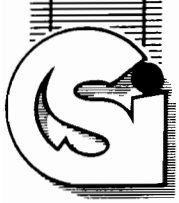
CSI REPORT
No. 2

A COMPARATIVE LOOK AT AIR-GROUND SUPPORT DOCTRINE AND PRACTICE IN WORLD WAR II



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No. 2

A COMPARATIVE LOOK AT AIR-GROUND SUPPORT DOCTRINE AND PRACTICE IN WORLD WAR II

with an appendix on
Current Soviet Close Air Support Doctrine

by LTC Kenneth A. Steadman

Combat Studies Institute
U.S. Army Command and General Staff College

A STUDY PREPARED FOR THE COMMANDER, COMBINED ARMS CENTER

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A COMPARATIVE LOOK AT AIR-GROUND SUPPORT DOCTRINE AND PRACTICE IN WORLD WAR II

This study summarizes the air-ground support doctrine and systems employed by both the Allies and their adversaries in World War II.[1] It is intended to identify similarities and differences in the doctrinal and procedural systems employed by the combatants; it is in no sense a complete historical study of air-ground operations during the war. The value of the study lies in its narrow focus on a specific application of air power and in its comparative examination of this application. This approach helps us to understand that, as of 1939, close air support for ground combat forces was a tactic universally discussed by the military powers but not universally accepted and practiced until after the war.

At the onset of the war, only the Germans had developed a doctrine and a procedural system for close air support.[2] The Russians and the Japanese had a doctrinal base, but lacked the integrating procedures necessary to convert doctrine into practice. Italy and France had neither doctrine nor procedures for substantive close air support.[3] In the case of the US and Great Britain, prewar debate and doctrine tended to inhibit development of close air support. Once the war began, battlefield requirements forced change.

Despite their different starting points, by war's end all major belligerents employed air-ground systems with some remarkably similar features. All had organized tactical air forces and had accepted the idea that a senior airman should command these forces. Universally, the air-ground systems relied upon Army and Air Force liaison officers, dedicated request nets, and the use of forward deployed controllers to insure the close integration of air and ground forces. Lastly, an air-ground control center at the ground force corps level was widely used, except in the Russian case, as the integrating center for joint air-ground operations.

It is apparent, however, that there were major differences between the US and British systems and the German version. In German doctrine little distinction was made between close air and interdiction targets. Both were selected by the ground commander, and target priority shifted according to phases in the battle and the contribution each kind of target would make to the ground force effort. US and British doctrine maintained this distinction in order to insure that selection of intersection targets and missions remained under Air Force control. Also, the Germans decentralized and delegated joint planning authority at a much lower echelon than did the Allies. While the theater army, army group, or army was the focal point for Allied air-ground planning, the German effort focused on army, corps, and division levels. A final major difference appears in the manner in which Allied and German forces achieved unity of effort. The Germans achieved unity of effort by dedicating selected air and ground forces to the same

mission and objective. In the Allied version, unity of effort was realized by centralizing control of air assets under command of the senior airman, who was responsive only to the theater commander.

Finally, it should be noted that the German air and ground forces were well-trained prior to and during the early war years in their standardized air-ground system. US and British forces had very little training prior to the war, and wartime training was assimilated from various battlefield experiences, with a resulting lack of standardization.

German Air-Ground System in WW II

The German air-ground system evolved from the experience of German air units and officers who participated in the Spanish Civil War. Prior to the Spanish experience, air doctrine focused on Douhet's theory of strategic bombardment (achieving victory by the psychological and industrial collapse of the opponent). This doctrine could not be fully implemented, however, because German aircraft technology had not perfected a long-range bomber and because Douhet's theory conflicted with Germany's traditional view of itself as a land power. This conflict was resolved when the Spanish Civil War revealed that air attacks against ground targets in the path of a projected advance contributed to overcoming enemy resistance.[4]

Because most German air commanders had served in World War I as ground commanders or had been detailed from the army to staff the fledgling air force in the eary 1930s, they were receptive to the use of air power to achieve ground objectives. An air-ground effort and the close interaction of these forces soon evolved. Ironically this doctrine and the system that was to employ it appear to have developed independently of the highly mobile armor operations popularly known as Blitzkrieg.

The doctrinal goal of air power was to assist the advance, or to support the defense, of the ground forces that would achieve the national war aim. Mindful of the principle of concentration, which was the very core of German military art, the developers of doctrine held that a concentration of air power should weight the main attack (or the most threatened defensive sector) and that for both offensive and defensive operations, a common main point of effort should be designated for the air and ground forces. Doctrine also stated that, to insure a unity of effort, supporting air forces should be assigned the same objectives as the ground forces.[6] The doctrine did not differentiate between close air support and battlefield interdiction, as each was believed valuable at different phases in the battle. Just as close air support was valuable for blasting through enemy front line defenses during the breakthrough phase, interdiction became valuable at preventing the movement of enemy reserves during the exploitation phase.[7]

To support this doctrine, the German Air Force (GAF) organized close air support (CAS) squadrons in the late 1930s and employed them in conjunction with ground units in field exercises. The field experience led them to organize larger units capable of performing multiple support roles for the ground force. By the time of the German invasion of France (May, 1940), specific close air support divisions and corps (Nahkampfverbande) included reconnaissance, fighter, and transport aircraft in addition to those designated for close support. Air reconnaissance units were task-organized, with strategic reconnaissance forces remaining under the air commander's control and tactical reconnaissance aircraft assigned exclusively to the ground commanders. Fighter aircraft, which remained under the air commander's control, were available to protect both close air missions and ground forces from hostile air attack. Lastly, transport aircraft were added to insure the rapid displacement and resupply of air force units and to resupply forward ground forces. The flexibility of these multi-mission formations was further enhanced by a doctrine which recognized the importance of being able to shift air forces rapidly from one sector to another.[9] This enabled German commanders to concentrate air power at different points at various phases in an operation and to take timely advantage of unforeseen opportunities.

Integration with the ground force was assured by assigning CAS divisions and corps to the ground force conducting the main effort. Operational planning was conducted jointly at collocated headquarters which were well forward and mobile. At the national level, joint planning consisted of designating the common point of the main effort and assigning missions and forces. Army group, army, and numbered Air Force staffs jointly designated objectives and assigned them to specific air and ground forces. At the air and ground corps and division level, detailed planning combined both maneuver and fire support and outlined the type of air missions, targets, and timetables for each phase of the operation.[10]

The Air Force routinely assigned its tactical reconnaissance aircraft to the infantry and armored corps and divisions making the main effort. In-flight reports were radioed to Air Liaison Officers at ground command posts and were monitored by the collocated Air Force CP. These aircraft also transported commanders around their sector, provided messenger and radio relay service, and adjusted artillery fire.[11] Curiously, however, it appears the GAF never recognized the potential of observation aircraft for controlling air strikes; this role remained undeveloped until the Fifth US Army established airborne air controllers in 1944.

During the operational planning phase, CAS missions were "preplanned" missions. Once the operation commenced, however, other types of missions were used. One variant was referred to as "independent commitment," in which the air commander could order additional sorties to attack preplanned or newly acquired targets on the basis of the monitored in-flight reconnaissance reports.[12] Another mission commonly applied on the Eastern Front

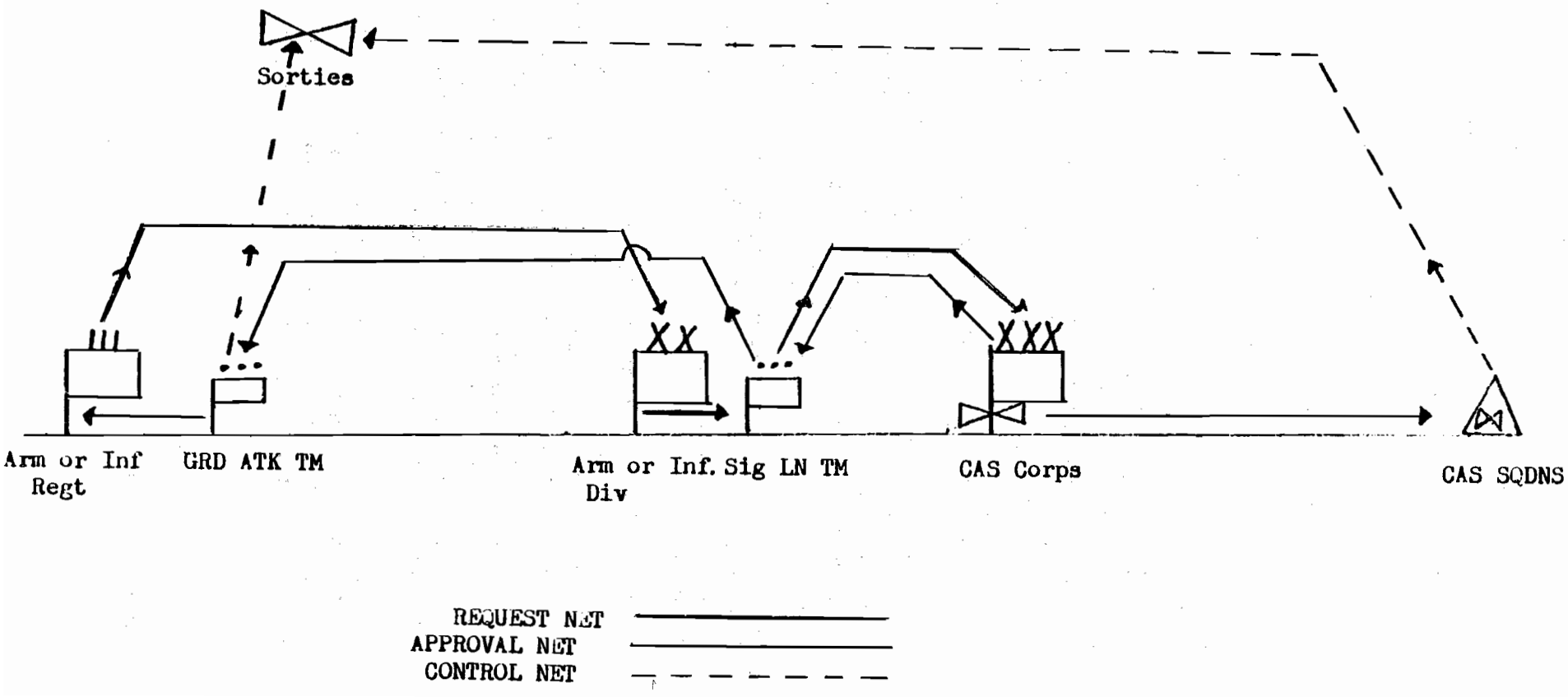
was the "free commitment" of sorties by the air commander. Once ground forces had broken through, the air commander could launch additional sorties to strike targets of opportunity at the front and flanks of the ground force spearheads. This had the effect of providing a combat air patrol above the advancing ground forces during the exploitation phase.[13] Both ground and air commanders noted that this enabled ground combat forces to place timely air support on unexpected targets and to maintain air superiority over the vital main point of the effort.[14]

In the crucial defensive battles on the Eastern Front in 1942 and 1943, "free commitment" missions were often used. Once German intelligence identified the threatened sector (always referred to as the main point), CAS units were positioned in depth to react quickly. The moment the Soviets achieved a breakthrough, the air commander would (freely and continually) commit his force to slow or halt the penetration. Often this was successful in gaining time for the ground forces to seal off and counterattack the penetration.[15]

Linking the ground combat force with its air support were Air Signal Liaison and Ground Attack Teams provided by the German Air Force. Each team was normally led by a GAF officer or NCO who had served on extended detail with a ground unit as part of his training. In order to provide the supporting air commander with continuous reports about the ground situation and about the ground commander's intentions, Air Signal Liaison Teams were sent to each army corps and division engaged in the main effort. These teams neither advised the ground commander nor directed air strikes, but were responsible solely for keeping the air commander informed of the ground battle.[16] Ground Attack Teams, who were assigned down to regimental level, were responsible for directing close air support strikes (note insert sketch). The teams employed colored panels, artillery smoke, and pyrotechnics to identify targets for the aircraft. Like the Air Signal Liaison Teams, they used GAF radios and frequencies, but were provided transport and supplies by the Army.[17]

The German air-ground system remained in effect, albeit with modifications, throughout World War II. The system was successfully employed in the mountains and plains of Europe as well as the deserts of North Africa. In the early years of World War II, it was the most advanced system of its kind and made a major contribution to German military success. To some extent it established the standard that the Allies strove to achieve. That the German Air Force was ultimately defeated was less a result of its failures in air-ground operations than of its failures in other applications of air power.

GERMAN AIR-GROUND SYSTEM



The British Air-Ground System in WW II

Prewar British air doctrine was firmly rooted in Douhet's theory of strategic bombing and gave limited consideration to the establishment of an air-ground system. However, the British experience in World War I and the possibility that Douhet might be applied by another hostile military power led the Royal Air Force (RAF) to recognize the importance of air defense. In time air defense formed the major link with the ground forces and the foundation for air-ground cooperation.[18]

When the RAF deployed to France in 1940, it consisted of two separate commands, the Advanced Air Striking Force, which was to carry out Douhet's strategic bombing, and the RAF component of the British Expeditionary Force. The RAF component was organized to provide air defense and reconnaissance for the ground forces, but it lacked either a communications or a liaison system to link the two except at the highest echelon.[19] Soon after the German attack, the RAF strategic bombers were ordered to attack the lines of communications supporting the German armored spearheads. The strikes were uncoordinated (with ground forces), often unescorted, and largely ineffective. Without inflicting serious damage to either German plans or forces, the bombing squadrons suffered high losses from the German Air Force combat air patrols and the AAA accompanying the Armor.[20]

Taking advantage of the lesson thus learned, the RAF established an Army Cooperation Command in December, 1940, to develop, with Army colleagues, the doctrine, techniques, and procedures for close support of ground forces. Unfortunately, because of its operational commitments, the RAF could provide little support for the command and was compelled to develop procedures without the benefit of testing them.[21] While the command was abolished in 1943, some of the techniques and procedures it pioneered were adopted and further refined by the Desert Air Force and Montgomery's Eighth Army in North Africa and formed the basis for both British and US air-ground systems.[22]

Following prewar precepts, centralized control of air power remained in the hands of the air commander, who was to employ the force to support the goals of the theater commander. It was believed that centralized control and the inherent flexibility of air power would permit air power to be rapidly concentrated in any sector of the theater. The primary task of air forces was to prevent the enemy air force from interfering with friendly operations. If air superiority was assured, then ground and air forces would gain freedom of action. Once attained, the air forces could fulfill their secondary task of assistance in the land battle.[23]

To facilitate cooperation, when practical, the air command headquarters and the theater army (or army group) headquarters were collocated and information was exchanged between the staffs. In 1943, these theater air components were renamed Tactical Air Forces and organized into tactical air

groups, with one group allotted for each army in the theater. Additionally, the Tactical Air Force retained control of a light or medium bomber group, a strategic reconnaissance wing, and an airbase defense group. The Tactical Air Groups, composed primarily of fighters for air and ground attack and some reconnaissance aircraft, were collocated with and operated in coordination with an army. The Theater Army-Tactical Air Force focused on the strategic direction of the air-ground effort, while the Army-Tactical Air Group was responsible for joint operational planning. Only for amphibious and airborne operations was this responsibility delegated to subordinate levels.

Because air power was under centralized control, targets nominated by ground commanders had to be reviewed by the air commander in the light of his strategic and/or operational guidance. This established the requirement that air support had to be prearranged as often as possible. If, after meeting strategic/operational requirements, additional air sorties were available, the air and ground commanders (or staffs) would draw up a priority list of close air support targets. While prearranged missions dominated joint air-ground operations, a system for requesting and controlling immediate missions was firmly established by early 1944.

Mobile Air Support Control Units were established and sent to each Army corps headquarters. These units would review, prioritize, and relay immediate mission requests between the ground combat force and the Tactical Air Group. Staffed by the RAF and a small army contingent assigned by the supported corps, these units maintained communication with ground combat forces (an army responsibility), airborne aircraft, airfields, and the headquarters of the Tactical Air Group.[24] When an immediate mission was requested, the RAF staff determined if a prearranged mission could be adjusted; simultaneously, the request was prioritized by the Army element. If Corps assigned a high priority to the request, the RAF transmitted the request to the airfields and to Group headquarters. This enabled the squadrons to plan for the mission while awaiting approval from Group. If the request was rejected by Group, the air support control unit was notified. If approved, the control unit was alerted by the airfield and informed of the number of sorties and the time over target. Ground units were then informed to mark the target and/or their positions by smoke, panel markers, or pyrotechnics, and the aircraft were guided to the target by the control unit.[25]

Reconnaissance mission requests were processed through the same system. In order to reduce duplication, missions were consolidated at Group and prioritized after consultation with the Army staff. Reconnaissance pilots were not allowed to transmit directly to ground commanders. Instead, following a debriefing, the information was provided by Group to its adjacent headquarters for relay down to the requesting unit.[26]

By the end of the war, this system had been further refined by assigning Army liaison officers at all levels of the Tactical Air Force, by maintaining armed reconnaissance sorties continually over the battle area, and by employing forward air controllers. The controllers accompanied ground combat units in an armored vehicle equipped with VHF radio to communicate with and call down the armed reconnaissance aircraft. In these instances, the Air Support Control Unit was responsible for monitoring the request between the Forward Air Controller and the aircraft. Unless the control unit verbally denied the request, its silence was considered approval of the request.

The British air-ground system was the first successful Allied adoption of close air support for ground forces. As such it became the early model for the US Army Air Force in World War II. Its adoption by US forces during the North African Campaign represented the point of departure in the US effort to forge an effective air-ground weapon.

US Army Air-Ground System in WWII

The development of a US air-ground system was impeded by the prewar controversy over the role of air power. Army Air Corps officers lined up behind the strategic role of bombing, while Army officers insisted that World War I's experience supported the tactical role. So persistent was the debate that Army aviators entered World War II believing autonomy was the only way the role of strategic bombardment could be secured.[27] During this period, air-ground doctrine suffered from having to "satisfice" the two extremes. Field Service Regulations, while supporting the ground commander's demand for direct support, accepted the aviators' position that interdiction offered the best means of providing that support.[28]

German successes with tactical aviation renewed US interest in it, and by 1942, a limited accommodation of opposing viewpoints was reached. The new doctrine declared both roles to be vital and stated that close cooperation with ground forces was to be given the same weight as strategic bombing. Unfortunately, the doctrine did not judge the relative importance of strikes on the immediate front and flanks of ground forces and strikes on other targets more distant from the front line.[29]

By the time Allied forces invaded Northwest Africa, an air-ground system had been organized to implement this doctrine. An air force consisting of strategic and tactical aircraft was assigned to each theater. One component of this force was an Air Support Command under control of an Air Corps officer, but made available to support a field army. The command would be composed of fighters, bombers, and observation aircraft. The air support commander was to collaborate with the Army commander, who was to determine the level of air support required and plan its allocation. Air Support Control units were to be collocated at corps command posts, and air support parties were to be dispatched to divisions that had received air allocations.[30]

This system was abandoned after the disastrous Battle of Kasserine Pass when, at the insistence of senior US airmen, the methods and organizations of the RAF's Desert Air Force were adopted.[31] US airmen charged that air power under control of ground commanders had been wasted on countless small (and poor) targets during this critical period.[32] The solution they demanded was centralized control under a senior airman. Under the reorganization, air-ground cooperation hit bottom during the seizure of Sicily. The participating air forces refused to coordinate their plans with the other services, spent their time searching for a meager enemy air force, and provided a maximum of only 18 missions a day to Patton's Seventh Army.[33]

In the midst of this poor performance, the Army Air Corps published FM 100-20, Command and Employment of Air Power, in July 1943. The new doctrine, published without the concurrence of the Chief of Army Ground Forces, centralized command and control in the hands of the air commander and set priorities for the employment of tactical aircraft. These priorities relegated close air support missions to last priority behind air superiority and isolation of the battlefield (interdiction). Air strikes against targets within range of ground weapons, the manual maintained, were ineffective and wasteful.[34] The larger and more profitable air targets, which would be selected by the air commander, were to be found along rearward lines of communication.[35]

After these failures, air-ground cooperation finally got on track during the Fifth US Army's campaign in Italy. Largely because of the personal intervention of the Army and Air commanders, a field expedient air-ground system was devised and implemented through local training directives. The directives allowed the Air Corps to follow the doctrinal priorities, but, ignoring the first two air priorities, detailed techniques and procedures for close air support.[36]

Army and Air Corps headquarters were collocated so that plans could be separately developed, but integrated at daily commanders' conferences. G-3 (air) sections were established at army, corps, and division levels, and air liaison officers were made available for temporary duty down to divisions. The Air Corps flew at least one photo reconnaissance mission every day (weather permitting) and the photos were distributed down to division G-3 air sections within 24 hours. Using the photos and other information, G-2s and G-3s, using dedicated radio nets, requested preplanned air strikes up through corps to army. Army presented the prioritized preplanned requests to the Air commander at a daily operations conference. After weighing his other air requirements, the Air commander would approve or disapprove the requests, and the units would be notified by Army.

For call (immediate) missions, G-3 air sections were expanded to include one or more ground liaison officers. Nicknamed "Rover Joes," because they traveled between front line battalions with a jeep mounted VHF radio, the GLOs developed procedures for directing close air support missions. Call

mission requests were relayed from front line battalions through G-3 air nets to army level where the request was handed to the collocated Air Corps CP. If approved, a GLO (division level) was sent to the requesting unit and told the frequency, call sign, and time the mission would be flown. Using the most convenient observation point, the GLO contacted the aircraft and identified the target (using smoke), enemy air defenses, and friendly force locations (using panel markers).[37]

Directing air strikes in the mountainous Italian terrain produced many accidents, which were partly reduced by use of Air Corps controllers and the prewar concept of a bomb line. In June, 1944, Fifth Army experimented with Air Corps controllers flying in Army observation aircraft. The experimental use of airborne controllers, nicknamed "Horseflys," continued until the war ended, but this arrangement was too little known to be widely used in the campaign across France.[38]

Following D-day, US forces in France adopted the "Rover Joe" and the Fifth Army--XII Tactical Air Force organization for their air-ground system. Since the Fifth Army--XII TAC field expedients had not become doctrine, procedures between armies varied. For instance, First, Third and Ninth armies relied upon Air Force communication channels, while Seventh Army relied upon Army Communications. Consequently when Third and Seventh armies were fighting side-by-side, their air ground systems were not compatible.[39]

After the war, attempts were made to streamline and standardize the air-ground system based upon the lessons learned in Europe. These efforts were less than successful until the Korean War underlined the requirement for a commonly agreed upon air-ground doctrine. However, despite the appearance of a harmonic doctrine in Vietnam, periodic evaluations of the state of the art suggest the doctrine remains a contested issue between the US Army and US Air Force.

Soviet Air-Ground System in WW II

Unlike the United States, the Soviet Union had a firm doctrinal base to build upon in World War II. The Russians attempted an air-ground system which would succeed in integrating both air and ground forces.

Soviet military doctrine on the eve of the war sought the achievement of combined arms operations involving full coordination of air and ground forces. The 1939 Field Service Regulations stressed that aviation should "act in close operational-tactical contact with ground forces" as well as conduct attacks on deep objectives and air superiority missions.[40] The Field Regulations of 1940 underscored this requirement. However, in 1941 there existed a considerable gap between theory and reality. The relatively small size of the Soviet ground attack aviation force (eleven regiments of

obsolete I-15 and I-153 aircraft), the general shortage of equipment (radios), the inexperience of aviation personnel, and the awkward organization of air assets hindered achievement of those theoretical arms. The German attack of June, 1941, compounded those difficulties by destroying the bulk of the Soviet air fleet.[41] (In the western Military District, 800 of 1,200 aircraft were destroyed on the ground.[42])

After June, 1941, the Soviets were forced to rebuild their ground support system. During the first period of the war (June 41-Nov 42), they concentrated on reconstructing their ground attack force and perfecting its organization. Initially, ground armies controlled aircraft assets. Ground attack aviation regiments with a TO&E strength of 20 aircraft (IL-2), but with an actual strength of 4-5 planes, were scattered throughout the ground force structure. (In December, 1941, there were nine regiments with a total of 42 IL-2 aircraft.)[43] This dissipation of effort, combined with a lack of radios, made ground support ineffective. The Soviets limited such support to the first phase of offensive operations (air preparation), to the repulse of counterattacks, and to covering intervals between ground formations. Pilots seldom attacked targets within 10-15 kms of friendly forces.[44]

During the first period of war, the Soviets used crude, improvised methods to designate targets and provide for mutual recognition by ground and air forces. They designated the "forward edge" by use of visual signal panels, smoke charges, colored signal rockets, tracer bullets, and vehicle headlights. When rockets, smoke charges, and signal panels were unavailable, ground forces often resorted to field expedients to mark their positions (in one instance the use of underwear).[45] In addition, ground forces were untrained in aircraft identification and in the use of the few available radios, and no system of forward command posts existed to control aircraft.

During the second period of war (Nov 42-Dec 43), the air-ground system improved somewhat. Air assets were centralized at front level (one Air Army per front), and in November, 1942, the Soviets adopted the concept of the "aviation offensive" which provided a purpose and set of procedures for air operations. To realize the aims of the "aviation offensive" the Soviets deployed a larger number of radios to air and ground units and built an air control system. Air command posts were located close to the front lines in contact with ground units. The CP of Air Armies deployed near the CP of the front commander, 7-8 kms from the front lines. The CP of the Fighter and Assault Aviation Corps were located near the OP of the army commander, 2-3 kms from the front lines. At the CP of each rifle or tank corps, aviation units provided a group of aviation officers with radios. Rifle divisions on the main attack axis often received aviation representatives to coordinate use of aircraft. Aviation commanders at the CPs of rifle or tank formations kept track of troop locations and guided pilots by radio to both airborne and ground targets.[46]

Improvements in recognition and target designation were slow, and in 1943 and 1944 the General Staff issued a series of specific instructions on the subject.[47] In particular, coordination of aircraft with artillery, tank, and mechanized forces evolved slowly due to the difficulty in distinguishing friendly and enemy positions. Ultimately units used rockets, turret markings, and radios to distinguish between units. Beginning in 1943, tank and rifle battalions created trained teams with signal equipment to designate the line of contact with the enemy and guide aircraft to their targets. Besides using radios, units designated the "forward edge" by signal rockets (pre-assigned color and angle of fire). At aviation units the front line trace was marked on the maps of pilots just prior to their missions.[48]

During the third period of war (1944-45), the network of air representatives and guidance officers at ground units expanded. Operations involved increasingly detailed planning for air support, and air control increased in efficiency (assisted by addition of radios to tanks and a higher percentage of aircraft). In conjunction with, or in lieu of, radios a wide variety of recognition and guidance methods evolved, including use of colored smoke fired by Control Identification Points spaced evenly along the front, tracers and artillery smoke shells to mark targets, pyrotechnic devices, prearranged aircraft maneuvers (dipping of wings), tank shrapnel fire, and intersecting searchlight beams to illuminate targets at night. During night operations in built-up areas, the Soviets guided aircraft to targets by setting fire to houses with artillery fire.[49]

The extreme fluidity and depth of ground operations in the latter stages of the war made air-ground coordination more complex. The large scale of operations often required coordination of two air armies (2,000-3,000 aircraft) in a single front area. Soviet inability to master this problem was evidenced by several instances of aircraft attacks on friendly troops.[50]

Throughout the course of the war, the Soviets made vast improvements in air-ground coordination. Those improvements were tied directly to the development and deployment of radio equipment and trained personnel. While radios proliferated in the force structure by war's end, the Soviets supplemented radios with a wide range of visual techniques. Yet, although an air-ground control system evolved, it was never able to control complex air-ground operations adequately. The achievement of an efficient system using sophisticated equipment became a goal of the postwar period.

How far the Soviets have advanced toward their goal of developing an efficient air-ground system can be judged by appraising the explanation of current Soviet doctrine described in the appendix to this study. It suggests that while there are similarities, the differences between the US (and NATO) and the Soviet (and Warsaw Pact) systems apparently stem from the different developmental backgrounds of each.

The Japanese Air-Ground System in WW II

World War II Imperial Japanese Army air doctrine stated that the Army Air Force would make the "greatest contribution to general operations," presumably by reducing the fighting strength of the opposing Air Force. After destroying the main strength of the enemy air, Japanese air would seek a favorable chance to destroy the remainder of the enemy's air power. If the conditions of the battle permitted, the Army Air Force would provide strategic and tactical reconnaissance for the ground forces. The keynote was "Air Superiority: A Must Over the Battlefield."

An air division was sometimes assigned to support an infantry division, if air superiority had been achieved. To provide liaison, a wireless platoon (two air-ground radios, one truck) was attached to division headquarters. Air units could only support ground troops in the initial stages of an engagement because, as the Japanese troops moved forward, the air squadron commanders had absolutely no idea where they were. The ground forces wanted CAS support at critical points, but this was not available. CAS was, as an account used at the Japanese Command and Staff College today notes, the ideal, but the emphasis on the air superiority role was natural.[51]

ENDNOTES

1. For this study, air-ground operations deals only with Close Air Support, which is defined as: "Air action against ground targets in close proximity to friendly (ground) forces." The definition is taken from USAF Manual TACM 2-1, Tactical Air Operations, 15 April 1978. The terms air-ground and close air support are used interchangeably in the study.

2. The German Air Force was often criticized for its close air doctrinal focus which, commentators have noted, excluded strategic bombing and air defense.

3. Alvin Coox's fine work on prewar French military doctrine describes French air doctrine as suspended between its tactical and strategic application. The equivocal result was an air force that could accomplish neither. Alvin David Coox, "French Military Doctrine, 1919-1939: Concepts of Ground and Aerial Warfare" (Ph.D. diss., Harvard University, 1951).

4. W. H. Tantum, IV, and E. J. Hoffschmidt, The Rise and Fall of the German Air Force, 1933 to 1945 (Old Greenwich Conn: WE, Inc., 1969), pp. 7-17.

5. Of the many sources on prewar German air and armor doctrine, none indicate that close air support and mechanized combined arms warfare developed in conjunction with one another. Indeed the lack of such evidence suggests the two doctrines developed independently, albeit on parallel tracks and were merged only in the opening phases of the war.

6. US: Department of the Army. "The Collaboration Between the Army and the Luftwaffe Support of the Army by the Luftwaffe on the Battlefield." Translation of POW report of General Karl Heinrich Schulz, dated 12 Dec 1947; translated by Charles E. Weber, MS #B791 (CARL, Fort Leavenworth, KS), pp. 5-6; also, B. H. Liddell Hart, The German Generals Talk (New York: William Morrow & Co., 1948), p. 95.

7. As Schulz reports, German air and ground commanders felt that close air attack, when coupled with a ground attack, had a greater psychological effect against the will to resist of frontline defenders than against enemy troops along rearward lines of communication not under ground attack.

8. These Nahkampfverbande also had AAA and maintenance units attached so that they could operate from bases well forward. Airbases were sometimes so far forward that AAA, specifically the 88mm gun units, were employed by ground forces.

9. Schulz, pp. 8-12; and Paul Deichmann, German Air Force Operations in Support of the Army (Maxwell AFB, AL: USAF Historical Division, Research Studies Institute, Air University, June 1962), pp. 72-82.

10. Schulz, pp. 7-10, 5-16, 33-34.

11. Schulz, p. 10.

12. Schulz, pp. 15-18, 26-28.

13. Schulz, pp. 26-28.

14. Tantum and Hoffschmidt, pp. 240-47; and Deichmann, pp. 164-65.

15. Schulz, pp. 26-28.

16. A large amount of the intercept intelligence credited to the strategic success of ULTRA may have come from the intercept of the Air Signal Liaison teams who frequently used relatively simple codes to transmit information about the ground forces. See Ralph Bennett, Ultra in the West: The Normandy Campaign 1944-45 (New York: Charles Scribnar's Sons, 1980), p. 7.

17. Deichman, pp. 69-82; and Schulz, pp. 12-17, 22.

18. Denis Richards, The Royal Air Force 1939-1945, Vol 1, The Fight at Odds (London: Her Majesty's Stationary Office, 1953), pp. 26-30.

19. Norman Macmillan, The Royal Air Force in the World War, Vol I, 1919-1940 (London: George G. Harrap & Co., LTD, 1942), pp. 143-56.

20. Richards, pp. 107-27.

21. Richards, p. 26.

22. Denis Richards and Hilary St. George Saunders, The Royal Air Force 1939-1945, Vol II, The Fight Avails (London: Her Majesty's Stationary Office, 1954), pp. 159-63. Also, Roderic Owen, The Desert Air Force (London: Hutchinson & Co., LTD, 1948), pp. 56-66, 109-13.

23. Bernard L. Montgomery, "Some Notes on the Use of Air Power in Support of Land Operations and Desert Air Support" (Holland: 1944); also, unpublished manscript, "The Employment of Air Forces in Support of Land Operations," in document entitled, "Operations in North West Africa" (CARL, Fort Leavenworth, KS), MS# N3497.

24. Separate wire lines were laid to each ground brigade in the corps sector. The RAF was responsible for wire lines to the airfields and Group Headquarters. Initially the only radios in the control units were the VHF sets used to communicate with airborne aircraft. By 1945 radios began to replace the wire lines.

25. Owen, p. 143.

26. Owen, p. 111.

27. USAF Historical Division, The Development of Air Doctrine in the Army Air Arm 1917-1941, USAF Historical Studies: No 9 (Manhattan, KS: MA/AH Publishing, Sep. 1955), pp. 44-75. Also, Kent Robert Greenfield, Army Ground Forces and the Air-Ground Battle Team including Organic Light Aviation, Study No. 35 (Historical Section--Army Ground Forces, 1948), p.1.

28. Greenfield, pp. 2-4.

29. Greenfield, p.4.

30. Wesley Frank Craven and James Lea Cate, The Army Air Forces in World War II, Vol II, Europe Torch to Point Blank, August 1942 to December 1943 (Chicago: University of Chicago Press, 1949), pp. 53-136.

31. Craven and Cate, pp. 53-136.

32. In fact, the system was never applied as outlined. Until after the Kasserine Pass battle, no ground combat commander had command or authority over US Air Forces. More important, less than 10 percent of the ground commander's requests for close air support were flown by the Air Force. The failure of close air support may be part of the reason for the poor US performance at Kasserine Pass. See Memorandum for All Ground General and Special Staff Section, Headquarters Army Ground Forces, 11 June 1943. Subject: Report of Visit to the North Africa, Theater of Operations (CARL, Fort Leavenworth, KS).

33. Albert W. Garland, Howard McGaw Smyth, and Martin Blumensen, United States Army in World War II: Mediterranean Theater of Operations, Sicily and the Surrender of Italy (Washington, D.C.: US Government Printing Office, 1965), pp. 105-8.

34. Greenfield, pp. 47-50.

35. It appears the Germans maintained the opposite view, i.e., that the more profitable targets were those whose destruction/neutralization aided ground combat forces.

36. Craven and Cate, pp. 544-45; and Greenfield, pp. 76-83.

37. Ibid.

38. Greenfield, pp. 87-92.

39. Greenfield, pp. 87-92. Also note that Seventh Army employed the airborne air controller, "Horsefly," while the other US armies did not.

40. M. Kozhevnikov, "Sovershenstvovanie Aviatsionnogo Nastupleniia" (Perfection of the Aviation Offensive). Voenno-Istoricheskii Zhurnal (hereafter cited as VIZH), May 1971, p. 14.

41. N. Dagaev and V. Chernitskii "Tendentsii pazvitiia organizatsionnykh form frontovoi i dal'nei aviatsii v gody Velikoi Otechestvennoi voiny" (Tendencies in the Development of Organizational Forms of Frontal and Long Range Aviation in the Years of the Great Patriotic War), VIZH, October 1981, pp. 19-20.

42. A. M. Nekrich, June 22, 1941, (Moscow: Nawka, 1965). Translated by V. Petrov, Univ of S. Carolina Press, 1968, p. 222.

43. S. Chepaliuk, "Pazvitic taktiki shturmovoi aviatsii v velikoi otechestvennoi Voine" (The Development of the Tactics of Assault Aviation in the Great Patriotic War), VIZH, January 1970, p. 25.

44. I. Timokhovich "Vzaimodeistvie aviatsii s sukhoputnymi voiskami vo frontovoi nastupatel'operatsii" (The Cooperation of Aviation with Ground Forces in Frontal Offensive Operations), VIZH, July 1977, p. 20.

45. N. Ostroumov "Vzaimnoe opoznavanie i tseleukazanie voisk i aviatsii" (Mutual Identifications and Target Designation of Troops and Aviation), VIZH, August 1980, p. 34.

46. L. Mikriukov and G. Briukhovskii, "Opyt boevogo primeneniia aviatsii pri proryve oborony protivnika" (The Experience of the Combat Use of Aviation during the Penetration of an Enemy Defense), VIZH, February 1981, pp. 30-31.

47. Ostroumov, p. 35.

48. Ibid, pp. 36-37; Mikriukov, pp. 32-34.

49. Mikriukov, pp. 37-41.

50. Ibid, p. 37.

51. Boei kenshujo senshibu (Military History Department, National Defense College), ed., Nomonhan jiken kokusakusen no kyosatsu (Considerations of the Air War During the Nomonham (Khalkhin Gol) Fighting) (Tokyo: 1975); and Akiyama Monjiro and Mitamura Kei, Rikugun kokushi (A History of the Japanese Army Air Force) (Tokyo: 1981).

APPENDIX

NOTES ON SOVIET CLOSE AIR SUPPORT

1. Trends in Soviet Fire Support

In the past decade, the Soviets have tried to improve the integration of air support into the total fire support effort. Major field exercises almost invariably feature joint air and ground operations. In addition, over the past 5 to 10 years, Soviet firepower capabilities have been enhanced by increasing both the quantity and quality of fire support means available to the commander.

a. Air Support

The size of helicopter forces has been expanding at a constant rate. There are now about 5,200 in the Soviet inventory.

Older Mi24 HIND-D combat helicopters are being replaced with the new AT-6 SPIRAL-equipped HIND-E which has greater standoff range and the freedom to maneuver after launching its missile.

The Soviet Union has in production or development precision-guided munitions (PGM) similar to those deployed by US forces.

The Soviets have deployed the AS-9, an anti-radar guided missile with a range of 80 kilometers, and AS-10, an electro-optically guided missile with a range of approximately 9 kilometers. The AS-X is expected to have a range of approximately 40 kilometers with electro-optical guidance, and a firing capability from an altitude as low as 150 meters.

2. Air Support of Ground Forces

a. General

In addition to the air operation which marks the onset of theater-level hostilities, Soviet doctrine calls for air support of ground forces in a given offensive operation. The Soviets recognize three stages of air support within an offensive operation: air preparation (aviatsionnaya podgotovka), air support (aviatsionnaya podderzhka), and air accompaniment (aviatsionnoye soprovozhdeniye). The major delineating criterion for these phases is their chronology, though there are some differences in targeting, command, and aircraft used.

b. Air Preparation (Aviatsionnaya Podgotovka)

Air preparation takes place prior to the onset of ground force action in a given sector of a front and is used in preparation for a variety of offensive operations, including the crossing of water obstacles, penetration operations, amphibious and airmobile assaults, and counterattacks.

When it occurs simultaneously with the preparation fire of both artillery and missile units, it requires close, detailed coordination with respect to targeting and timing. Air operations in the preparation phase generally extend no farther than the enemy's immediate operational depth (i.e., enemy corps rear area). Depending on the combat situation, the duration of air preparation can be from 10 minutes to over an hour. The targets are those which conventional artillery and missiles cannot destroy due to the targets' distance, mobility, or their "hardened" quality. In special situations, such as amphibious assaults, Long-Range Aviation and/or Naval Aviation may participate in air preparation attacks. Air preparation is an integral part of the fire preparation (ognevaya podgotovka) phase.

c. Air Support (Aviatsionnaya Podderzhka)

The distinction between air support and air accompaniment is primarily one of chronology and proximity of targets. The air support stage begins when the ground forces start an offensive. Its targets are at the tactical and immediate operational depths, and include enemy nuclear weapons, command and control systems, and enemy reserve forces close to the front line. On-call air attack missions against centers of resistance are made at the request of ground force commanders within the limitations of their allocated resources. The air support phase closely follows the operational plan prepared prior to the onset of the offensive, and is an extension of the strong artillery support associated with Soviet offensive operations. As in the air preparation stage, the targets are generally those beyond the capabilities of artillery and missiles to destroy. Air support is an integral part of the fire support (ognevaya podderzhka) phase.

d. Air Accompaniment (Aviatsionnoye Soprovozhdeniye)

Air accompaniment, the final stage of air support of ground forces, occurs as Soviet ground units penetrate deeply within enemy defenses. The specific point at which air accompaniment begins is not clear, but it is during the advanced stage of offensive operations when the progress of the ground forces has outstripped the prepared air support plan, and reassessment and reallocation of air resources is necessary. It is significant to note that, after allocating air resources prior to an offensive, the front commander plays little further direct role in the conduct of air support operations, unless large reallocations are required. However, in the air accompaniment phase, the role of the front commander is again emphasized, indicating the probability that significant reallocations of air resources supporting ground force armies will be made in adjusting to the developments in the combat situation.

Obviously, air cover for airborne and airmobile operations is a very demanding and important air accompaniment mission which might take place concurrently with the preparation phase or support phase over the Forward Line of Own Troops (FLOT).

e. Rotary-Wing Aircraft

Fixed-wing aircraft and combat helicopters are used in the three stages of air support for offensive ground operations. The increasing numbers of combat helicopters deployed enable them to play a greater role in the support of ground forces within the immediate battle area, thereby freeing fixed-wing aircraft for missions against fixed targets, such as nuclear weapons depots and airfields.

The Soviets perceive combat helicopters as fulfilling four basic air support missions: preplanned air support missions, on-call missions, armed reconnaissance, and ambushes. The reduced logistical requirements of combat helicopters, compared to those of fixed-wing aircraft, very often enable deployment close to the main battle area. This enhances their ability to respond to on-call missions. Given the Soviet emphasis on rapid offensive operations and the consequent anticipation of the meeting engagement as the most frequent type of combat encounter, the Soviets see great potential in the combat helicopter's ability to respond rapidly to requests for air support. In a meeting engagement, combat helicopters can screen and support Soviet units as they maneuver into position.

In pursuit operations, helicopters harass withdrawing units through armed reconnaissance missions and in ambushes along retreat routes, impeding the enemy's attempts to establish defensive positions. Conversely, helicopters support rear guard units in disengagement and withdrawal operations by harassing advancing enemy units from ambush and by laying minefields. Combat helicopters can also be assigned to support the operations of advance or independent units outside the range of artillery support.

3. Command and Control

a. Organization

The command and control structure of Frontal Aviation (FA) is integrated with that of the ground forces to insure close and continuous coordination in a combined-arms offensive (see Figure A1).

In wartime the front commander has direct command of some aviation resources. He normally exercises this command in consultation with the tactical air army commander, who serves as chief of aviation on the front staff.

At the ground force army and division level, an Air Task Group (ATG) normally is assigned to the staff of the army commander. At army, this Air Task Group generally consists of about seven officers, including a deputy commander of the tactical air army, an air controller, an intelligence officer, a liaison officer, a decoder, and a chief of the communications team. The ATGs assigned to the combined arms or tank divisions are usually headed by deputy air division commanders or deputy air regiment commanders, and are similar to the ATG assigned to the combined arms or tank army CPs, only smaller (about five officers).

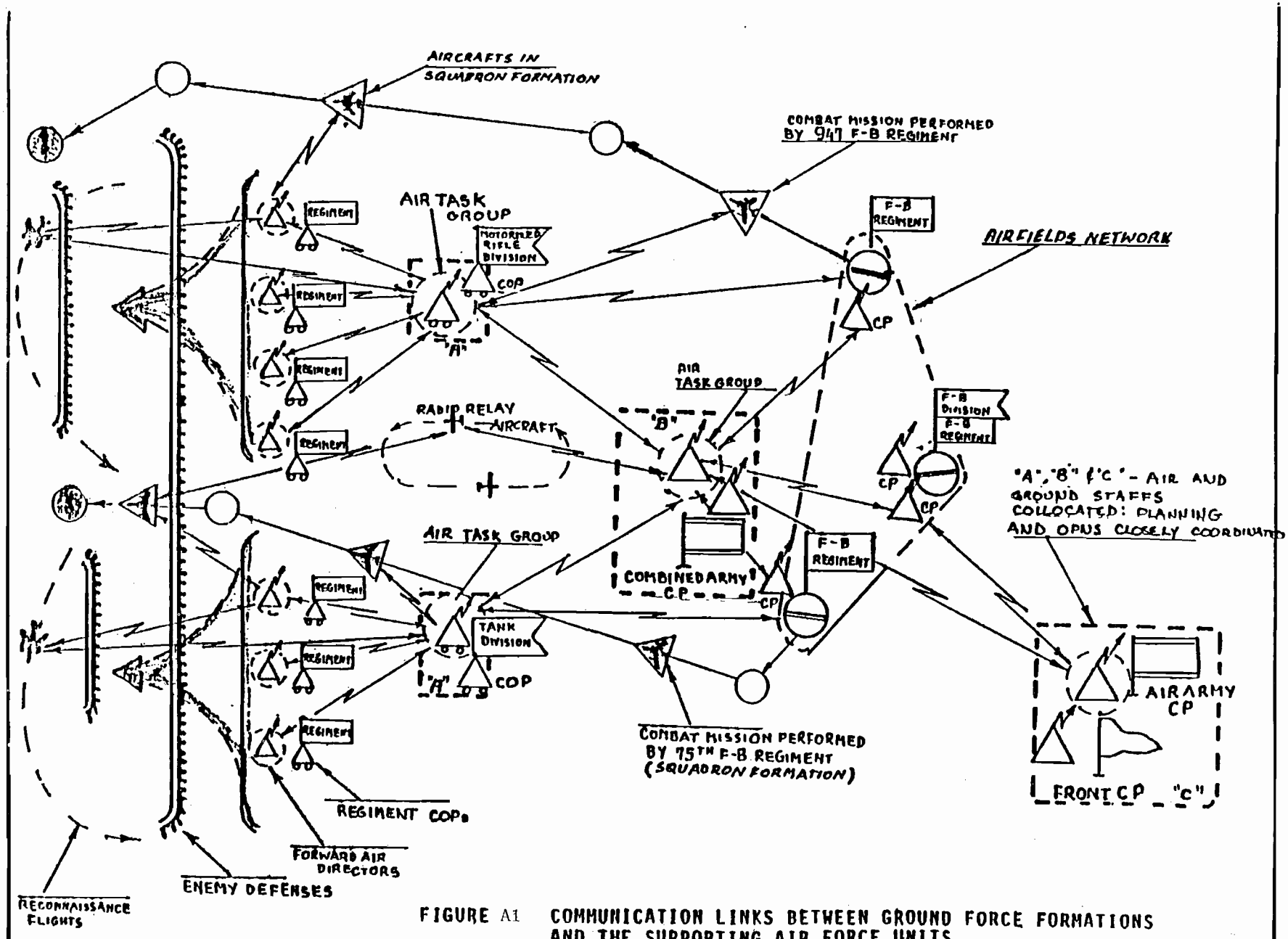


FIGURE A1 COMMUNICATION LINKS BETWEEN GROUND FORCE FORMATIONS AND THE SUPPORTING AIR FORCE UNITS

The Air Task Group is similar in nature to the US air liaison section and advises on the use of air resources, transmits air support requests from the army commander to air divisions or independent air regiments, maintains communications and control with aircraft in the battle area, and advises the army commander of aerial reconnaissance information. At the division, the Air Task Group is separated into two sections, each with a radio-equipped BTR-60. One section is collocated with the commander and the other with the chief of staff.

While it is rare to find an air representative in a ground force battalion, a forward air director may be assigned when combat helicopters are providing air support in a particularly important or difficult operation. Normally, however, a battalion commander has no direct communications with air support resources.

For mutual recognition and target designation, radio-electronic means, such as radio beacons, are widely used by the air directing officers; however, when there is visual contact, the use of signal flares, colored smoke, beacon lights, and even cloth panels is possible. When aircraft are operating against objectives which cannot be observed by ground troops or air directing officers, target designation is carried out mainly on the basis of reconnaissance information obtained by the aircraft crews themselves. The crews use flares, aircraft maneuvers, and radio-electronic means of signalling, passing communications, and mutual identification.

b. Problems and Progress

Judging from the Soviet military press, coordination between the air and ground forces, especially at lower level, is not always successful. The documents worked out by air and ground force commanders prior to the launch of combat air missions often inhibit flexibility in mutual cooperation and once the missions get underway, prevent changes required by the evolving situation.

Some exercises carried out jointly by air and ground units demonstrate that the specifics of mutual cooperation result from subjective factors and interpretations. There are ground force commanders who do not have in-depth knowledge of the combat capabilities of aviation, and in turn, some aviators are unable to judge the development of the battle on the ground in anything but general terms. Ground force unit commanders sometimes hesitate to call for air support unless the support has been planned beforehand. As one commentator stated recently: "The aviators fight according to their rules, and the combined-arms troops according to theirs." The plans for mutual cooperation worked out prior to the actions

are often incomplete, accounting only for that situation when aircraft approach the FLOT. Also they do not always inform lower level ground force commanders of the fighter-bomber and combat helicopter resources allocated for "on-call" missions. The combined-arms commanders do not always know the location and condition of aviation during the battle, the readiness of aviation to commit reserves, or the types of air strikes available. The lack of damage assessment data supplied to ground commanders can cause unnecessary firing at previously destroyed targets.

In order to resolve the problems of mutual cooperation successfully, Soviet military experts suggest wider adoption of automated control systems to speed up and simplify collecting, transmitting, and processing information on all levels of command and control. More frequent joint tactical briefings, technical conferences, and meetings between lower ground force and air commanders are also suggested in Soviet military publications.

At present, the Soviets are stressing the importance of increasing the effectiveness of air support in complex weather conditions and at night. Soviet FA operations under these conditions slacken considerably because of inadequate aircraft and ground-based equipment, and shortcomings in flight personnel training. The mutual identification and target designation systems used during complex weather conditions and for night flying also do not always meet modern requirments. Evidently the Soviets are making efforts to correct these shortcomings. It is believed that about 20 percent of the third-generation fixed-wing aircraft introduced in the 1970s and a similar percentage of FA's combat helicopters are equipped with the type of radio-electronic and infrared instruments that will enable pilots to carry out sorties at night and at low altitudes, to search for and detect targets, and to destroy them with guided munitions. However, even when modern sophisticated equipment is used, the Soviets believe that for air support of ground troops it is important to train pilots to navigate by landmarks, to search for targets visually, and to determine the distances to targets without technical aids.

Effective FA operations in support of advancing troops depend a great deal upon providing appropriate airfields. Some restored enemy airfields could also be utilized by FA. In this respect, the increase in operational range and load capability of the third-generation aircraft enables the Soviets to provide air support to the ground forces advancing at high speed. The Soviets, on the other hand, have been actively seeking an effective type of aircraft, which operating from small, unpaved airfields, would insure reliable air support to their ground forces. In at least a partial response to this need, the combat helicopter has emerged as a weapons system that can provide adequate support with the required flexibility.

c. Planning and Preparation of Air Support in an Offensive

Planning of preparatory air strikes prior to an offensive begins with the front commander's issuance of orders to the air army commander(s) and the combined-arms/tank army commander(s). The order specifies the air units to be committed, the ground armies to be supported, and the timing of the offensive.

Receiving this information, the ground force army commander and his Air Task Group reconcile the air resources allocated by the front commander with the air support requirements of the ground force divisions. A ground force division commander, in consultation with his Air Task Group, develops his requirements by determining the targets to be attacked in his sector and estimating his on-call missions. Available air support is divided among predesignated targets, on-call missions, and reserves. An on-call mission is one in which the target may be predesignated, but the timing of the strike remains at the discretion of the ground force commander. If combat helicopters are to be employed, air support is specifically divided between fixed-and rotary-wing aircraft. The division is based on the nature of the targets, flight distances, and the disposition of enemy anti-aircraft defenses. On approval and integration of these determinations with the front fire support plan, the air army commander issues specific orders to his air divisions and regiments concerning targets, numbers of sorties, air approach, corridors, communications codes, and mission timing. The air representatives at army, division, and regiment then confirm, for their respective ground force commanders, the air resources allocated to them. Normally, the air army commander holds a percentage of his forces in reserve to meet unforeseen demands of division commanders. Division commanders, in turn, can withhold a percentage of their allocated air assets as reserves.

When a regiment has been assigned specific air support, the regiment commander explains his objectives to the commander of the supporting air unit and the forward air director assigned to his regiments, and seeks their recommendations.

Both front and army commanders pay particular attention to the coordination of artillery and missile fire with preplanned and on-call air strikes, enabling the artillery and missile fire to neutralize or suppress enemy anti-aircraft defenses prior to the arrival of attack aircraft.

Coordinating the delivery of nuclear strikes is an important function for the ground and air commanders and their staffs. It is considered best for the commander of combined arms forces to decide immediately the question of nuclear weapons employment within the zone of advance, to the depth of the range of his tactical missiles. He has to determine the target, and the type, method, and time of delivery of nuclear strikes, both for his own missiles and for the carrier aircraft operating in the zone of advance. Aviation missions for delivery of nuclear strikes beyond the range of ground force missiles have to be assigned by the commander in charge of the entire operation (usually the front commander or above).

The Soviets normally maintain strict centralization in controlling air support resources. In some instances, the supporting aviation will not be surbordinated to the operational control of the combined arms commander. Instead, air support resources will be apportioned into regiment-flights (polks-vylety), aircraft sorties, and the required quantity of munitions. These resources can be used by the ground force commander for the destruction of selected objectives. It is possible that the ground force commander will not even know which specific Air Force unit or formation will accomplish the missions he requested.

Under a rapidly changing combat situation, such centralized control makes possible a more rapid reallocation of air support resources to accomplish the most important missions that suddenly arise during combat operations, such as destruction of enemy nuclear weapons, aviation, and reserves. At times, Air Force units which are not originally assigned for ground support may take part in delivering air strikes against ground objectives. Obviously, decentralized employment of aviation (especially combat helicopters) will be used when combat operations are being waged on separate and disconnected axes. In such cases aviation assigned for air support will be transferred to the operational control of the combined arms commander, who will employ it according to his own needs.

d. Missions Planning and Execution

(1) Predesignated Air Support Missions (Udary na Zaraneye Zaplanirovanym Tselyam).

As predesignated target assignments are received by air regiments and squadrons, they are studied closely to determine the best tactical approach. Large-scale maps and, in some cases, scale models of the terrain and targets are used to familiarize pilots with their assignments and to demonstrate the desired flight path and approach maneuvers. Deviation from the determined flight plan without ground control approval is not permitted.

In anticipation of being diverted from predesignated targets on later on-call missions, pilots attempt to familiarize themselves with key terrain and important fixed targets within their area of operations. Approach flight paths and maneuvers for potential targets are discussed and determined, subject to later ground control confirmation.

Coordination between helicopter crews and ground personnel is improved when helicopters are able to land near the ground force units to be supported. Fixed-wing air crews often have less opportunity for coordination because airfields are farther to the rear. When a regiment is assigned helicopter support and the combat situation allows, pilots confer on the ground with the regiment commander and the forward air director to coordinate air strikes and confirm communication codes to be used during the mission.

Once airborne, the aircraft proceed to a designated checkpoint behind friendly lines, where they confirm their target assignment with ground control. The emphasis placed on strict adherence to predetermined timing and flight paths indicates the probable use of "safe" corridors through friendly anti-aircraft defenses. Though radio traffic is minimized, Air Task Groups and forward air directors maintain communications with attack aircraft either directly or through radio relay aircraft.

As the aircraft approach the target area, forward air directors establish communications and insure that targets are correctly identified by the attack pilots. Radio communications, pyrotechnics, flags, and marker panels can be used. Having gained sight of the target and having had it confirmed by the forward air director, the flight leader assigns individual targets or target areas to his pilots and gives the order to attack. Regrouping of the aircraft following an attack and designation of a path through friendly anti-aircraft defenses follows the premission flight plan unless countermanded by ground control.

(2) On-Call Support Missions (Udary po Vyzovu)

A request for immediate on-call air support is submitted by the ground commander to the next higher headquarters and then forwarded through the chain of command. Aside from those elements which have combat helicopter units directly assigned, the division is the lowest Soviet ground force unit which has direct communication with air support resources. An exception occurs when a regiment commander has been allocated combat helicopters for air support missions at his discretion. Ordinarily, if a request for air support does not exceed the division commander's allocated on-call air resources, he can order the air strike through his Air Task Group. Otherwise, army or front approval must be obtained depending on the size of the air support request.

As with preplanned support, the Air Task Group at each command echelon participates directly in the evaluation of each air support request and the coordination of the strike mission.

Aircraft designated for on-call missions can be airborne in holding areas or on the ground at airfields. Occasionally, an aircraft on armed reconnaissance patrol can be directed to respond to an air support request within its area of operations. The Soviets recognize three levels of combat readiness for Frontal Aviation aircraft and crews (Figure A2). Aircraft in categories one and two respond to ground force requests for immediate air support. Prior to takeoff, pilots receive a short briefing indicating a checkpoint, the pilots contact the air representative of the ground force units being supported to receive target designation or confirmation, if this was not given earlier. Approach, attack, and recovery air control procedures remain the same as in predesignated air support missions.

COMBAT-READINESS STATUS OF SOVIET FIGHTER-BOMBER UNITS

Category	Crew and Aircraft Position	Duration of Readiness	Time Before Takeoff
One	Aircraft are fully serviced and armed. Combat crews are briefed on their mission and are in the aircraft ready to start engines. Ground personnel are assisting the combat crews.	1-2 hour	3-5 minutes
Two	Aircraft are fully serviced and armed. Combat crews are briefed and are in the vicinity of aircraft ready to take off within a specified short period of time after receiving a mission order.	2-4 hours	15 minutes
Three	Aircraft are refueled and serviced. Cannons are loaded. External systems (bombs, rockets, missiles, fuel tanks, etc.) are not loaded. Combat crews are known, but briefing on air and ground situation is given before takeoff.	2-4 days	1-2 hours

Figure A2

(3) Armed Reconnaissance (Svobodnyy Okhot)

Armed reconnaissance within the battle area is an integral part of Soviet air support, particularly in a fluid combat situation when the precise disposition of enemy forces is not known. Both fixed-wing and rotary-wing aircraft, singly or in small formations, conduct armed reconnaissance to exploit targets of opportunity. In poor weather conditions which restrict fixed-wing aircraft operation, an increase in combat helicopter armed reconnaissance can be expected. While on patrol, aircraft maintain radio contact with ground control to report reconnaissance information and to receive priority targeting assignments which may develop.

Searching for targets requires aircraft to operate at higher altitudes than when approaching predesignated targets. Depending on the terrain and the density of the air defenses, this altitude varies between 275 meters and 1,500 meters for fixed-wing aircraft. Upon detecting the target, the aircraft dives to an approach altitude of approximately 60 meters; on nearing the target, it climbs to an altitude of several hundred meters and delivers fire. The senior pilot in the patrol formation has the authority to attack without first gaining ground control approval.

Rotary-wing aircraft do not significantly alter their normal ground attack tactics in armed reconnaissance patrols, though a small increase in cruising altitude may be necessary to locate potential targets.

Armed reconnaissance would be most often employed during the accompaniment of ground forces pursuit operations. The primary targets of the supporting combat aircraft would be the destruction of enemy nuclear delivery means and enemy counterattack forces. Should the patrolling aircraft prove unable to destroy a given target, the target would be engaged and additional air support requested from ground control, noting the location of the target or the direction of its movement.

4. Tactics

a. Air Support and Interdiction

(1) Fixed-Wing Aircraft

Soviet ground-attack tactics strive to deliver the greatest amount of firepower to the target, while presenting the least opportunity to enemy anti-aircraft defenses. The first concern in a ground attack mission is neutralization of enemy anti-aircraft weapon systems and their attendant command and communications systems. If sufficient aircraft are available in the attacking force, the first flight engages and attempts to destroy anti-aircraft defenses in the target area.

The Soviets emphasize the importance of deception and surprise in paralyzing hostile anti-aircraft defenses. Aircraft approach the target area at the lowest permissible altitude, given weather and terrain restrictions. Ideally, the approach altitude over enemy territory is 50 to 100 meters. Radio transmission is reduced to a minimum or prohibited entirely. Detected gaps in enemy radar coverage are exploited, and decoy flights in advance of attacking aircraft can be used to distract defending anti-aircraft systems. If more than one pass is necessary to destroy the target, attacking flights approach the target from different directions to minimize anti-aircraft effectiveness, or approach from the direction of bright sunlight to minimize visual detection and recognition. Electronic countermeasures (ECM), play a large role in neutralizing air defenses.

The Soviets prefer small formations of aircraft for ground attack missions. Small formations reduce the probability of detection and provide less profitable targets for air defense systems. Increased maneuverability and simplification of ground control are additional advantages of small attack formations. Though an exception to the rule, formations of squadron strength or larger can be used against important area targets such as troop assembly areas and airfields.

While the nature of the target or targets dictates the weapons payload of the attacking aircraft, generally each flight is armed with cannons or machine guns and carries a mixed load of bombs and air-to-surface missiles/rockets. If more than one pass is to be made over the target, the first attacks are bombing runs, with strafing and rocket attacks following.

According to the Soviet press, the distance between friendly ground troops and explosions of the ammunition released from the supporting aircraft during joint exercises varies between 200 and 700 meters. In real combat conditions, the distance may well be less than that noted during peacetime practicing. In order to avoid mutual interference and to prevent damage to friendly forces, the air strikes are carefully coordinated and closely integrated with the efforts of ground units.

In level bombing, aircraft climb from their approach altitude of 50 to 100 meters to deliver their bombs. Unless the bombs have delayed fuses, climbing is necessary to prevent collateral damage to the aircraft. In some circumstances, Soviet fighter-bombers use loft-bombing techniques to reduce the possibility of damage to the attacking aircraft.

The accompanying diagrams (Figures A3-A6) depict the most common Soviet tactical approach maneuvers for strafing and attacks on point targets. Of these, an attack from the combat turn or chandelle is deemed the most desirable by the Soviets in that it provides adequate aiming time for the pilot, while presenting a difficult target or anti-aircraft defenses. The time interval between attacking aircraft is generally 6 to 10 seconds. This interval may be increased during poor weather or periods of low visibility.

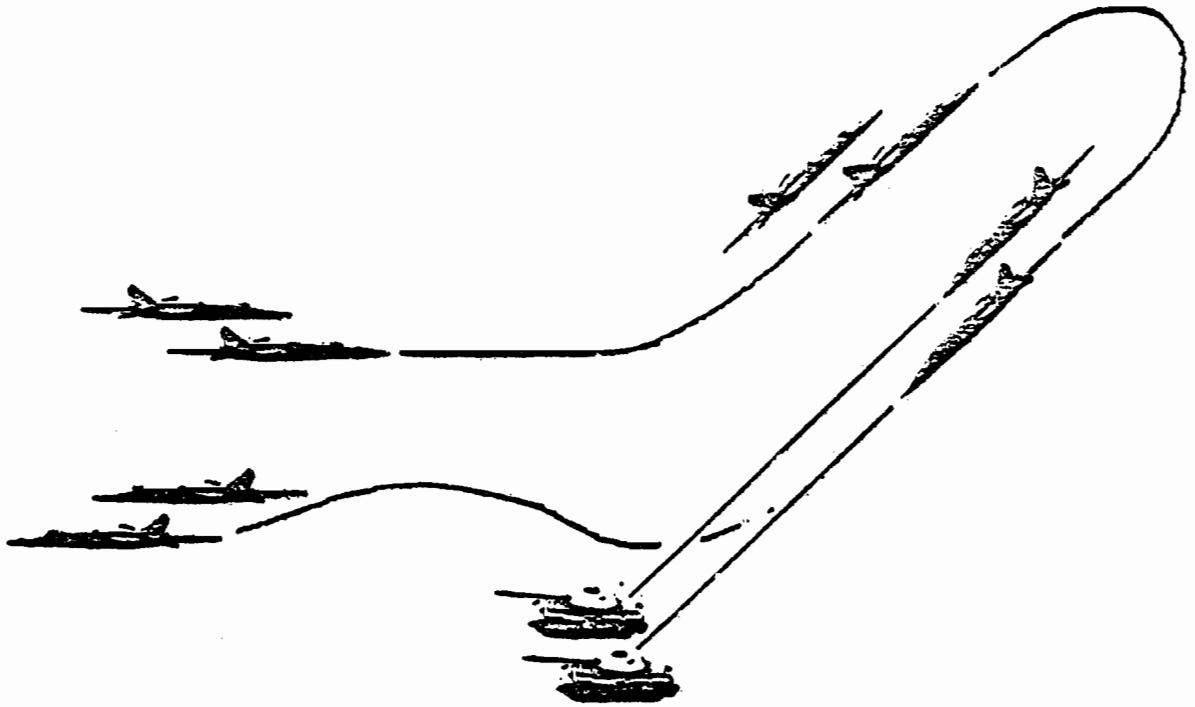


Figure A3 Combat Turn (Chandell) Maneuver.

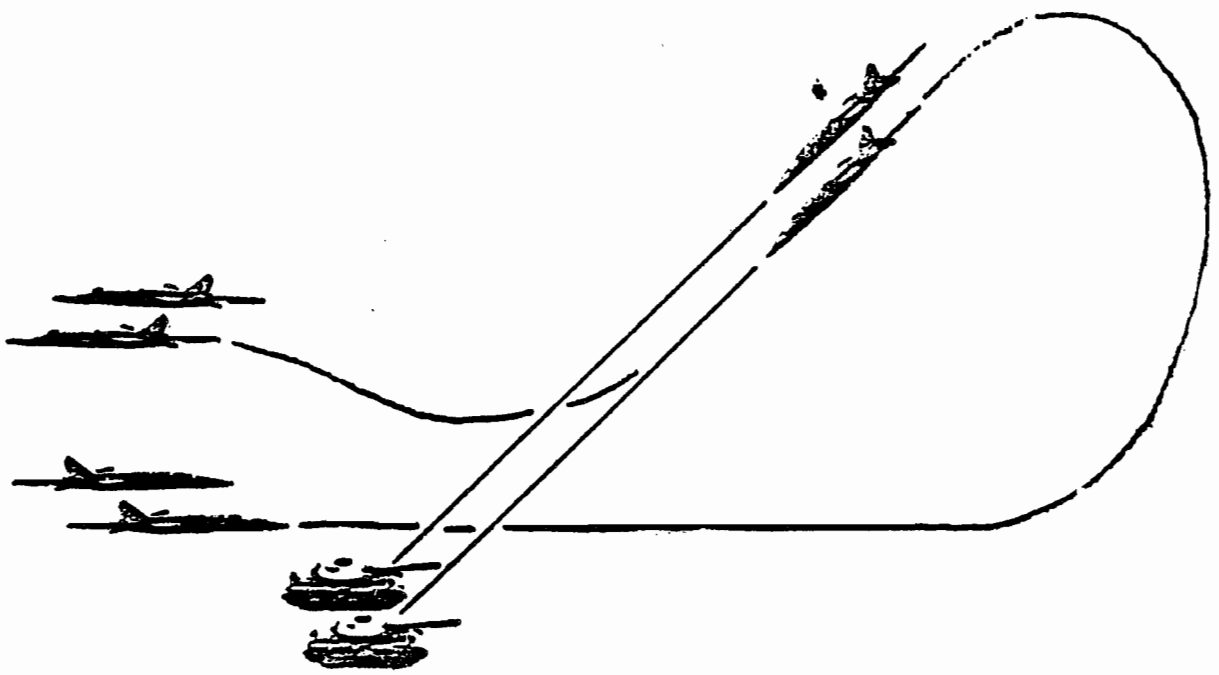


Figure A4 Attack From the "Half Loop."

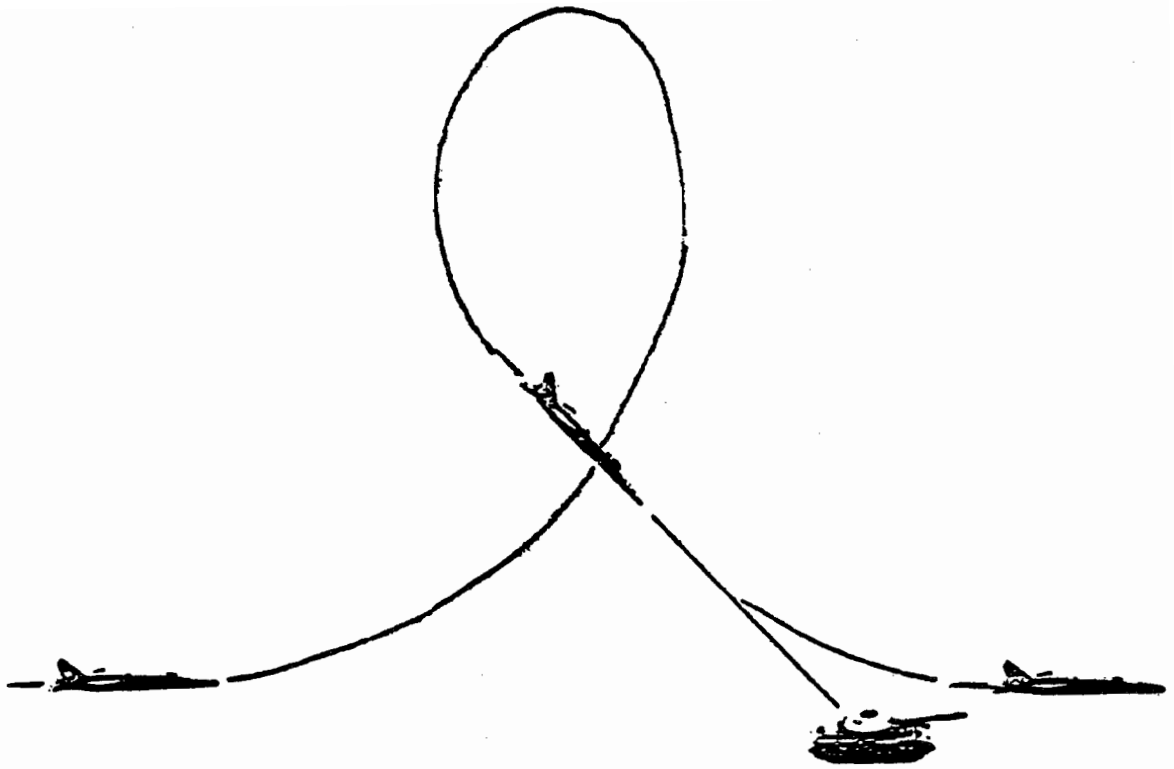


Figure A5 Attack From the "Loop."

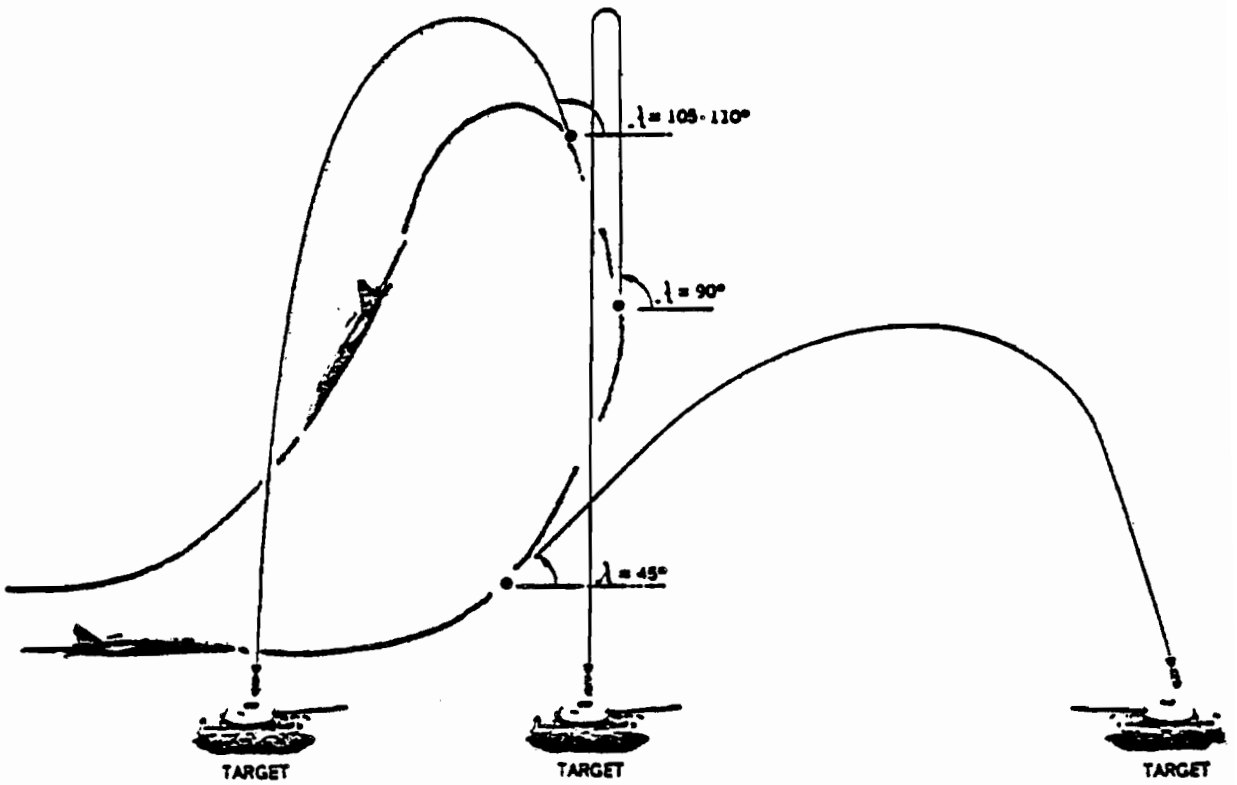


Figure A6 Pitch-up Bombing.

As long as modern anti-aircraft defense relies on radio-electronic equipment, neutralizing its operation through interference is considered by the Soviets to be a major way to reduce aircraft losses. Soviet aircraft possess radio-electronic jamming equipment, which the Soviets believe will increase the aircrafts' capability for overcoming the enemy anti-aircraft defenses. The Soviets also expect their aircraft losses would be reduced as a result of the destruction of enemy anti-aircraft defense weapons by fire delivered by the ground troops. The ground force radio-technical facilities can also create interference in enemy systems of control.

5. Combat Role of Helicopters

a. General

The Soviets have produced large numbers of fire-support helicopters. These rotary-wing aircraft, often referred to by the Soviets as "combat helicopters," are praised as a formidable weapon no less effective than fixed-wing aircraft and, in certain tactical situations, virtually indispensible. Using terrain masking to their advantage, these helicopters could appear unexpectedly over the battlefield, showering the enemy with bombs, guided missiles, unguided rockets, and machine gun fire.

Some Soviet military authorities believe that it is wasteful to use Mikoyan (MiG) and Sukhoi (Su) designed supersonic combat aircraft pricipally for close air support. General M. P. Odintsov, Air Force Commander in the Moscow Military District, declared in the Soviet military press that it is the task of artillery and combat helicopters to strike the enemy on the FEBA. The concentration of high-performance modern aircraft for close air support "cannot be justified." Instead, he stressed that "they must be utilized in finding and destroying objectives deeper in the enemy's rear." There seems to be no argument among Soviet military authorities that combat helicopters have, to some extent, freed fixed-wing aircraft from the direct support of ground troops on the battlefield.

The Soviets have trained extensively in the use of rotary-wing aircraft in antitank operations. Heavily armed combat helicopters have been seen in every major Soviet military exercise. This type of helicopter is able to attack tanks and other armored vehicles on the battlefield and in the rear. It also can be used to lay mines, blow up bridges, and create road obstacles aimed at stalling the movement of ground forces. Recent Soviet helicopter modifications for antitank combat include the AT-6/SPIRAL antitank missle with a much greater stand-off range than the existing SWATTER. Newer Soviet helicopters will probably be fitted with navigational equipment that gives them the capability of "contour flying during time of darkness and reduced visibility."

b. Missions

The missions assigned to combat helicopters include the destruction of enemy tanks and other armored vehicles, antitank means, personnel, artillery, and missiles. They are also considered to have some effectiveness against enemy fire-support helicopters in the air and on the ground, and against fixed-wing and vertical-takeoff-and-landing (VTOL) aircraft on the ground.

One of the most important missions of combat helicopters involves air support to friendly forces in meeting engagements. Current trends in Soviet literature indicate a preference for the use of combat helicopters in restricting the enemy's maneuvering room and supplying real-time reconnaissance data to the ground force unit commanders. They are also valuable in the fire preparation phase prior to the offensive. They can knock out armored antitank means such as self-propelled guns, infantry-carrying combat vehicles equipped with antitank rockets, and tanks.

c. Ground Force Support

The employment of combat helicopters, in general, is similar to the employment of fighter-bombers. They strike against preplanned targets, they operate "on-call" for ground commanders, they undertake armed reconnaissance (okhot) missions and, unlike fixed-wing aircraft, they are especially well suited for ambush operations.

In their role of striking preplanned targets, combat helicopters provide additional fire to support artillery during the fire preparation and during tactical heliborne operations. In the later case, they escort troop carrying helicopters and destroy enemy fire means en route to, and at, the landing site.

While operating "on call" for ground commanders, combat helicopters provide air support to ground troops on the battlefield and destroy newly discovered targets. They can respond to the calls either while on the ground or while patrolling in the air. They can also be called upon to strike counterattacking enemy tanks, to reinforce artillery fire, and to provide direct air support in meeting engagements and in pursuing the enemy.

The armed reconnaissance method is likely to be employed under conditions of limited visibility, when information about targets is incomplete, and when the enemy's flanks are not protected. Among the objectives sought by helicopters "hunting" behind enemy lines would be missiles on the move and in firing position, radar, control and communications facilities, antitank weapons, and enemy helicopters on the ground and in the air. Combat helicopters could also support friendly sabotage and reconnaissance units. A two-or-four-aircraft flight of helicopters is believed to be the most efficient combat formation assigned to an armed reconnaissance mission. In such a mission, the group's leader makes the decision to strike the objectives.

Ambushes employing combat helicopters are set up in forest clearings, on broken terrain, in heavily populated areas, and in river deltas.

Soviet aviation specialists consider the following to be an effective method of ambush for combat helicopters. The helicopters would approach the target, concealed behind masking terrain features, pop up suddenly for 20 to 30 seconds, aim, strike, and quickly withdraw. After firing on the target, a quick reduction in altitude by a sideslipping maneuver is recommended, followed by withdrawal to a safe area. Soviet combat helicopters practice attacking targets from horizontal flight, from a gentle dive, from a pitch-up, from a hovering (pop up) positions, and from the ground.

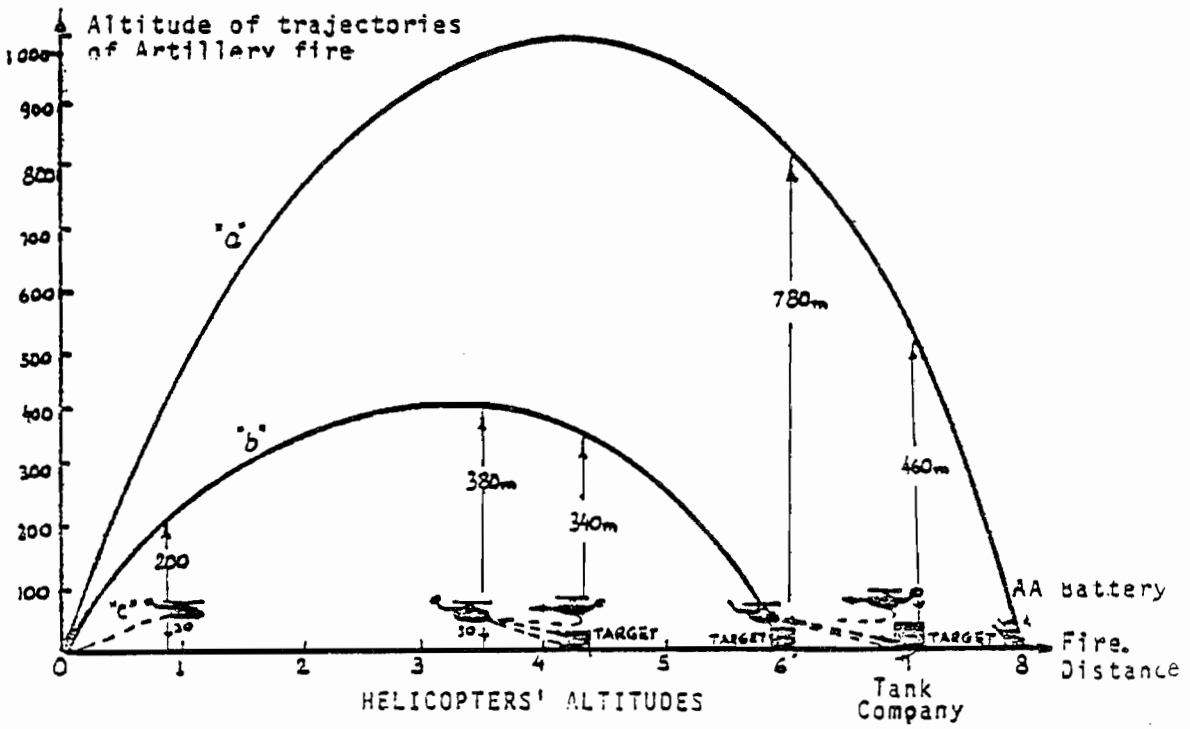
In employing these tactics, several launching positions could be prepared ahead of time where the helicopters secretly mass. The helicopters would rise up from behind their cover on the request of the combined-arms commander, identify the targets, engage them, and then disappear behind terrain masking. The HIND-E equipped with the AT-6/SPIRAL will afford the Soviet pilot greater flexibility because of its greater stand-off range and more sophisticated guidance system that allows the helicopter to maneuver while the missile is on its way to the target.

6. Coordination Techniques Between Helicopters and Artillery

The appearance of combat helicopters as a direct support weapon system has complicated the organization of tactical coordination between air and ground forces. Helicopters, fixed-wing aircraft, and artillery usually are not utilized simultaneously in the same fire zone; to do so would require strict coordination. Attacks by fixed-wing aircraft and the artillery fire sometimes coincide in time, but they are assigned separate target sectors. Combat helicopters are normally employed after the completion of the artillery preparation. It is possible, however, to use the artillery and helicopters simultaneously. In such a situation, close, careful coordination is required. It is planned in such a way as not to allow any pauses in artillery fire while the combat helicopters are carrying out this mission.

In the following illustrations (Figures A7 and A8), combat helicopters are assigned to strike an enemy tank company held in reserve while the artillery fire suppresses air defenses. Hovering at about 30 meters, 1 to 2 kilometers from the FLOT, under an umbrella of artillery fire, the helicopters can hit enemy targets up to 3 kilometers away. Five-hundred meter-wide corridors are assigned parallel to the direction of friendly artillery fire, allowing them to approach the forward line and to withdraw safely.

FIGURE A7 HELICOPTERS ENGAGING TANKS DURING ARTILLERY PREPARATION--SIDE VIEW (ARTILLERY: 122-mm HOWITZER D-30)



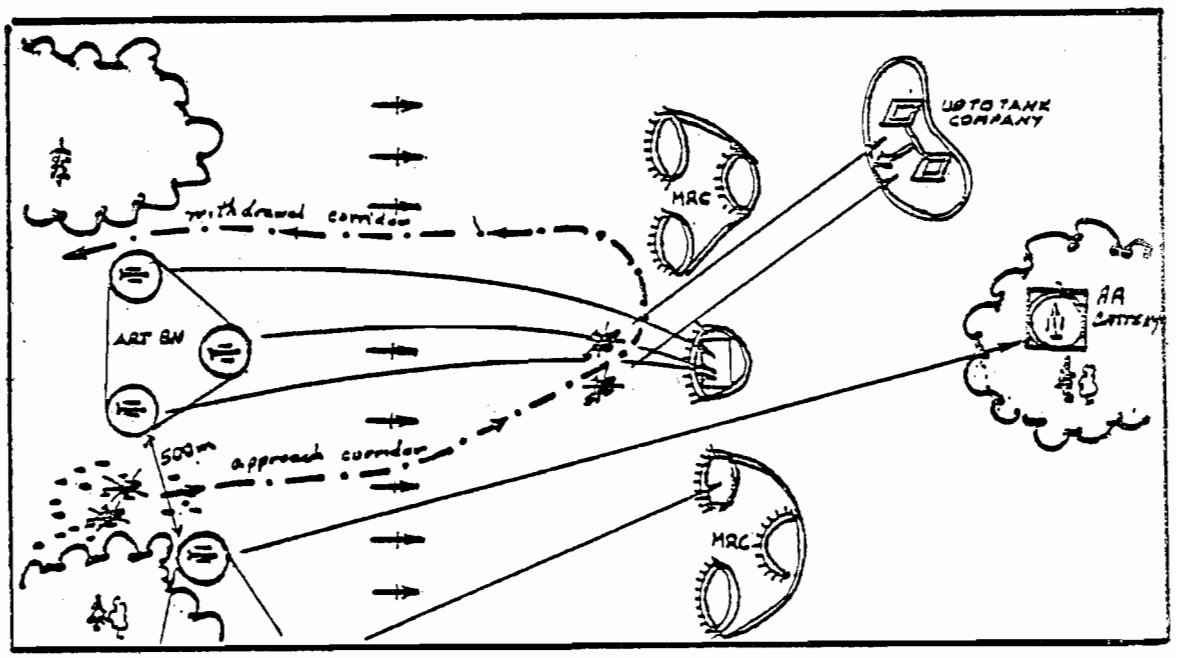
Situation a - Deep Targets

Most distant artillery target 8 km (AA battery).
Helicopters' most distant target 7 km (enemy reserve-tank company
Height of artillery trajectory at helicopters' turning point- 460 m.
Helicopter firing distance - 1,000 m.
Height of artillery trajectory at beginning of helicopters' firing run 780 m.

Situation b - Close Targets

Most distant artillery target 6 km.
Helicopters' target 4,500 m.
Height of artillery trajectory at helicopters'turning point- 340 m.
Height of artillery trajectory at beginning of helicopters' firing run 380 m.
Helicopters' firing distance.

FIGURE A8 HELICOPTERS ENGAGING TANKS DURING ARTILLERY PREPARATION--TOP VIEW



Coordination: Intense artillery preparatory fires suppress enemy air defenses while combat helicopters engage enemy reserve tank company.

Helicopters are less vulnerable on the battlefield when they are used in conjunction with other types of combat systems--fighter-bombers, mortars, tanks, rockets, large-caliber machine guns. Brief, highly concentrated fire and the use of smoke along critical sectors of the helicopter's flight path can improve survivability. The essential requirement of successful operations by combat helicopters is fighter cover. It is emphasized that additional forces are not usually required for this, since fighters will be covering ground troops anyway.

The survivability and effectiveness of combat helicopters in battle depend also upon close and well-organized coordination with ground troops. Helicopter crews must have a good understanding of the tactical situation in the general battle and be able to evaluate the area and the enemy. The commanders of ground force units, in their turn, must know the capabilities of helicopters and the effectiveness of their weapons systems. The Soviets are giving careful attention to the development of better methods of calling for helicopter support, directing helicopters to targets, and maintaining continuous communications.

Various methods of tactical coordination have been developed and tried in joint air and ground force exercises in recent years. The crews of combat helicopter squadrons prepare for exercises by polishing their piloting skills and by attacking different kinds of targets under various weather conditions--individually, in pairs, and in large groups. They often practice low-altitude navigation and attack runs from different directions using all weapons systems. Prior to joint exercises, a combat helicopter squadron commander is assigned to support a particular ground force formation or unit. The squadron commander, together with his staff and flight leaders, works out several tactical variants on how to provide air support. The helicopter crews carefully study the terrain of the combat area on large-scale maps and, considering both the ground and air situations, develop detailed plans for alternative actions in case the original concept should change.

During the preparation for such exercises, helicopter crews meet with the forward air directing officer, an experienced pilot who is assigned to the supported ground force units. They agree on communications, mutual identification, and target designation techniques. Often a ground force battalion commander will brief the helicopter crews on the tactics employed by the ground troops. In the beginning of the exercise, the combat helicopter squadron takes off from its main base and lands at an auxiliary airfield near the command post of the supported ground force formation.

On the ground force commander's request, the helicopters take off and head toward the initial point (IP), usually located about 15 kilometers from the FLOT, which is easily distinguishable visually or electronically. The helicopters maintain a low altitude, using terrain to mask their presence when they reach the IP. From there the helicopters may be directed

by the forward air directing officer toward the target. The security of communications between the helicopter crews and the air directing officer is maintained by the use of brief coded messages.

The air directing officer communicates with the helicopter crews in flight and may brief them on the target, the flight route, time of the strike, and other matters related to the mission. He also may give a signal to the helicopter crews to climb and identify the targets. The crews then identify the targets visually and launch ordnance from a hovering position, or make one attack run, and exit at low level.

Ordnance may be fired by an entire group of helicopters simultaneously or by an individual helicopter. The method is selected that affords the minimum exposure time for the attacking helicopters, thereby reducing the possibility of losing the aircraft to hostile gun or missile fire. Should the ground situation dictate, several runs, or hovering pop-ups, could be made.

The reaction time of air support could be shortened by locating the helicopter groups closer to the FLOT. In this case, the flights or pairs of helicopter will be launched from the forward sites, if the need is immediate, and will provide the ground commander with support within 15-30 minutes after his request.