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The Effects of Airpower on the
Offensive Culminating Point

by

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School of Advanced Military Studies
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Fort Leavenworth, Kansas

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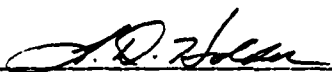
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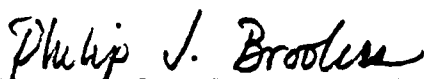
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ABSTRACT

THE EFFECTS OF AIRPOWER ON THE OFFENSIVE CULMINATING POINT
by MAJ Barry D. Fulbright, USAF, 36 pages.

This monograph discusses ways in which airpower can be most effectively applied to hasten or delay the offensive culminating point. Airpower can be used to strengthen friendly combat power, delaying the arrival of the culminating point, or used to hasten the arrival of the enemy's culminating point by weakening his combat power.

The monograph first studies historical examples to derive lessons learned which might be applicable today. Next, current Soviet doctrine for offensive operations is examined to determine strengths and weaknesses which airpower can exploit. Finally, historical lessons are compared to Soviet doctrine and current systems to determine the most productive methods for employing airpower against the offensive culminating point.

Recent emphasis on sophisticated armor-killing weapon systems provide effective means to delay and disrupt Soviet forces but are expensive and available in limited numbers. The enemy's logistics system offers an inviting target for less sophisticated weapons but the results of attacking supply assets are often delayed. The operational commander must balance operational requirements with anticipated results and risk when applying airpower.

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I. INTRODUCTION

Since the invention of heavier-than-air flight by the Wright Brothers in 1903, military thinkers have continuously struggled to develop the best methods to employ airpower as a part of the overall combined arms team. Concepts have ranged from the original use of aircraft for artillery spotting and observation/reconnaissance to Billy Mitchell's belief that airpower

"...will attack centers of production of all kinds, means of transportation, agricultural areas, ports and shipping; not so much the people themselves. They will destroy the means of making war."

History has shown that airpower has neither been restricted to a strictly observation role nor has it been capable of single-handedly deciding conflict. It has, however, proven to be an influential part of the combined arms team when employed intelligently.

The purpose of this study is to determine how airpower can most effectively be used to delay or hasten the arrival of the offensive culminating point. In numerous historical instances, failure to recognize the arrival of the offensive culminating point has resulted in the attacker failing to achieve operational objectives. This often occurs as a result of excessively long and vulnerable lines of communication or unexpectedly high attrition rates. However,

a frequently overlooked element of a defender's overall combat power is his air assets. They can be used both to interdict the attacker's lines of communication/supply and to strengthen the defense itself through close air support, thus hastening the arrival of the attacker's offensive culminating point. Additionally, when determining the proper timing of a counterattack, the counterattacking force must take into account the enemy's airpower when estimating his ability to conduct a successful defense.

This study will first examine the effects of airpower on the offensive culminating point by looking at examples from World War II and the 1967/73 Arab-Israeli Wars. Emphasis will be placed on determining the effects of airpower on the success or failure of the campaign to achieve its operational objectives. Next, current doctrine as set out in Army and Air Force manuals will be tested against historical case studies to determine the most effective ways of employing airpower to bring the enemy to, or cause him to go beyond his culminating point. Finally, conclusions and recommendations concerning doctrinal concepts for the employment of airpower against an attacking enemy will be presented. In all cases, historical lessons and doctrinal concepts will be evaluated in light of current Soviet doctrine for the operational employment of its forces.

Before proceeding further, it is necessary to both define

the offensive culminating point and explain how the arrival of the enemy's offensive culminating point may be hastened. In his classic work, On War, Carl von Clausewitz defines the attacker's culminating point as

"...the point where their remaining strength is just enough to maintain a defense and wait for peace. Beyond that point the scale turns and the reaction follows with a force that is usually much stronger than that of the original attack."²

The 1986 version of Army FM 100-5, Operations, defines the offensive culminating point as

"...a point where the strength of the attacker no longer significantly exceeds that of the defender, and beyond which continued offensive operations therefore risk overextension, counterattack, and defeat."³

Simply stated, a defender's best chances for a successful counterattack occur when the attacker has reached or exceeded his offensive culminating point. It should be pointed out, however, that simply exceeding the culminating point does not guarantee defeat. The defender must be aware of the arrival of the enemy's culminating point and take appropriate action.

In order to hasten the arrival of the attacker's culminating point, the defender must not only act upon the enemy force itself but also on his overall sustainment system. According to FM 100-5, "The more readily the defender can trade space for time without unacceptable operational or strategic loss, the easier this will

be."4 By trading space for time, the defender both conserves his own combat power and lengthens the enemy's Lines of Communication (LOC). As LOCs become longer, more and more resources are consumed maintaining the LOC itself leaving fewer resources available to combat units. Additionally, long LOCs are more susceptible to interdiction and, therefore, require increased protection which further diverts combat resources from front line units. By both inflicting attrition on the enemy force itself and slowing or disrupting his sustainment flow, the defender can cause the attacker to arrive at or exceed his culminating point. Subsequent sections will examine ways in which airpower can be used to accomplish this. This study will also look at ways in which the attacker, once reaching his culminating point, can use his own airpower to help conduct a successful defense.

II. HISTORICAL BACKGROUND

Historically, armies have reached their offensive culminating points for a variety of reasons. The following section will examine selected examples of campaigns reaching their culminating point before operational objectives were achieved. Primary emphasis will be placed on the effects of airpower in hastening the arrival of the attacker's

culminating point or delaying the arrival of one's own culminating point.

Perhaps one of the best examples of an offensive reaching its culminating point was Rommel's drive into Egypt which culminated at El Alamein. Hitler's original intent was to send troops to defend a rather limited area in the vicinity of Tripoli. Rommel repeatedly violated his orders and attempted to advance all the way to the Nile -- a distance that was not logistically supportable given the ports and road/rail facilities available to him at the time. To put things into perspective, the distance from the Soviet demarcation line in Poland to Moscow was 600 miles. On the other hand, the distance from Tripoli to Alexandria was twice that.* To complicate matters, only one road, the Via Balbia, existed between Tripoli and the front and was an inviting target for roaming British aircraft. As the Afrika Korps advanced eastward toward the Egyptian frontier, the port of Benghazi, only 300 miles from the Egyptian border, was captured. While theoretically capable of handling 2,700 tons of supplies per day, constant harassment by the Royal Air Force (RAF) kept the port's capacity at 700-800 tons as a maximum.* When the front progressed even further to the east at El Alamein, the supply situation became even more desperate. Now, even Benghazi was some 800 miles from the front. The capture of Tobruk in June 1942 only slightly

relieved the problem since, once again, the Egyptian based RAF was well within range and continually hammered the port. The result was that the majority of supplies continued to be unloaded at Tripoli or Benghazi which required excessively long land LOCs to bring the supplies forward. Compounding the problem was the fact that constant threat of air attack forced the convoys to move primarily at night, effectively reducing their capacity by half.'

To infer that British airpower alone caused the Afrika Korps most of its logistics problems would be overstating the case. As previously mentioned, the problems Rommel encountered in North Africa existed even without interference from the enemy in the form of insufficient ports near the front and the resulting inadequate land based LOCs. However, the capture of the Egyptian port of Alexandria would have solved much of his supply problem while at the same time denying this valuable port to the British. It must be remembered that El Alamein was only some 60 miles from Alexandria and he reached this point in spite of seemingly insurmountable logistics problems. The British air interdiction of the more forward ports (especially Tobruk) and the long and vulnerable land supply routes unquestionably had an adverse effect on Rommel's ability to proceed past El Alamein.

The German drive into the Soviet Union which culminated

at Stalingrad is another classic example of an offensive culminating before operational objectives were reached. The German drive to the east was halted not so much by the Russians as by the sheer distance and the inability to supply themselves.* Notwithstanding the ultimate Soviet numerical superiority, it remains to be seen whether or not the Germans could have taken Moscow and consolidated their position in the Caucasus had they been able to solve their supply problems. As the German offensive reached the limits of its advance, numerous logistics factors began to play against them.

While, like in North Africa, the German lines of supply were extremely long, it was the fact that they ran through generally hostile territory, and were therefore subject to constant interdiction, that proved fatal. The battle of Kursk in 1943 illustrates the effects of interdiction on the offensive culminating point. While the Russians were busy building their defenses within the Kursk salient, they were also endeavoring to disrupt the German buildup as much as possible. This was a coordinated effort between partisan groups and Soviet air forces. The efforts of both were directed primarily against the German supply routes, especially the railways. In June, for example, 44 bridges were blown up, and 298 locomotives with 1223 railcars were damaged by partisan attacks in the rear of Army Group

Center.* Added to this was a severe disruption of movement which resulted in concentrations of rolling stock near key rail junctions. These concentrations made inviting targets for the Red Air Force. Not only did the attacks on the railways adversely affect the German supply problem, but they also affected morale and reduced their manpower -- a critical shortfall. As one young German wrote home,

"Yesterday the Russians again attacked the leave train, and there was hard fighting, and of course we didn't get by without losses. It isn't all that pleasant nowadays to go on leave, since only a few manage to get to the German frontier unharmed." 10

At the beginning of the Kursk campaign (Operation Citadel), Field Marshall Erich von Manstein, commander of Southern Army Group, believed that the German Army in Russia had not exceeded its culminating point and could conduct a successful strategic defensive to force a draw in the east." He believed that a series of localized blows would sap the Soviet strength to a decisive degree and force a stalemate. Operation Citadel was to be one of these decisive blows. Citadel was a failure and resulted in a general retreat throughout the eastern theater which was to continue until the end of the war. It would appear, then, that the Germans had exceeded their offensive culminating point and were unable to conduct a successful defense. Admittedly, the Soviet forces had, by this time, greatly

outnumbered the German forces and had at least qualitative parity with the German equipment, especially in tanks. But the logistics problems of the Germans may have been the factor which tilted the overall equation in favor of the Soviets. According to Martin van Creveld,

"At Army Group South, it was so difficult as to make it necessary to start the next offensive without any proper base at all, with the result that operations east of the Dnieper always hung by a thread and ultimately came to a halt short of the operational objectives."¹²

While it is true that partisan activity was a key factor in the interdiction of German lines of supply during the eastern offensive, the same types of targets lend themselves readily to attack by air. In fact, once the German rail convoys were held up at key junctions, the Soviet Air Force proved very effective at destroying German logistics resources.

The western front in World War II produced examples of airpower both hastening the arrival of and delaying the offensive culminating point. For the Allies at this point, virtual air supremacy had been achieved. They could effectively protect their own formations from enemy attack and simultaneously attack enemy forces.

Following the breakout from Normandy, Allied forces outran their supply assets during the pursuit across France and were forced to halt at the German border in order to

rectify their supply problem. The question now arises as to whether this was simply an operational pause or actually the arrival of the offensive culminating point. Going back to the definition of the offensive culminating point presented in section I, it is the point where the attacker risks defeat if he continues offensive operations and the conduct of a successful defense becomes questionable. Ultimately, the Allies were able to conduct a successful defense against the German counterattack and eventually to resume the offensive. This was, therefore, merely an operational pause. The role airpower played in the ability of the Allies to conduct a successful defense will be looked at next.

The German offensive known as the "Battle of the Bulge" was deliberately planned to occur during the traditionally poor European winter weather. Fearing Allied airpower, they hoped to achieve decisive results before the weather favored air operations. Hitler saw a chance for success in striking through the weakly held Ardennes, exposing the Allied logistics system, and isolating the British Army in the north of Belgium. The Allies had arrived at this precarious position as a result of a serious underestimation of the German ability to mount offensive operations. The totally unexpected collapse of the German Army in France and the rapid Allied pursuit led many to believe that the German Army in the west was no longer a formidable enemy. This led to

the Allies' acceptance of risk in pursuing all the way to the German border over excessively long lines of supply.

Now, this paper will address the issue of how allied airpower hastened the arrival of the German offensive culminating point during the Ardennes offensive. The German Army suffered severe transportation problems and were hard pressed to keep their offensive supplied. The estimates of rated road capacities were reduced by at least one-third because of Allied bombing and the heavy snowfall.¹³

Whenever the weather cleared, Allied fighters ruled the sky and attacked any German forces in the open, especially supply columns within Germany itself. The Luftwaffe, too, suffered from the Allied air attacks. Even though the Germans managed to produce over 4000 fighters during September of 1944, the shortage of fuel caused by General Spaatz's "oil campaign" lessened the effects of these numbers. When fuel could be hoarded to support large efforts such as the 600 to 700 sorties flown on December 17 in support of the ground offensive, lack of fuel for training sorties resulted in inferior pilots and heavy losses of German aviators.¹⁴

All of this is not to say that the German offensive in the Ardennes was brought to its culminating point by airpower alone, but that the cumulative effects of air operation both prior to and during the battle hastened the arrival of the culminating point.

In contrast to the direct effects of airpower on the German offensive, Allied air supremacy prohibited the Germans from using the Luftwaffe to increase their own combat power significantly. As previously mentioned, the rapid Allied drive across France had resulted in excessively long and vulnerable lines of supply. Since these lines of supply were in friendly territory, they were not subject to widespread guerilla or partisan activity, but were vulnerable to air attack. This was particularly true of the famed "Red Ball Express". If it were not for the Allied mastery of the air, German interdiction of these lines of supply could have had a serious adverse effect on the outcome of the operation. For example, Patton's Third Army, already suffering from a shortage of supplies, may not have been able to make its move to the north to "pinch off" the southern portion of the bulge. So here we see a case of airpower denying the enemy the ability to use all of the combat power at his disposal to produce decisive operational results.

The 1967/73 Arab-Israeli Wars provide relatively recent examples of the application of airpower against Soviet-style forces in both the offense and defense. They serve to show examples of airpower both delaying one's own and hastening the arrival of an enemy's offensive culminating point.

The 1967 war involved the massive use of airpower to delay the arrival of the Israeli culminating point. The

Israelis understood the importance of their own air force as well as the potential threat that the Egyptian Air Force posed to its offensive operations. As a result, they planned and executed a preemptive strike against the Egyptian Air Force. Flying low to evade radar detection, the Israelis destroyed 309 out of 340 combat aircraft on the ground.¹⁵ Later that day, the Syrian, Jordanian, and Iraqi air forces would suffer the same fate. Thereafter, the Israelis would enjoy complete air superiority and would be free to provide close air support to the advancing ground formations. In addition, the Israeli ground forces were virtually free from air attack and their lines of supply were secure. The enemy was subjected to relentless attack by airpower and suffered accordingly. During the retreat from the Sinai, for example, the Egyptians were caught in the eastern approaches to the Mitla Pass by the Israeli Air Force and,

"First hundreds and then thousands of burning vehicles were piling up in the area, leaving little or no room for any of the units to manoeuvre."¹⁶

Essentially, the Israelis were able to use their Air Force as a combat multiplier to delay the arrival of their own offensive culminating point while at the same time, denying the enemy the use of his own airpower.

The "Yom Kippur" war of 1973 illustrated the potential problems that might be encountered while attempting to thwart

an attacking enemy equipped with modern Soviet air defense systems. The Egyptians learned from the 1967 war the importance of Israeli airpower in their operational doctrine. As a result, they took steps to strengthen their air defenses through acquisition of modern Soviet air defense systems to provide a protective "umbrella" for both their combat forces as well as their lines of supply. Lieutenant General Saad El Shazly, in his book, The Crossing of the Suez, when addressing the imbalance of forces, stated that, "The main reason for the imbalance was enemy air superiority"."

The Israelis, on the other hand, had developed an air of overconfidence based on their striking successes during the 1967 war. They continued to rely heavily on their armored and air forces acting as a team. Additionally, they depended on time, at least 72 hours, to mobilize their forces.¹⁰ Because of the relative surprise of the October 6 attack, the Egyptians were able to gain a secure bridgehead on the east bank of the Suez and establish strong anti-armor defenses. When the Israeli armor responded in force, the Egyptian anti-tank missiles took a heavy toll. The Air Force, upon which the Israelis depended for cover for their armored forces, was shot out of the sky in large numbers by the sophisticated Egyptian air defenses. Only after the Israelis crossed the canal with ground forces and neutralized a number

of the air defense sites was the Air Force able to influence the battle significantly. During this war, airpower had both positive and negative effects on the offensive culminating point. On the positive side, the Israeli Air Force was able to protect the ground force's lines of supply and cover the mobilization and deployment to the front. Also, once the Israeli ground forces had crossed the canal and destroyed the surface-to-air missile batteries, the Air Force was able to support and protect the Israeli armored forces, thus delaying the arrival of their offensive culminating point. On the negative side, the Egyptian air defenses, at least initially, were able to deny to the enemy an essential element of his overall combat power. The result was that prior to the Israeli crossing, the Egyptians were able to defend their gains successfully and avoid exceeding their offensive culminating point.

In summary, these brief examples serve to show ways in which airpower has affected the offensive culminating point in the past. The above was not intended to be a history of the campaigns discussed, but rather a basis for deriving lessons which can be applied to current times.

III. LESSONS LEARNED

As indicated in the previous section, airpower has had an

influential, if not decisive effect on the offensive culminating point of both friendly and enemy forces. Airpower can be used both directly or indirectly against the enemy and can be used to protect one's own forces from early culmination. Equally important, its combat power can be used to keep an offensive which has reached its culminating point from exceeding it and becoming vulnerable to defeat.

Hastening the arrival of the enemy's culminating point appears to be the most obvious and straightforward application of airpower. Both Rommel's North Africa campaign and the German offensive into Russia resulted in excessively long and vulnerable lines of supply. The constant interdiction of these lines of supply, by both air and ground forces, had both direct and indirect effects on the overall combat power at the front. The direct effects resulted from attrition of reinforcements and the diversion of combat power to protect the lines of supply. Both manpower and material resources were critical in Germany and this diversion of resources, especially in Russia to protect against partisan attack, ultimately proved critical in what turned out to be close-run campaigns. The indirect results were achieved by denying front line forces adequate means to press the advantage and by forcing numerous "operational pauses" at inopportune times. We must keep in mind that logistical problems were but one of many factors acting against the

Germans in these campaigns. However, the importance of airpower in interdicting the logistics tail should not be underestimated when considering how close the Germans came to taking Moscow, cutting off the Kursk salient, or reaching Alexandria. There can be no doubt that airpower hastened the arrival of the German culminating point prior to the achievement of operational objectives. Once the operational objectives were denied, continued pressure on supply lines prevented the Germans from conducting a successful defense, thus causing them to operate beyond their culminating point.

A less obvious but equally important application of airpower is in the delaying of one's own offensive culminating point, allowing maximum operational objectives to be achieved. Both the German drive into France in 1940, and the Allied drive across France in 1944 were examples of this. In both cases, the overall combat power of the frontline forces was increased by adding the force of airpower in the form of close air support. Additionally, the freedom of action of the enemy air force was denied and friendly lines of supply were protected.

In order to appreciate fully the positive effects of airpower, it is necessary to also examine the reasons for the failure of airpower to influence the offensive culminating point. As seen earlier, the Egyptian Air Force was virtually eliminated during the opening hours of the 1967 Arab-Israeli

War. Obviously, this is one way to eliminate the threat to the friendly offensive culminating point, but political as well as military factors will normally prohibit this solution. The 1973 war, on the other hand presented a more likely scenario involving the neutralization of airpower. The Egyptian air defenses, sophisticated for the time but less so than U.S. or NATO forces would face today, virtually negated the effects of the Israeli Air Force during the early days of the war. The Israeli concept of the armor/air team was therefore preempted with initial disastrous results. The combat power of the Israeli counterattacks was thus reduced, leaving the armor vulnerable to the Egyptian infantry armed with anti-tank missiles. Later, after the Israeli ground forces neutralized the Egyptian air defenses, the armor/air team was reestablished, giving the Israelis the combat power necessary to encircle the Third Army. The Egyptian Air Force, on the other hand, was troublesome but never decisive because of Israeli air superiority over her own forces.

In summary, airpower can, in several ways, have an effect on the offensive culminating point. First, through direct close air support of ground forces, it can strengthen one's own combat power in relation to that of the enemy. Second, it can strike at the enemy's lines of supply and thus weaken the power of his front-line formations. Finally, it can protect friendly lines of communication to preserve and

strengthen the combat power at the front. All of this affects the dynamic combat power relationship between the defender and the attacker which defines the arrival of the culminating point. It should be noted that the preceding historical examples represent cases where the offensive culminating point had been exceeded or, in other words, where the attacking force was no longer able to revert to a successful defense and was vulnerable to counterattack.

IV. SOVIET DOCTRINE

In order to apply the previous lessons learned to today's situation, an examination of current Soviet military doctrine is necessary. According to FM 100-2-1, Soviet offensive doctrine emphasizes, "...the primacy of offensive operations, surprise, 'shock power', and the combination of several arms and services to attain decisive operational success to a considerable depth within the enemy's defense."¹⁹ They see offensive operations as a totally combined arms concept with their airpower playing a key role. Maintaining a rapid tempo is critical to success in Soviet offensive operations, hence the requirement to echelon forces. They rely on simultaneous

"...artillery attack and airstrikes through the entire depth of enemy defenses combined with tank and infantry formations to break through his tactical defensive

and to drive rapidly and forcefully into the depth of his operational rear..."²⁰

In short, the Soviets rely heavily on rapid tempo for the attack, combined arms warfare, and attack throughout the depth of the battlefield to achieve success.

Since Soviet doctrine is primarily offensive in nature, they believe that the "hasty defense will be more prevalent than the prepared defense."²¹ Their stated reasons for assuming the defense are:

- To consolidate gains.
- To await additional resources when temporarily halted by the enemy during the course of an offensive.
- To protect the flanks of a formation or a seacoast.
- To repulse an enemy counterthrust.
- To regroup after severe losses suffered from nuclear weapons.
- To free resources for other units that are on the offensive.
- To await logistic support.²²

In most cases, they consider the defense to be temporary, ultimately leading to the resumption of the offense. This all seems to imply that by attacking the same resources needed to maintain the Soviet offense will also help to prohibit him from resuming the offense.

The Soviets have developed a concept for employing a

tailored high-speed exploitation force called an Operational Maneuver Group (OMG). This force is employed at army and probably front level. At front level, the OMG

"...is designed to move deep into the enemy rear area and to seize critical objectives, normally before second echelon Soviet formations are committed to combat."²³

The OMG is designed to help the first echelon penetrate enemy defenses and raid deep into the enemy rear. It represents a serious threat to friendly forces and therefore bears special consideration when formulating campaign plans.

Soviet doctrine for the employment of its air forces in the offensive calls for four stages of support: support for movement forward, air preparation, air support, and air accompaniment. Support for movement forward is rather straightforward and involves the protection of units as they move forward. Air preparation is similar to a pre-attack artillery preparation except that it extends to operational depth. Air support begins after the ground forces start the offensive and its targets are generally those beyond the range and destruction capabilities of artillery and missiles. Finally, air accompaniment occurs as ground forces penetrate deep into the enemy rear. Involving both fixed and rotary wing assets, it provides both fire support as well as defensive protection for the penetrating ground forces. It is obvious that the Soviets have carefully integrated

airpower into all phases of their operational maneuver and rely quite heavily on their air assets to achieve success.

From this discussion of Soviet offensive doctrine, at least three characteristics which are paramount to their success emerge. These are the requirements for rapid tempo, attack in depth, and integration of all arms (especially airpower) into the operational plan. The following section will analyze and evaluate ways in which airpower can most effectively exploit these characteristics and bring about the offensive culminating point.

V. ANALYSIS AND EVALUATION

In order to determine the best methods for employing airpower to hasten or delay the arrival of the offensive culminating point, lessons learned from historical examples will be evaluated in light of current Soviet doctrine for the offense. Additionally, ways in which airpower can be used to delay the arrival of our own offensive culminating point will be examined.

From the historical examples, it is apparent that there were three primary reasons why offensives culminate. First, the strength of the attacker is reduced through attrition to a point where he is no longer capable of continuing the attack. Second, the defender is able to build his strength

to a point where he is essentially the equal of the attacker. Finally, the attacker's supply problems are such that he is unable to project the required combat power at the front and is required to revert to the defense or risk defeat. All of the operational offensives studied culminated for one, or a combination of these reasons. This section will analyze the ability of modern airpower to bring an offensive to culmination by causing the above conditions to occur.

The current Soviet offensive doctrine calling for rapid penetration to the depth of the enemy's defense requires complicated and extensive logistical preparation. It follows that the more rapid and deep the advance, the longer and more vulnerable the lines of supply become. Soviet doctrine, not unlike the German "Blitzkrieg" doctrine of World War II, offers many of the same vulnerabilities. As discovered in North Africa, Russia, and the Western front in 1944, German lines of supply presented inviting targets for both airpower as well as guerilla or partisan attack. There are several reasons why they are such a lucrative targets. First, most targets are "soft" targets which do not require sophisticated weapons to destroy them effectively. Second, routes can be predicted with some degree of certainty, making location and destruction of logistics targets likely. And finally, air defenses will generally not be as dense as those at the

front. Even without an intense interdiction effort, the Soviet supply system has its weaknesses. Given the sheer size of the combat forces to be supported, traffic congestion on the roads is likely to occur. Also, the different rail gauges between the Soviet Union and Eastern Europe will require transloading at the border, and along with it, potential congestion. All of this will provide inviting targets for friendly airpower. Just as the long lines of supply had adverse effects on the offensive culminating point during World War II, they will probably be a point of vulnerability for current Soviet forces also.

The Soviet procedure for echeloning forces is required to sustain the rapid tempo of an offensive and apply continuous pressure on the enemy. This is another characteristic of Soviet offensive operations which airpower can exploit. By disrupting the movement of follow-on echelons, the tempo of the Soviet attack can be broken. U.S. Air Force doctrine recognizes the importance of air interdiction and calls it a campaign developed to

"...delay the arrival or buildup of forces and supplies, disrupt the enemy's scheme of operation and control of forces, divert valuable enemy resources to other uses, and destroy forces and supplies."²⁴

When the Allies landed in France in 1944, the Germans relied on the rapid movement of critical reserves to the decisive point to defeat the Allied landings. While Rommel

realized the capabilities of Allied airpower and wanted to concentrate forces forward on the invasion beaches, von Rundstedt

"...had never fought a campaign against an enemy possessing unchallenged air superiority, so he had little idea of what that would mean. He believed that reserves could be moved forward, and that the logical, conventional thing to do was to keep them well back and well in hand until the landing was thoroughly underway."²⁵

As it turned out, Rommel was correct and the movement of reserves to the critical point was delayed effectively by Allied airpower. AirLand Battle as well as NATO's Follow-on Forces Attack (FOFA) both rely on the ability of airpower to delay and disrupt the commitment of Soviet follow-on forces in order to break the tempo and momentum of the offensive. There are two ways to accomplish this. First, the routes upon which these forces must travel can be interdicted to slow progress. Bridges, key rail facilities, and road junctions can be attacked to produce significant delays. Second, the forces themselves can be attacked. Unfortunately, mobile modern air defense systems associated with Soviet combat formations make attack of these forces risky at best. As the Israelis discovered in the 1973 Yom Kippur War, air defenses must be neutralized before direct attack of enemy forces becomes effective. Soviet doctrine prescribes detailed procedures for the use of air defense

assets to protect forces in march formation from enemy air attack. All of this makes the direct attack of follow-on forces a costly method of hastening the arrival of the enemy's offensive culminating point.

Since the Soviets rely heavily on their air forces during offensive operations, denial of this important asset will have a significant effect on their overall combat capability. By denying the freedom of action to their air forces, we can directly decrease the combat power available at the front. Just as U.S. Air Force doctrine requires "freedom of action to conduct operations against the enemy"²⁶, Soviet forces rely on the early achievement of air superiority to employ airpower effectively in support of offensive operations. Again, the 1973 Arab-Israeli War showed the adverse effects of denying "freedom of action" to the air force when the the Egyptian air defenses effectively neutralized the Israeli Air Force. Reliance on airpower, in itself, creates a vulnerability which opposing forces can exploit.

The current doctrine and capability of U.S. forces regarding the integration of airpower into the overall campaign plan is only partially satisfactory. In defensive operations, current AirLand Battle doctrine emphasizes deep attack, or in NATO terms, FOFA. It emphasizes disruption of the enemy's movement in depth, destruction of high-value

targets vital to the attacker, and interruption of command and control at critical times.²⁷ It does not, however, specifically discuss the attempt to hasten the arrival of the enemy's culminating point. In most situations, the hastening of the enemy's offensive culminating point should be the focus of air operations. It both conserves combat power by reducing the enemy's combat capability and allows the ground forces to seize the initiative as early as possible. Depending on the development of the battle, the primary focus of air operations may be the front line forces, follow-on forces, or the logistics network supporting those forces. By specifically seeking to hasten the arrival of the enemy's offensive culminating point, airpower can be focused upon the most productive targets at the right time.

Unlike Soviet doctrine which identifies specific and sequenced roles for airpower during offensive operations, U.S. and NATO doctrine is somewhat unclear. While FM 100-5 emphasizes the importance of air operations during the offensive, specific procedures and sequencing of operations is vague. AFM 1-1, by emphasizing the primacy of the counter-air battle, satisfies the requirement to protect the ground force from enemy air attack, but is also hazy concerning specific procedures for supporting other aspects of the offensive. Support priorities and objectives are not delineated.

In light of current doctrine and historical lessons, several shortfalls exist regarding the proper application of airpower. At least in perception, current doctrine places excessive emphasis on attack of follow-on forces at the expense of attack on the enemy's means of support. Even Soviet military writers believe that at the very outset of a conflict on the Central Front, NATO intends to "destroy the enemy's second echelon and reserves before they are committed to battle, thereby paralyzing his troop movements and disrupting his weapons and control systems."²⁰ As a result, increased emphasis has been placed on air-delivered weapons designed to destroy "hard" targets such as armor and hardened ground installations. Unfortunately, the weapons required to destroy these hard targets are expensive and, consequently, in short supply. On the other hand, relatively unsophisticated weapons such as cluster bombs and light cannon are effective against "soft" logistics targets. Both logistics interdiction as well as delay and destruction of follow-on combat forces serve to hasten the arrival of the offensive culminating point. However, the relative payoff, as well as economic realities should be considered when developing deep battle doctrine.

It appears that the previously identified shortfalls in both doctrine and equipment may limit the effectiveness of air operations against the enemy's offensive culminating

point. Since airpower is a limited resource, it must be used to produce the most cost-efficient results, while still being driven by the overall operational campaign objectives. Granted, when immediate results are necessary, or when combat forces are the most viable target, weapons and procedures designed to cause attrition of combat forces may be the most effective way to employ airpower against the offensive culminating point. Examples of this case might be an OMG where lines of supply are not particularly critical to the enemy or during friendly offensive operations where direct attrition of enemy combat forces adds to friendly combat power and delays the arrival of the offensive culminating point. On the other hand, when delayed results are acceptable, emphasis on enemy lines of supply may prove more efficient. The cumulative effect of attack of the enemy logistics effort, in many cases, will have a more pronounced and long-lasting effect on the outcome of the campaign.

VI. CONCLUSIONS AND RECOMMENDATIONS

Throughout the history of airpower, we have seen both successful and unsuccessful integration of the air arm into the overall campaign plan. Successful campaigns have resulted from the proper and timely application of airpower against the enemy's most vulnerable points. Unsuccessful

campaigns resulted from an improper assessment of enemy capabilities and vulnerabilities and application of airpower against relatively unimportant targets. Since airpower is a limited resource, the operational commander must insure that it is always used against high priority targets.

In order to use our limited air resources most effectively, they should be concentrated against high payoff and relatively low risk formations. From the previous study, logistical targets have historically proven to be the most vulnerable and productive targets for airpower. Modern Soviet doctrine also serves to make logistic targets lucrative for air attack. Emphasis on tempo and depth of the offensive automatically create massive logistics problems for the Soviets. An effective interdiction campaign against enemy lines of supply can produce significant and long term effects, resulting in early culmination of his offensive. While potentially the most efficient method of bringing the enemy to culmination, interdiction of logistics may not produce quick results. When this is required, direct attrition of enemy combat forces is required. This will require the use of sophisticated armor-killing weapons and will probably result in a high loss rate due to the density of air defense systems associated with Soviet combat formations.

While defensive operations require that the tempo and

pressure of the enemy offensive be interrupted, friendly offensive operations require friendly forces to be protected and enemy defenses to be disrupted. Attrition of enemy combat forces in order to strengthen one's own combat power in relation to the enemy will delay the arrival of the friendly offensive culminating point. While this may prove costly in terms of losses to the Air Force, it provides quick and decisive results.

The decisions involving where the emphasis of an air campaign should be placed constitutes the operational level of war regarding air operations. General Charles L. Donnelly, former commander of U.S. Air Forces Central Europe and Allied Air Forces Central Europe describes the operational challenge as the ability to

"...concentrate firepower at the right times and places to meet overall campaign objectives. By 'the right time and places' I mean the prioritized times and places and the prioritized missions to meet campaign objectives for the theater."²⁹

Both AirLand Battle and FOFA stress delay and disruption of enemy follow-on forces. While not specifically delineated, it is implied that this should be accomplished by attack of follow-on combat forces. The operational commander should analyze the overall situation and select the most productive and risk free solution whenever possible. Attack of the enemy logistics system can achieve the highest payoff

with the least losses of aircraft, but requires longer for the results to be felt. Direct attack of enemy combat forces will probably provide the quickest results but is likely to result in higher aircraft losses and expenditure of quantitatively scarce resources.

The operational commander, therefore, must carefully analyze the situation and apply airpower in such a way as to cause the enemy offensive to culminate or to delay the arrival of the friendly culminating point. Whenever possible, this should be done in such a way as to minimize the risk to air resources. Attacking enemy logistics appears to be an excellent way of achieving significant results with a minimum of risk, assuming the operational situation does not require more immediate results. Balancing the operational requirements with the anticipated results and risk constitutes operational art when applying airpower.

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