrender to the tender mercies of fate.

(Maj Gen Avn V. Pavlov): Every time I get together with veterans of the Great Patriotic War, I am moved beyond words. Combat veterans seem to me to be special, unusual people. In the flames of war they experienced a harsh ordeal, shed blood for our homeland and for our happiness. It is scarcely likely that there is a single person who would not feel the greatest respect for them, who would not admire them for their exploits.

I was born a year and a half before the Great Patriotic War ended. And I know about the war chiefly from the stories of my father, a former machinegun squad commander, as well as from books, movies and TV films. Others of my age are in approximately the same position. But I can state quite definitely that the interests of the homeland are just as precious and sacred for us, members of the postwar generation, as they are for our predecessors, the fighting men of the last war.

After becoming an officer I served for more than 10 years at the Syzran Military Aviation School for Pilots. I worked my way up from instructor pilot to squadron commander. I subsequently held command slots in various districts. And I know our younger generation fairly well. I shall state frankly that we have outstanding young people. Bold, courageous, intrepid, totally dedicated to their sacred military duty. They are not only carefully preserving our fine fighting traditions but are working tirelessly to add to them by their own selfless military labor.

I shall cite as an example Lieutenant Colonel Smirnov, who came to us as a subunit navigator. Vladimir Sergeyeovich had flown transport aircraft prior to this time. This officer displayed exceptional diligence and industry. Within a short time he had mastered what was a new job for him and had successfully passed all tests. He also made a weighty contribution toward increasing the subunit's combat readiness. Vladimir Sergeyeovich was awarded several decorations, including the Order of the Red Star.

I also frequently recall my service with other comrades in arms -- Military Pilot 1st Class Lt Col Oleg Bukatov, who was awarded the Order of the Red Star for courage and military valor (he is currently an aviation regiment deputy commander); a former student of mine, a graduate of the Syzran School, pilot and expert marksman Maj Nikolay Polyanskiy, who has been awarded the Order of the Red Star, and who is presently also a regimental deputy commander. By personal example they inspire their men to selfless performance of military duty. I am also moved and filled with pride when I think about the military deeds of helicopter squadron commander Maj Yuriy Grudinkin and his deputy commander for political affairs, Maj Aleksandr Sadokhin, who were awarded the Order of Lenin and the Order of the Red Star for daring and valor displayed in performance of their military duty. In the most complex situations they performed boldly and resolutely, scorning danger. These individuals have taken in, as it were, the finest qualities characteristic of the Soviet fighting man -- a patriot and internationalist.

The new generation of Soviet aviators is faithfully preserving the traditions handed down to us and is working persistently to continue on with the cause for which the combat veterans fought. We pay homage to you for the fact that today we can study, work, love, and raise children under peaceful skies. And if hard times come, it will be our turn to stand up for the homeland, to show what the Soviet fighting man is capable of accomplishing.

The editors' guests touched upon many interesting and emotion-stirring points in the round-table discussion. Every statement was permeated by the thought that our combat aviators, just as the fighting men of the other combat arms, were led from victory to victory by an indomitable feeling of Soviet patriotism and proletarian internationalism, filial faithfulness to the homeland, to the Communist Party, to their people, an unbending courage and staunchness in struggle with the hated foe. The

courage of the war veterans was taken up like a relay baton by their successors -- aviators of the postwar generation -- and they are continuing to carry it with honor.

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### 30TH ANNIVERSARY OF WARSAW PACT NOTED

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[Article, published under the heading "30th Anniversary of Warsaw Pact": "Reliable Shield of Peace and Socialism"]

[Text] "The first commandment of the party and state is to safeguard and make every effort to strengthen the fraternal friendship with our closest companions in arms and allies -- the nations of the great socialist community."

From the proceedings of the special  
March (1985) CPSU Central Committee  
Plenum

It took place at a field exercise. The "aggressor," taking advantage of fog, had put an amphibious assault force ashore. The naval infantrymen, supported by tanks and armored personnel carriers, engaged without a pause and seized nearby high ground. Their further advance was halted, however, by artillery fire and heavy airstrikes by missile-armed aircraft. The opposing force's aircraft did an excellent job of performing their assigned mission, hitting their targets with accuracy. The "aggressor" was given a pasting and driven back.

Units and subunits of the armies of the Warsaw Pact member nations took part in this exercise, which ran several days. This May is the 30th anniversary of the establishment of this pact. Operating shoulder to shoulder and wing to wing at the "Soyuz" [Alliance], "Bratstvo po oruzhiyu" [Brotherhood in Arms], "Druzhiba" [Friendship], "Shchit" [Shield] and other combined exercises, the fighting men of the allied armies on each occasion have demonstrated and continue to demonstrate class solidarity and a high degree of combat readiness and proficiency.

Establishment of the Warsaw Pact Organization was a forced measure taken by the European socialist nations in response to the aggressive aspirations of imperialism.

After World War II our party unswervingly followed a Leninist strategy of peace, viewing peaceful coexistence with other countries as a most important condition for the further development of all mankind and the successful building of socialism and communism. The CPSU and the toilers of the USSR, the Communist and worker parties and peoples of the brother countries waged an active campaign to strengthen peace.

But the most reactionary imperialist circles had begun planning aggression against the USSR. The United States, for example, had drawn up a plan of attack against the Soviet Union with the objective of achieving its crushing military defeat. This plan, code-named "Trojan," called for U.S. strategic air forces to deliver nuclear strikes on our country's most important political-administrative, economic, and military targets.

The imperialists' schemes were not destined to be executed. This aggressive plan, however, was succeeded by another one -- "Dropshot." According to this plan, at the first phase of the war 300 atomic bombs and more than 20,000 tons of conventional bombs were to be dropped on the Soviet Union. Forces of the United States and its allies in the NATO bloc, organized in 1949, were to be used to seize Soviet territory. Later other aggressive blocs -- SEATO and CENTO -- were also created under direct U.S. supervision.

Imperialism was openly counting on aggression against the USSR, with the goal of "driving back communism." In practice this meant acts of provocation against the socialist countries, constant political and military pressure on the young people's democracies, discriminatory measures in trade, and psychological warfare.

Accelerated revival of militarism in the FRG was taking place with the all-out assistance of the United States, Great Britain, and France. With the inclusion of West Germany in the NATO bloc, its aggressiveness increased appreciably.

It was necessary to counter the hostile onslaught of the class enemy with the unified strength of the socialist nations, capable of protecting their freedom and independence and defending peace on earth. Thus practical experience and harsh realities have convincingly confirmed the validity of V. I. Lenin's statement that peoples which have taken the path of socialist development "mandatorily need a close military and economic alliance, for otherwise the capitalists... will crush and strangle us one by one." Vladimir Ilich considered collective defense of socialist achievements to be the highest internationalist duty of the international proletariat.

Proceeding from the prevailing international situation, on 14 May 1955 a number of European socialist countries signed in Warsaw a treaty of friendship, cooperation and mutual assistance.

The Warsaw Pact radically differs in its class nature, aims and methods of activity from all past and presently existing coalitions. It is an alliance of sovereign and equal socialist states, resting on a solid sociopolitical, economic, ideological, and military-political foundation. It is a defensive alliance in its content and its goals. Having established and consolidating

the collective defense of socialism, the Warsaw Pact member nations are endeavoring only to ensure firm defense of their independence and to protect the peaceful labor of their peoples.

The entire history of the Warsaw Pact organization has been a purposeful and persistent struggle for peace and detente, disarmament, and prevention of another world war. And the greatest achievement of the fraternal alliance over the last three decades is the fact that, as a result of coordinated actions by socialist nations as well as the might of their armies, they have succeeded in holding the military threat in check.

The Soviet Union, together with the other nations of the socialist community, consistently comes forward with specific peace initiatives. An important place among these initiatives is occupied, for example, by a proposal to enter into a treaty with the NATO countries on a mutual repudiation of military force and maintaining relations of peace, a pledge by the USSR not to be the first to employ nuclear weapons, plus many other initiatives. Our friends and allies and the entire progressive world community welcome the endeavor by the Soviet Union to reach an agreement with the United States on settling an entire group of issues pertaining to nuclear and space arms.

A myth about a "Soviet military threat" is being aggressively disseminated in the West, however, under the banner of a "crusade" against communism. In the meantime, hiding behind lying anti-Soviet fabrications, the Pentagon is requesting for Fiscal Year 1986 more than 320 billion dollars, which it plans to use for financing new military programs.

The peace initiatives presented by the Soviet Union are by no means an indication of our weakness and are not "propaganda tricks," as bourgeois ideologists in the West attempt to claim. Our campaign for peace organically proceeds from the nature of the socialist society and system of government. The Communist Party and Soviet people at the same time remember Lenin's statement on the need for the highest degree of vigilance against the aggressive intrigues of imperialism and Lenin's demand that we accompany our steps toward peace with intensification of all our military preparedness. Precisely for this reason the proceedings and decisions of the 26th CPSU Congress and subsequent CPSU Central Committee plenums stress that the combat might of the Soviet Armed Forces should be maintained at a high level, guaranteeing immediate resolute countermeasures to any aggressor.

Thanks to constant concern by the Communist and worker parties, the Joint Armed Forces of the Warsaw Pact member nations are presently furnished with modern equipment and weapons. They constitute a reliable defensive shield. Military aviation is a powerful component part, a striking force of the brother armies. Supersonic high-altitude and all-weather fighters and fighter-bombers, reconnaissance aircraft, combat and transport helicopters comprise the foundation of military aviation.

The invincible power of the armies of the Warsaw Pact member nations is determined not only by potent modern combat equipment and arms. It is grounded first and foremost on the excellent moral-fighting qualities of class brothers, brothers in arms, indoctrinated in a spirit of faithfulness to the

ideas of Marxism-Leninism, socialist patriotism and internationalism, and constant readiness to defend the security of the socialist community and world peace.

The combat and political training schedules for aviation personnel of the allied armies include a number of joint measures. Such work assumes particular significance in the units and subunits deployed on the front lines of defense of socialism. In the course of combined exercises, drills, exchange of know-how, and mastery of complex aircraft systems and their combat employment, air warriors gain an understanding of the laws of friendship and mutual assistance and are learning to make common cause in battle. Such measures are a genuine school of air, weapon and tactical proficiency, and internationalist indoctrination of aviation personnel of the brother armies.

The 30th anniversary of establishment of the Warsaw Pact coincides with another historic date -- the 40th anniversary of the Victory of the Soviet people in the Great Patriotic War. This event is also important for the brother countries of Europe, which the Soviet Union helped in becoming liberated from fascist slavery. Today the socialist world has become an enormous arena of multifaceted friendly interaction between our nations. The process of drawing together by the peoples of the socialist community is advancing steadily. The Joint Armed Forces of the Warsaw Pact member nations are vigilantly guarding their security.

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## TRAINING COMMUNICATIONS PERSONNEL IN EQUIPMENT INSPECTION, MAINTENANCE

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 5, May 85 (signed to press 2 Apr 85) pp 40-41

[Article, published under the heading "The Army's Strength Lies in Discipline," by Lt Col P. Shkel, deputy commander for political affairs, master rating in communications: "The Higher the Degree of Organization"]

[Text] For 15 years now our combat collective has maintained the lofty, honorable rating of excellent. This year, the year of the 40th anniversary of the Great Victory and a year of preparations for the next party congress, the majority of our crews and subunits have in the winter training period achieved good results in training and maintaining stable communications. They also perform high-quality equipment servicing and maintenance. Many communications operators have become high proficiency-rating specialists and perform all tasks with confidence in a difficult tactical and weather environment.

For example, the subordinates of officers A. Osadchuk, A. Gordeyev, Yu. Kruglyy and others are distinguished by smooth coordination and precision in their combat work as well as by a high degree of discipline. This is due first and foremost to the excellent professional competence of the commanders, their ability to organize the work of their subordinates, personal discipline, constant demandingness as prescribed by regulations and, of course, efficiency on the part of the men themselves, who intelligently utilize instruction time at training classes and drills and in the course of servicing and maintenance procedures.

We endeavor efficiently to employ well-known forms of indoctrination of personnel in a spirit of love for military equipment, the most rigorous efficiency in servicing, operating and maintaining it, and we persistently seek new innovations. We have solidly adopted the practice of discussing the state of work-procedures discipline and follow-through at technical conferences and critique sessions, at special seminars and meetings held with various categories of military personnel. At these get-togethers we thoroughly synthesize the experience and know-how of vanguard commanders, political workers and activists who have achieved a high degree of discipline on the part of specialist personnel in working on communications equipment, in servicing and maintenance of specialized trucks and other military equipment. An objective analysis of the state of affairs and the ability promptly to take

effective measures, such as to improve the quality of routine servicing and maintenance procedures, and to strengthen job-process discipline have become a firm rule for our officers and warrant officers.

Success did not come immediately or suddenly, however. I recall that there was a time when the command authorities and party organizations began to be concerned by the poor follow-through on the part of certain specialist personnel in performing routine inspection and maintenance operations. Commanders, political workers, secretaries of subunit party organizations and other officers were summoned to an enlarged meeting of the party buro of the headquarters party organization, with the following agenda: "On exemplariness by Communists in observance of the requirements of regulations and guideline documents pertaining to servicing communications equipment and preventing breaches of work-process and military discipline." A detailed, useful discussion was held. Discussing the issue which had been raised, party members revealed a number of errors in work to strengthen discipline in the platoons and crews and suggested ways to correct and prevent them. At the same time subunit commanders, political workers, and activists shared work experience and know-how in promptly nipping in the bud departures from the requirements of documents governing high quality of work-process operations.

The audience listened with interest to Maj A. Borisov, who stressed the importance of a high degree of technical knowledgeability and observance by communications personnel of the requirements of regulations. He cited instances of a less than conscientious attitude on the part of some soldiers toward equipment assigned to them as well as other military equipment, and he made some sensible suggestions directed toward strengthening discipline in tuning and adjustment operations.

Professional competence on the part of officer personnel is inconceivable without strong technical training. It is important that officers possess firm knowledge of the prescribed issue equipment and weapons and possess the ability to service and utilize them knowledgeably both in permanent-site and field conditions. Technical maturity alongside high efficiency is an important factor in maintaining equipment and specialized vehicles in a continuous state of combat readiness.

The experience of Maj V. Nezhentsev, Lt A. Zger and others of our officers indicates that their successes are grounded on proper demandingness on themselves and their subordinates and the ability to handle administrative and housekeeping matters in a precise manner. This is especially important on routine inspection and maintenance days. An objective and frank assessment of the labor of each serviceman, intelligent application of disciplinary measures on the basis of points of regulations and the principles of military education science, reliance on the party and Komsomol body of activists, and extensive utilization of advanced know-how -- these are the most important key elements which determine the effectiveness of the job done by commanders in accomplishing instructional plan-schedules and performing preventive maintenance on equipment and specialized vehicles.

In order to maintain discipline at the proper level in a crew or subunit, commanders and senior personnel, as we know, are invested with considerable authority. The skilled, prompt and timely utilization of these authorities determines to a considerable degree the effectiveness of training and indoctrination of personnel. Correct handling of practical discipline characterizes commander maturity in large measure.

The overwhelming majority of our lower-echelon commanders skillfully instruct and indoctrinate communications personnel and have the ability to find the correct way to reach the heart of each individual. These include Sgt S. Gerasimchuk and V. Litsukov, Jr Sgts A. Vorobyev and A. Prokurin, and other personnel in charge of radio units.

The unit's Communists and Komsomol members have now become stricter in approaching matters pertaining to observing the requirements of the oath and regulations, and the provisions of documents governing high-quality servicing, efficient operation and maintenance of communications equipment and to observing the daily routine. Party and Komsomol activists are conducting purposeful mass-agitation work. Recently talks on the following topics have been held in the subunits: "Scientific and technological advances in the Signal Troops and work-process discipline"; "Efficiency on the part of communications specialists"; "Proper relationships -- an essential condition of friendship and mutual assistance by specialist personnel," plus others. Party member officers N. Minakov, V. Ulyanov, P. Klebanyuk, N. Serbin, and others took active part in holding the talks.

Practical experience indicates that wherever a commanding officer skillfully relies on his activists and constantly utilizes the force of influence of party and Komsomol organizations, military discipline is stronger and fighting efficiency and combat readiness are greater. It is not surprising that for a long time now there have been no breaches of military and work-process discipline in the subunits headed by officers A. Sokolov and Yu. Kruglyy, and organizational and ideological indoctrination work is being conducted well.

Maintaining proper observance of regulations and organization requires constant efforts on a commander's part. But here is a paradox. You observe the job-related activities of a given officer and see that he cares a great deal about his job, but he is not having success. Why is this happening? First of all because he is trying, as they say, to embrace the unencompassable -- he wants to do everything himself. Of course most frequently this happens with young, inexperienced officers. But unfortunately it also happens to some commanders with a considerable length of service.

I once called a certain officer, and the company duty man informed me: "He is not here. He went out to get instruments for performing inspection and maintenance procedures."

This surprised me. Didn't the officer have more important things to do? On another occasion, on a scheduled inspection and maintenance day, I found him checking off a subunit equipment inventory list. But his sergeant major should have been doing this.

"There have been a lot of errors of omission," he explained. "I am trying to make a thorough check."

I had to remind the officer of those points of regulations which state that a commander shall combine an uncompromising attitude toward shortcomings with confidence in his men, that he should be first and foremost an organizer and leader. And not only because otherwise he will inevitably find himself engulfed by routine matters. The problem is that the attempt to do everything for oneself inevitably engenders a lack of responsibility, a lack of initiative and, ultimately, a lack of efficiency on the part of one's subordinates.

Let us say, for example, that today a platoon commander is doing his platoon sergeant's job, based on the argument that it is faster to do it himself than to issue an order and subsequently check to see how that order was carried out. As a result the sergeant is left out of things and loses his initiative and independence. Ultimately he displays passivity both in organizing training classes for the men and in performing routine inspection and maintenance on the equipment.

In our unit Sr Lt A. Sokolov has repeatedly been cited as an example. The platoon he commands produces consistently high results in training, equipment operation and maintenance. What helps produce this result? The officer holds his men strictly to account, and he places trust in them. Characteristically, this trust is manifested precisely in demandingness. He is saying to a subordinate, as it were: "I have faith in your ability and therefore am assigning you such a difficult job for these routine inspection and maintenance procedures." And the individual in question endeavors to live up to this trust, displaying initiative and efficiency.

As we know, particular demands in regard to mastering complex communications equipment are placed on personnel in charge of radio units. For this reason company commanders organize their technical and specialized training in such a manner that they thoroughly master not only their own but also a related occupational specialty as well as the test equipment. An important role in this is played by brief courses of training in instruction methods, technical training drills, brief tactical drills, demonstration and combined instruction classes. Majors V. Matsay, S. Butov and others who conduct such training activities are waging a resolute campaign against unnecessary relaxation of demands and unnecessary situation simplification in the training process and seek to develop in warrant officers and noncommissioned officers an innovative attitude toward methodology.

We use technical conferences, special evening activities, quizzes, presentations by master-rated individuals in combat occupational specialties, and reviews of military-technical literature to expand the military-technical knowledgeability of communications personnel. The topic "Specific Features of Operation and Maintenance of Radio Units in Adverse Meteorological Conditions" was discussed at a recently-held technical conference, for example. Later an NCO competition was held. The commanding officer also organizes similar contests on knowledge of the design and construction of communications equipment and test instruments.

By decision of the unit commanding officer, interviews are held with personnel in charge of radio crews, at which their knowledge of their military occupational specialty is determined. They are also given briefings on radio operation and maintenance service and methods of conducting specialized training classes for their men. A training class on the topic "Combat capabilities of modern radio units" was conducted in a substantial and interesting manner, for example. Participating personnel heard presentations by the unit's experienced specialists. Maj V. Afanasyev, commander of an excellent-rated subunit, shared his experience in the conduct of training drills with radiotelegraph operators and other personnel in a complex jamming environment. All this helped increase the professional competency of training-class instructor warrant officers and NCOs.

Combining training subjects in instructional classes is one way to achieve efficiency of personnel combat training and increase the combat readiness of the subunits. This is why serious importance is attached to this matter in the unit. Training drills, brief tactical drills, and handling of various scenario instructions are always conducted against a complex tactical environment, in a rapidly-changing situation.

The command authorities are working with a will to adopt into the practical training of personnel not only all positive achievements in their subunit but are also adopting their neighbors' advanced know-how. Category-rated specialists from other subunits have repeatedly spoken to the men. Considerable attention is devoted to engagement in competition for successful accomplishment of assigned tasks and surpassing performance standards. The competition was initiated by commanders of excellent-rated crews master-rated communications specialists WOs V. Kirilov and G. Zhelobovskiy. They persistently sought and found ways to improve on established performance standards. The men will long remember question-and-answer evenings on the topics: "Do you know your performance standards?", "How do you observe safety measures when working on equipment?", and "What do you need to know in order to pass the examinations for the top proficiency ratings?" Competitions for the title of best radio operator, switchboard operator, telegrapher, and driver were conducted in an instructive manner. The campaign for an excellent result from each and every day of instruction has spread considerably. The following slogans have become a practical guide to action: "If you have given your word, keep it, if you have made a pledge, carry it out," "Today an excellent-rated individual, tomorrow an excellent-rated crew and squad," "Expend combat equipment resources economically," plus others.

The overwhelming majority of our servicemen have a conscientious attitude toward their job-related duties. Then why is it that we have concentrated attention on shortcomings? Because they should not be repeated in the future. The logic of development of military affairs is such that demands are steadily growing on commanders and other persons in authority -- executors of party

policy and organizers of training and indoctrination of military personnel in a strong spirit of efficiency, discipline, and constant readiness to defend the socialist homeland.

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## TERRAIN COLLISION HAZARDS AND MINIMUM SAFE ALTITUDE

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[Article, published under the heading "Flying Without Accidents," by Honored Military Navigator USSR Candidate of Military Sciences Col V. Dudin: "Safe Altitude"]

[Text] This parameter is one of the most important in the practical flying activities of all air components. Considerable time and attention is devoted to gaining a firm grasp of and working on this parameter in aviation units during training and preparation of crews for flying training sorties. Nevertheless disturbing errors still occur in determining and maintaining a safe altitude.

Analysis of such incidents indicates that airplanes (helicopters) become dangerously close to obstacles practically instantaneously, leaving the pilot no time for maneuver or avoidance, or to execute emergency procedures. In connection with this, it is essential that flying personnel possess firm knowledge not only of the rules and procedures for determining, maintaining, and monitoring a safe altitude but also the circumstances under which one can end up below minimum safe altitude.

As we know, a high degree of aircrew proficiency, increased capabilities of flight and navigation systems, and preventive efforts by command personnel are steadily reducing the number of near-mishap situations connected with failing to maintain a safe altitude. The majority of aviation units operate for long periods of time without any violations of the requirements of guideline documents. Sometimes, however, this fact evokes in certain pilots a feeling of complacency. Why, they reason, should I waste time on analyzing past errors and their causes? But experience indicates that it is precisely in such an instance that failure to maintain a safe altitude is most probable. It also frequently happens that a near-mishap situation is almost identical to one which occurred previously in another subunit.

The majority of such violations involve not mechanical failures but mistakes and incorrect actions by aircrews as well as air traffic control personnel. Mistakes include incorrect determination or faulty calculation of minimum safe indicated altitude, or failure adequately to consider the topography and

obstacles, and sometimes deliberate departure from prescribed parameters during a specific phase of a flight. Consequently, such incidents can certainly be prevented if flight rules, regulations and procedures are conscientiously observed.

Unfortunately some pilots at times forget that minimum safe altitude is an important restriction for an aircraft. In contrast to other restrictions, however, which have a specific assigned value, minimum safe altitude varies, since it depends on the terrain over which an aircraft is flying. There is a minimum safe altitude on each route segment, and this figure must be strictly observed. Failure to follow this rule is fraught with serious consequences.

A New Zealand passenger aircraft was on a special excursion flight over the coast of Antarctica in November 1979. The captain, departing from his flight plan, decided to fly across the saddle between the volcano Mt. Erebus and Mt. Terra Nova, descending to a lower altitude. As a result the aircraft struck the ground, killing the 257 persons on board.

Young pilots, when mastering the skills of low-level flying along practice routes, with which they are usually familiar, at first do not experience any particularly difficulties. Contributing factors include a well thought-out choice of low-level route segments, rigorous consideration of actual weather, and adequate support of such practice flights with nav aids and flight monitoring. For this reason they sometimes form the illusion that it is a simple matter to fly low-level sorties. They experience difficulties later, when they begin flying on their own above variable-profile terrain, shooting landing approaches into little-familiar airfields on mountainous terrain, and practicing combat flying involving vertical maneuvers and low-level intercepts. In view of this fact, the commanding officer should explain to his men what deviations may arise when working on mastering various types of flying.

For example, during descent over mountain terrain, especially in IFR conditions and at night, failure to maintain minimum safe altitude frequently involves aircrew errors in determining the aircraft's exact position. The pilot begins his descent, assuming that he has reached the designated point and is on the prescribed course line. But if the aircraft has wandered laterally toward rising ground or if he has not actually reached the point to begin descent, the calculated minimum safe altitude is no longer valid. This happened to the crew of a transport aircraft which was making a night flight to a mountain airfield. The aircraft commander, officer A. Tikhov, incorrectly determining his aircraft's position and believing that he was maintaining a safe altitude, descended to what he thought was safe terrain clearance altitude several dozen kilometers out from the outer marker. The aircraft struck a ridgetop, and it was only pure luck that it was just a glancing blow. The pilot succeeded in landing the damaged aircraft.

Here is another incident. A crew under the command of officer V. Kudryashov was flying a training sortie, radar-searching for "aggressor" warships. The aircraft was flying above the sea, in solid cloud cover. After several hours of search the reconnaissance aircraft had wandered quite a distance beyond the boundaries of its assigned search area, in the vicinity of an island the

mountain peaks of which were much higher than the calculated minimum safe altitude.

Analysis of such incidents indicates that sometimes an aircrew fails to maintain a safe altitude due to the cumulative effect of several errors -- in reading the altimeter, putting in an incorrect destination field altimeter setting, and extending the standard landing approach configuration toward obstacles. The situation becomes aggravated if the crew members have received insufficient navigation training and if they are sluggish in carrying out commands. At a mountain airfield terrain clearance height, when flying a holding pattern, for example, can be safe only if one precisely maintains the holding pattern. Drifting off track as a rule brings the aircraft closer to dangerously high terrain. And what if the air traffic controller who has given clearance to descend has made a mistake?

When flying an approach in IFR conditions or at weather minimums, aircrews pay particular attention to the altitude at which to execute a missed approach upon descending to the specified minimum altitude without establishing visual contact with the ground. Some pilots have found themselves in a difficult situation precisely from descending below decision height. It also sometimes happens that a weather reconnaissance (final reconnaissance) aircrew displays a lack of discipline, deciding to "probe" cloud bases. Such recklessness can cost dearly.

Some pilots insufficiently utilize the technical devices which help maintain a predetermined altitude on an attack course or approach run. They forget that regular use of such devices develops stable skills in determining this parameter and helps avert hazardous situations when working on the range. Aircrews working in coordination with other component services and being vectored to low-level air targets should devote particular attention to maintaining a safe altitude, because such missions are flown as a rule along rather unfamiliar routes.

It is also essential to bear in mind that pilots do not independently choose a flight altitude but respond to commands issued by appropriate command posts, observation posts, tactical control officers, and exercise directors. The level of training of these persons in authority cannot always be matched to that of the pilots (for example, when redeploying aircrews to other airfields). An endeavor by ground control and guidance specialists to vector an aircraft (helicopter) to the target at all costs and to ensure a target kill in conditions of deteriorating weather, mountain terrain and other complicating factors sometimes leads to departure from certain requirements pertaining to observing flight operations safety, including maintaining a safe altitude. Therefore minimum safe altitude should be calculated particularly painstakingly when making preparations for such activities.

It is absolutely essential to consider the following factors when planning, preparing for and executing flight operations at extremely low level, below minimum en route altitude, as well as variable-profile missions, where a minimum safe altitude is particularly important in order to ensure a safe flight.

It is very important to select in the field low-level route segments. There have been instances where they were first laid out on the chart, clearance notifications made, and only after this determining what high terrain lies along the route and what electronic facilities are capable of maintaining continuous surveillance of the aircraft during flight. Experience indicates that first one must study the route and obstacles, and only after that designate waypoints and route segments. One should take into consideration the most reasonable variations of specific route segments, especially descent segments. It is best to locate them running from land to sea, from higher to lower terrain elevations, from IFR to VFR weather.

After determining the route, one must determine specific minimum safe altitudes along the route segments -- first true altitudes, then indicated altitudes. Computations shall be made according to the corresponding forms in "Basic Flight Regulations" by at least two specialists, independently of one another. Then the figures shall be compared and communicated to all flying personnel. Minimum safe altitudes for target runs on ranges and vectoring routes shall be determined separately. Tactical control officers and range flight operations officers should have precise knowledge of them.

When preparing for training sorties, pilots and navigators should thoroughly study topography and obstacles along the route of flight and also work out the procedure of utilization of devices warning that a preselected altitude has been reached.

Inspections indicate that in some units and subunits work connected with developing skills and habits of determining minimum safe altitude boils down to solving sample problems with formulas. But this is only one aspect of things. In the air a pilot as a rule maintains altitudes and flight levels which were not computed by him but assigned to him on the ground. Therefore in addition to the ability to use formulas it is essential to master an aggregate of skills which make it possible to estimate the relationship between safe altitude and change in route, weather and other factors of a flight. This will help eliminate instances of dangerous near misses between aircraft, helicopters, ground obstacles and the terrain.

Successful mastery of extremely low-level flight and reliable securement of flight safety with this type of training will be a substantial contribution to the cause of further increasing Air Forces combat readiness.

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## TETHERED SATELLITE-PROBE SYSTEM FOR ATMOSPHERIC INVESTIGATIONS

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[Article, published under the heading "Problems of Astronautics," by Doctor of Technical Sciences V. Ivanov: "Probing the Atmosphere"]

[Text] The orbital parameters of a satellite change with the passage of time under the influence of perturbation factors. One of the causes of fluctuations in the density of the atmosphere, for example, is solar activity. These are primarily diurnal changes connected with the succession of day and night, fluctuations with a period of approximately 27 days, equal to the period of the Sun's rotation on its axis in respect to the Earth, as well as seasonal fluctuations: the density of the atmosphere tends to reach a minimum in July and a maximum in October. The atmosphere in addition reacts to fluctuations in solar activity during the course of the 11-year cycle of relative change in the number of sunspots. There exist long-period and short-period variations in the density of the atmosphere. Finally, it is also dependent on geographic latitude. All this influences not only change in satellite orbital parameters but also a satellite's life in orbit. Investigations of the Earth's atmosphere are needed for a quantitative evaluation of these phenomena.

Study of the processes taking place in near-Earth space, and particularly in the upper layers of the atmosphere, at altitudes of 100-150 kilometers, is of great scientific and economic significance. Here the lower neutral atmosphere is in contact with the plasma of space. The effect of this interaction has not yet been fully studied. In addition, at these altitudes molecular diffusion causes turbulence and winds, while solar electromagnetic radiation and high-energy particles become the principal sources of energy. This region comprises an important part of atmospheric global electrical circulation.

We shall note that there are problems here. Probing with the aid of meteorological rockets is space-limited and of brief duration (several minutes). A satellite substantially increases capabilities to accomplish this task. But a satellite's life is not more than several hours at an altitude of 100-150 kilometers. But what if an orbital tether system were to be developed? Duration of sensing in this range of altitudes will increase by a factor of hundreds.

Let us examine a possible version of a tether system for probing the upper layers of atmosphere, consisting of two vehicles tied together. Imagine that a satellite is traveling in a circular orbit at an altitude of 200 km, with a probe traveling below it (at an altitude of 100 km). If all elements in the system have circular orbits, these conditions of motion are called steady-state equilibrium. If the system travels at substantial altitudes, where the effect of aerodynamic forces is virtually nil, during steady-state motion the satellite and probe are positioned at all times on a single vertical.

Deployment of an orbital tether system can be accomplished both by reaction force and by gravitational and inertial forces. The first method requires certain energy expenditures, while the second method avoids them. Therefore we shall examine deployment of a tethered system where the pulling force of a cable is utilized. The force is generated as a consequence of difference in the gravitational and inertial forces acting on the satellite and the probe.

The process of deployment is subdivided into three phases: initial, main, and final. The probe is separated from the satellite in the initial phase. In the main phase the probe is lowered to the required altitude within a certain angular sector. The rate of unreeling of the tether cable (for example, proportionally to its current length) or its pulling force is controlled. Angular oscillations of the tether system and radial velocity are extinguished in the final phase. Deployment of a tether system to a length of up to 100 km can take several hours.

The effect of aerodynamic forces is considerable at altitudes less than 150 km. Drag deflects the probe from the local vertical in a direction opposite to the orbital motion of the system. Gravitational forces, however, which seek to return the system to a vertical position, do not allow the probe to deflect very far. When aerodynamic and gravitational moments relative to the system's center of mass equalize, motion becomes equilibrium steady-state. In time, under the effect of the atmosphere, the altitude of the tethered objects decreases, and the system's deviation from a vertical position increases. A probe descends from an altitude of 125 km to 100 km in 120 hours. For a similar duration of operation in these conditions by a conventional satellite, it would require a vernier motor with a characteristic speed reserve in the order of 1,000 m/s, that is, considerably more than that of the Soyuz T spacecraft.

A tether system can be used without lowering the probe's altitude with a satellite propulsion unit which compensates for aerodynamic drag. The required thrust increases with a decrease in altitude. Therefore extended probing of the atmosphere at altitudes below 100 km involves considerable energy expenditures.

The conditions of equilibrium steady-state motion of an orbital tether system are disrupted when satellite velocity drops below the required figure. Then the absolute motion of the satellite will differ from circular under the effect of the radial component of the tether's reaction force. The satellite travels in quasielliptical orbits similar to oval, enclosed within an annular layer. Initially the satellite will descend to some minimum altitude and

subsequently will begin to rise to its original orbit. The motion of the probe will follow the same pattern. This will make it possible to probe the atmosphere in a certain annular layer. Its boundaries are defined by the characteristics of the tether system and its initial motion data, and in actual conditions the width of this layer may amount to several kilometers.

The resistance of the atmosphere increases with a decrease in sensing altitude, which leads to intensive heating of probe and tether cable. Calculations (in the assumption that air molecules are ideally in elastic and that the surfaces of probe and tether are ideally black) indicate that while at an altitude of 140 km the steady-state probe temperature is 260 degrees K, at an altitude of 100 km it is 873 degrees K, and exceeds 1,000 degrees K at 90 km. And the tether temperature proves to be even higher. Therefore extended probing of the atmosphere at low altitudes requires special heat-shielding.

Tether systems can also be equipped with a probe with adjustable aerodynamic efficiency (winged probes), which perform selective investigation of the atmosphere above a designated area. This is a promising technique, since it makes it possible to reduce energy expenditures to compensate for aerodynamic drag and to provide more favorable tether system operating conditions.

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