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THIRD DIMENSION DEEP OPERATIONS
IMPACTS AND IMPLICATIONS

BY

LIEUTENANT COLONEL ALLEN P. HASBROUCK, ADA

15 MARCH 1990

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The 1980's saw an increased emphasis on the need to operate jointly in the planning and conduct of military operations. Historically, one sphere of operations has been conducted jointly for several decades -- counterair operations. However, Army - Air Force counterair operations primarily consisted of efforts to deconflict, divide, and compartmentalize activities rather than integrate them. This was due to technological limitations which precluded simultaneous Army and Air Force operations in the same air space.

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This study seeks to examine changes in threat technology and doctrine; imperatives of our current AirLand Battle doctrine; and, potential mismatches between our capabilities and those required to meet the intent of our doctrine. Both the Soviet and non-Soviet threats we confront worldwide are more sophisticated and evolving. They are demonstrating an increasing use of the airspace in their conduct of operations. Such uses potentially inhibit execution of our AirLand Battle doctrine. However, from these conditions come opportunities for the future. The paper explores potential counters to a threat's use of the third dimension, doctrinal implications of the counters, and some possible technological considerations. The study closes with the conclusion that considerable joint study is needed to develop an optimum mix of future counterair capabilities.

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THIRD DIMENSION DEEP OPERATIONS IMPACTS AND IMPLICATIONS

An Individual Study Project

by

Lieutenant Colonel Allen P. Hasbrouck, ADA

Colonel(Ret.) Michael J. Morin
Project Advisor

U.S. Army War College
Carlisle Barracks, Pennsylvania 17013
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The 1980's saw an increased emphasis on the need to operate jointly in the planning and conduct of military operations. Historically, one sphere of operations has been conducted jointly for several decades -- counterair operations. However, Army - Air Force counterair operations primarily consisted of efforts to deconflict, divide, and compartmentalize activities rather than integrate them. This was due to technological limitations which precluded simultaneous Army and Air Force operations in the same air space. This study seeks to examine changes in threat technology and doctrine; imperatives of our current AirLand Battle doctrine; and, potential mismatches between our capabilities and those required to meet the intent of our doctrine. Both the Soviet and non-Soviet threats we confront world-wide are more sophisticated and evolving. They are demonstrating an increasing use of the airspace in their conduct of operations. Such uses potentially inhibit execution of our AirLand Battle doctrine. However, from these conditions come opportunities for the future. The paper explores potential counters to a threat's use of the third dimension, doctrinal implications of the counters, and some possible technological considerations. The study closes with the conclusion that considerable joint study is needed to develop an optimum mix of future counterair capabilities.

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INTRODUCTION

The past five to ten years have seen an increased emphasis on defining and attaining "jointness" in military planning and operations. The Grenada experience and the Goldwater-Nichols Bill notwithstanding, a watershed source document in the recognition of jointness is Army Field Manual 100-5, Operations. The manual provides the doctrine for Army warfighting whose title -- Airland Battle -- epitomizes jointness. The doctrine is called AirLand Battle in recognition of the inherently three dimensional nature of modern warfare. All ground actions above the level of the smallest engagements will be strongly affected by the supporting air operations of one or both combatants.[1]

One area of joint Army -- Air Force operations which predates these most recent "jointness" crusades is that of counterair operations. The Army and Air Force have long been forced to cooperate in the conduct of operations designed to reduce, nullify or destroy the enemy's air capability and thereby gain control of the air environment and protect the force.[2] In the past, counterair operations have been typified

by a process of segregation rather than an integration of activities. Historically, the fires of surface-to-air and air-to-air systems have been segregated vertically, horizontally, and in depth. This has been done primarily to avoid the fratricide associated with co-use of the airspace. The result has been the establishment of engagement zones oriented on specific weapon system capabilities. Each zone represents airspace of defined dimensions within which the responsibility for engagement normally rest with a particular weapon system.[3]

Technological realities were the primary limiting factor in joint counterair operations. Fielded air defense systems were incapable of continuously tracking and positively identifying aircraft operating within their system engagement envelopes. These realities led to the creation of fighter and missile zones over the battlefield. More importantly, the principle of segregation of the airspace has led to an acceptance, on the part of Army surface-to-air forces, that their fires are limited to targets in friendly airspace. This has led to a FLOT orientation -- a linear approach in a non-linear environment -- where weapons are employed and engagements zones oriented on an imaginary line. The lines used may in fact be totally inappropriate for conducting an

air battle in support of a land battle.

The end result of this counterair evolution has been our development of and investment in ground based air defense forces of limited capability. We have failed to stress the development of those capabilities of design required to move into air defense operations beyond the FLOT. The purpose of this paper then is to examine the need for surface based systems to participate in counterair operations across the FLOT in both a close and deep battle context. The paper examines the potential use of the airspace by the threat; the impact of those activities on the AirLand Battle force; the opportunities arising from threat tendencies; the implications of cross FLOT operations by Army air defense forces; and, some concluding thoughts.

ENDNOTES

1. U.S. Department of the Army, Field Manual 100-5, p. 9.
2. Joint Chiefs of Staff, JCS Publication 3-01.2, p. III-1.
3. Joint Chiefs of Staff, JCS Publication 3-01.3, p. A-1.

CHAPTER II

THIRD DIMENSION OPERATIONS

BACKGROUND

Military history is replete with examples of air power in action -- Hitler's Blitzkrieg; the Arab-Israeli war of 1967; and Allied bombing of Dresden and Tokyo in World War II. Such destruction wrought from the air can be decisive in battle. However, the delivery of munitions is but one application of the platforms that will utilize the airspace above future battlefields. This point is clearly acknowledged in current doctrinal publications such as JCS Publication 3-01.2 . . .

> "Enemy fixed wing aircraft and cruise missiles pose a primary threat to friendly forces and must be countered to gain control of the air and to protect U.S. forces. Additionally, enemy SOF, airborne forces, and attack helicopters . . . tactical ballistic missiles . . . remotely piloted vehicles and nonlethal air vehicles with electronic or psychological warfare capabilities also threaten the joint force."[1]

and FM 100-5 . . .

> "The airspace of a theater is as important a dimension of ground operations as the terrain itself. This airspace is used for various purposes including maneuver, delivery of fires, reconnaissance and surveillance, transportation,

and command and control."[2]

The increasing utilization of aerial platforms to perform various functions is common to all technologically sophisticated air forces. The U.S. Air Force has articulated numerous missions and tasks it must be capable of performing in order to deter war, defend the United States, and conduct warfare.[3] Specifically, U.S. Air Force operational and tactical level missions include counterair, air interdiction, close air support, surveillance and reconnaissance, airlift, and special operations.[4] In addition to these missions, specialized tasks have been identified. These include electronic combat, warning and command and control and communications, and intelligence.[5]

For purposes of this paper, the above missions and tasks have been aggregated into four general categories. The first category is comprised of aerial platforms designed to destroy or directly attack. These include aircraft, missiles, and remotely piloted vehicles (RPV) conducting counterair, air interdiction, close air support or fire support missions. A second category is electronic combat. Fixed and rotary wing aircraft and RPV platforms are included and conduct intelligence gathering, direction finding, and jamming activities. The third category is reconnaissance and

surveillance. Included here are fixed and rotary wing aircraft and remotely piloted vehicles or drones. The fourth category is friendly command, control, and communications (C3). Potential platforms performing a C3 enhancement task include fixed and rotary wing aircraft and drones.

The recognition of the various uses of aerial platforms evidenced in U.S. doctrine has not been missed by our potential adversaries. In addition to the Soviet Union, various regional powers have adopted a similar air and ground operations doctrine. Therefore, multiple potential adversaries in the world present a technologically sophisticated threat committed to fully utilizing the airspace over the entire battlefield.[6]

SOVIET THREAT

Soviet air power poses a significant threat to the AirLand Battle commander. A review of Soviet air capability reveals an appreciation of the multiple opportunities associated with the use of aerial platforms. The Soviets have considerable investment in destruction, electronic combat, reconnaissance and surveillance, and C3 platforms.

The most well known and understood category of Soviet air power is its destructive capability. The expected combination

fighter and fighter-bomber fixed-wing aircraft; tactical ballistic and cruise missiles; attack helicopters; and advanced munitions represents a very credible threat to any joint commander. In order to execute the destruction mission, however, the threat must come to the target. This is the type of threat current air defense assets are designed to counter. Such air defense operations are primarily components of rear operations to defend critical theater, corps, and division level sustainment, firepower, and command and control capabilities. As stated previously, the purpose of this paper is to examine the implications of cross FLOT operations. Therefore, the remaining threat discussion will address those potential threats operating predominately in enemy airspace.

As the sophistication of weapons continues to increase, electronic systems are expanding the use of the frequency spectrum. In order to operate effectively our forces must retain the use of essential portions of the electronic spectrum.[7] The Soviets have developed their electronic warfare capabilities into an integrated system called radio-electronic combat (REC). REC combines signals intelligence, direction finding intensive jamming, deception, and a link to destructive fires to attack enemy organizations and systems through their means of control.[8] The purpose of REC is to

limit, delay, or nullify the enemy's use of his command and control systems.[9] Soviet high power jammers can cover all the radio frequencies currently in use by the U.S.[10] Both very high frequency (VHF) and ultra high frequency (UHF) systems are vulnerable to airborne jammers.[11]

Electronic combat or REC platforms include both fixed and rotary wing aircraft. Fixed wing stand-off threats include the IL-20 COOT and the AN-12 CUB.[12] In wartime the COOT and CUB aircraft would operate well behind the FLOT when conducting jamming operations.[13] The CUB jamming variant carries a complex jamming system and is capable of barrage jamming at an effective range of over 200km.[14] Rotary wing platforms modified to conduct jamming operations include the MI4 HOUND and MI8 HIP. There are two primary tactical jammers -- the HIP J and HIP K.[15] These aircraft appear focused on radar and communications jamming.[16] These aircraft are found at Front level with at least one squadron of 12 to 30 ECM equipped HIPs and HOUNDs per Front.[17]

While considerable resources are dedicated to disrupting enemy command and control through jamming, Soviet doctrine places an enormous burden on its own information gathering system. The tactical concepts of Soviet ground forces require timely, accurate, and continuous information on the enemy, terrain, and weather.[18] Airborne electronic reconnaissance

platforms provide a much improved capability to intercept radio and radar signals more frequently and at greater distance. Such systems are aimed at the detection and location of enemy battlefield surveillance radars, command posts, and communications centers.[19] Soviet technology exploitation and modernization has resulted in an enhanced warfighting capability through improvements in surveillance, reconnaissance and target acquisition.[20]

Reconnaissance and surveillance platforms are primarily fixed wing but some rotary wing aircraft have appeared. Fixed wing platforms are both manned and unmanned. Remotely piloted vehicles or drone reconnaissance systems include the DR 3, DR 4, and DR 5.[21] Manned reconnaissance aircraft include the MIG 25 FOXBAT and the IL-18, both equipped with side looking airborne radar (SLAR).[22] Fixed wing aircraft may also carry multi-sensor (ELINT, Infrared) reconnaissance systems.[23] If information derived from these airborne sensors can be fed into a sophisticated command and control system, it may begin providing the targeting information, disposition of enemy forces, enemy order of battle, location of reserve forces and other information key to executing Soviet operational plans.

The Soviet program to automate battlefield operations is known as automated troop control.[24] The Soviets expect enhancements in their C3, coupled with weapons modernization,

to be a key element of their future force development.[25] An automated command and control system can link together deep strike missile and artillery systems and advanced surveillance and target acquisition systems and provide enhanced capability to achieve military objectives.[26] Aerial platforms can assist in the development and maintenance of a robust command and control network. Aircraft such as the Soviet AWACS, the MAINSTAY, and small airborne battle staffs provide flexibility to command and control systems while aircraft mounted retransmission stations enhance communications connectivity. Two such aircraft are the MI 4 and MI 8 D/G helicopters.[27]

A review of the platforms above reveals a Soviet appreciation of the synergy possible through the coordination of various airborne systems. The linkage of target acquisition and battlefield reconnaissance systems to a network capable of managing electronic combat and direct attack forces presents a considerable challenge to the AirLand Battle commander. The Soviets have recognized the dependency of modern military forces on command, control and communications and have developed a formidable capability to degrade the C3 of enemy forces.[28]

The Soviet commitment to the acquisition and fielding of forces designed to disrupt our C3; reduce their "fog of

war" through relentless reconnaissance and surveillance; and, fully integrate those capabilities with its awesome destructive power through automated C3 networks cannot be ignored. These forces, operating from the sanctuary of their own airspace, could significantly affect the AirLand Battle commander's ability to conduct aggressive, decisive operations characterized by agility, initiative, depth and most importantly, synchronization. The next chapter will address the potential effects of such air power operations on the AirLand battlefield.

ENDNOTES

1. Joint Chiefs of Staff, JCS Publication 3-01.2, p. III-1.

2. U.S. Department of the Army, Field Manual 100-5, p. 4.

3. U.S. Department of the Air Force, Air Force Manual 1-1, p. 3-1.

4. Ibid., p. 3-2.

5. Ibid., p. 3-6.

6. U.S. Army Counterair Operations, Study Project, p. 1-8.

7. U.S. Department of the Air Force, Report to the 100th Congress FY 1989. p. 20.

8. U.S. Department of the Army, Field Manual 100-2-1, p. 15-1.

9. Ibid.

10. David C. Isby, Weapons and Tactics of the Soviet Army, p. 483.

11. Ibid.

12. Bill Gunston, Encyclopedia of World Air Power, p. 175.

13. Ibid.

14. Isby, p. 484.

15. Gunston, p. 221.

16. Isby, p. 449.

17. Ibid., p. 440.

18. FM 100-2-1, p. 7-1.

19. Ibid., p. 15-1.

20. U.S. Department of Defense, Soviet Military Power 1988, p. 151.

21. Isby, p. 385.

22. Ibid., p. 370.

23. Ray Bonds, The Illustrated Directory of Modern Soviet Weapons, p. 364.

24. William Baxter, Soviet AirLand Battle Tactics, p. 348.

25. U.S. Department of Defense, Soviet Military Power 1989, p. 63.

26. Ibid.

27. Ibid., p. 71.

28. Soviet Military Power 1988, p. 151.

CHAPTER III

AIRLAND BATTLE DOCTRINE AND THE THREAT

IMPACTS

Prior to drawing conclusions about a threat, professionals should place it into context. One way to do so is through an assessment of our ability to fight, as our doctrine and concepts describe, in light of the threat. Out of such assessments come warfighting needs, deficiencies and opportunities.[1] While the Soviet aerial platforms reviewed in the previous chapter are but one element of a massive conventional air and ground force, their unchecked employment would have devastating effects on U.S. and allied battlefield execution. The failure to address these threats throughout the battlefield provides the enemy a low cost, reliable strategy to successfully counter our AirLand Battle doctrine.

AirLand Battle doctrine describes the Army's approach to generating and applying combat power.[2] The dynamics of combat power, as described in FM 100-5, provide a start point for discussion.

> "The dynamics of combat power decide the outcome of campaigns, major operations, battles and engagements. Combat power is the ability to fight. Leaders combine maneuver, firepower, and leadership . . . They also attempt to interfere with the enemy leader's ability

> to generate the greatest effect . . . by interfering with the enemy's ability to maneuver, apply firepower, or provide protection . . . the ability of the leader to avoid the enemy's efforts to degrade his own capabilities before or during battle may be equally or more important."[3]

The generation of combat power is vital to both friendly and enemy forces. Not surprisingly then, the disruption of an enemy's ability to combine the elements of maneuver, firepower and protection into combat power is also vitally important. The extent to which a commander can avoid enemy attempts to degrade and disrupt those activities may well decide who is capable of executing his plans in accordance with his doctrine.

How AirLand Battle describes the generation and employment of combat power and the execution of the doctrine is characterized by the application of four basic tenets: initiative, agility, depth, and synchronization.[4] Success on the battlefield will depend on the Army's ability to fight in accordance with those tenets.[5] The assessment which follows summarizes the doctrinal impacts if enemy third dimension operations are not countered.

INITIATIVE

The enemy can deny initiative through the coordinated

application of the four categories of airspace usage. One is said to have the initiative when he can set or change the terms of battle. Initiative requires a constant effort to force the enemy to conform to our operational purpose and tempo while retaining our own freedom of action.[6] On the defense, initiative implies the ability to react quickly and make adjustments so as to fragment the attacker and cause the initiative to pass to the defender.[7] In the attack, initiative implies keeping the defender in shock and off-balance through concentration and speed of execution; flexible shifting of the main effort; and transition to exploitation.[8]

In both the defense and the offense, initiative requires the ability to mass forces, adjust quickly, and react to opportunities created. The threat's ability to conduct relentless reconnaissance and surveillance and link that information to accurate and timely kill mechanisms tends to preclude massing of forces. Similarly, the threat's airborne electronic combat platforms, designed to deny our surveillance and disrupt our communications, place our reaction and adjustment capabilities at risk. Simultaneously, the application of those airborne systems to deny and disrupt our operations, while enhancing his own C3, offers the enemy increased opportunities to retain the initiative.

AGILITY

Agility is characterized by the ability to adjust and act faster than the enemy. To achieve agility, forces must overcome the friction of war. Friction is described as the accumulation of chance errors, unexpected difficulties and the confusion of battle.[9] Leaders overcome this friction and attain agility by reading the battlefield, deciding quickly, and acting without hesitation.[10] Key elements of agility, then, are the ability to conduct reconnaissance and surveillance, understand the battlefield, decide on a course of action and translate that decision into action.

The enemy's airborne systems provide him the opportunity to disrupt our operations; add to the friction of the battle; and, act more quickly. Direct attack and electronic combat efforts disrupt our operations and increase confusion. The enemy's reconnaissance efforts and C3 network operating from relative sanctuary in his own airspace, increase his ability to see the battlefield and act. The enemy's application of airborne platforms thereby serves to decrease our agility while increasing the agility of his own forces.

DEPTH

Depth is described as the extension of related operations

in space, time, and resources. This includes the space to maneuver, the time to plan and execute, and the resources to win.[11] Depth requires the concentration of friendly forces; the interdiction of uncommitted enemy forces; the disruption of enemy command and control; and, the provision of adequate reserve forces. The feasibility of dispersing and concentrating forces and maintaining an adequate reserve is a function of our ability to avoid detection and/or attack by enemy forces. Thus, enemy air platforms present a risk to our ability to concentrate forces in depth. The capability to strike uncommitted forces and disrupt enemy command and control connotes an ability to decide, detect, and deliver. Enemy platforms designed to disrupt our decision networks; deny or nullify our detection capabilities; and attack our delivery means place in question our ability to effectively operate in depth.

SYNCHRONIZATION

Synchronization is the arrangement of battlefield activities in time, space, and purpose to produce maximum relative combat power at the decisive point.[12] Included in synchronization is the concentration of forces and fires and, more indirectly, the well-timed culmination of results from

past activities which support success in the present. Thus, the consequences of yesterday's and today's activities are both felt at the decisive time and place.

Again, the ability to synchronize appears to be dependent on the existence of friendly C3; viable reconnaissance and surveillance capability; and, systems to attack targets throughout the battlefield. Soviet air platforms described previously appear to be optimized to contribute to his synchronization while simultaneously degrading our own. This is accomplished through lethal and non-lethal attack of our C3 networks and continual reconnaissance and targeting of our target acquisition means and attack systems.

If the Soviets are allowed to continue operations from the sanctuary of their own airspace, successful execution of AirLand Battle is questionable. It should be recognized that these current and projected capabilities are at least partially a reaction to our successful AirLand Battle doctrine development. That doctrine coupled with a demonstrated resolve to develop and acquire the means with which to execute has given the Soviets reason for concern. They appear to be particularly concerned with the development of attack packages designed to either stand-off or penetrate and place at risk their offensive capabilities.[13] It is therefore logical that

they emphasize the fielding of the means to reduce or eliminate the effectiveness of our emerging systems.

ENDNOTES

1. U.S. Department of the Army, IRADOC Regulation 11-15, p. 7.
2. U.S. Department of the Army, Field Manual 100-5, p. 11.
3. Ibid.
4. Ibid., p. 15.
5. Ibid.
6. Ibid.
7. Ibid.
8. Ibid.
9. Ibid., p. 16.
10. Ibid.
11. Ibid.
12. Ibid., p. 12.
13. U.S. Department of Defense, Soviet Military Power 1988, p. 68.

CHAPTER IV

OPPORTUNITIES: OPTIONS AND IMPLICATIONS

The increasing Soviet dependence on and usage of his own airspace represents a considerable threat to the execution of our doctrine. However, such dependence and usage may also provide very real opportunities. The extent to which operations in their own airspace become critical to the execution of their doctrine increases the payoff should we be able to deny or disrupt those operations. Thus, there is an opportunity to exploit, as a vulnerability, the threat's need to conduct third dimension operations from sanctuary. As aerial platforms become ever more integral to the disruption of our operations and the control of his own, we must assess our conceptual, doctrinal, materiel, and force structure capabilities to negate the effects of the threat's investment.

OPTIONS

At the most fundamental level, the force-on-force equation is simple. Using C3I as an example, the US Army holds that command and control is key to success on the battlefield.[1] Therefore, commanders have the responsibility to protect their own C3I systems while countering those of the enemy. The resulting differential in C2 effectiveness

facilitates friendly operations.[2] This example provides two general options to explore regarding threat third dimension operations. We may either take action to reduce our susceptibility through changes in our own doctrine, materiel, or force structure or we may choose to reduce his capability to operate freely from sanctuary by attacking those means. Alternatives to reducing our susceptibility could include reducing our dependence on those systems being targeted; hardening of our systems; and, proliferation of our systems.

The first alternative is probably no option at all. The suggestion that the way to avoid the effects of an enemy's capability is to plan not to use our own systems admits defeat. If our doctrine is sound and if our materiel solutions are consistent with and supportive of the doctrine, it is illogical to give up both investments to counter a threat strength.

The second alternative is a more viable and commonly practiced approach. Hardening or enhancing one's critical systems can certainly reduce the effects of an enemy's efforts. Examples are many. The new family of SINCGARS radios improves tactical communications survivability and security. Efforts to reduce or alter system signatures limit detection and identification by enemy reconnaissance and surveillance systems. Enhancements in system mobility serves

to reduce exposure times and increase survivability. Such efforts are appropriate and necessary but they are also expensive as one applies improvements and modifications across the entire force.

Cost is certainly a significant factor in the third alternative -- proliferation. This "brute force" approach would procure equipment and personnel sufficient to field more capability than the enemy can reasonably nullify. This approach is essentially unacceptable in the United States. The United States tends to attack problems more intellectually and find technological, labor-saving solutions. It is unreasonable to expect that the Department of Defense will ever be able to justify an approach which attempts to our-number a potential enemy.

The actions above are all passive in nature. They depict steps to be taken based on an assumption that enemy operations from sanctuary go unchallenged. In reality, the most economical and effective solution is probably a combination of active and passive steps which collectively reduce the effects of enemy operations to an acceptable level. The combination of measures to reduce our susceptibility while simultaneously pursuing efforts to reduce the enemy's capability appear feasible.

The other option then is the attack, or credible threat

of attack, of his aerial systems to reduce their effectiveness. The attack of the enemy platforms can be accomplished by either airborne or surface systems and the attack could occur in the air or on the ground. The question becomes what systems or combination of systems should be capable of placing the enemy's platforms at risk and who controls the effort. Notionally, the attack of systems in the air may be accomplished by either fighter aircraft, rotary wing aircraft, or surface-based air defense fires. The attack of the systems on the ground also includes fighter aircraft and helicopters along with surface-to-surface fires. Rather than argue the appropriateness or relative worth of Army air defense over Air Force systems at this point, an alternative is to look at the implications of conducting operations to reduce the enemy's capability to operate effectively in his airspace.

IMPLICATIONS

The implications of attacking aerial platforms across the FLOT with Army air defense systems can be categorized into three areas:

-- conceptual or doctrinal implications;

-- technological or materiel implications; and

-- force structure or organizational implications.

The conceptual or doctrinal implications are of primary importance. A clear enunciation of a cross FLOT concept and the resulting doctrine changes should also trigger appropriate materiel and force structure actions. The first issue is the definition or categorization of cross FLOT activities by surface air defense systems. As mentioned earlier, Army ground based air defense systems have been developed and fielded to conduct operations primarily over friendly territory. The attack of enemy aircraft over enemy territory has been an Air Force mission. Such an attack is generally defined as an offensive counter air (OCA) operations.

Air Force Manual 1-1 defines OCA as operations conducted to seek out and neutralize or destroy enemy aerospace forces at a time and place of our choosing. This effort includes conducting operations in the enemy's aerospace environment.[3] The attack of aircraft in the air over enemy territory is defined as a fighter sweep and is designed to seek out and destroy enemy airborne aircraft or targets of opportunity in an allotted area of operations.[4]

Joint doctrine generally agrees with Air Force definitions of OCA by describing it as actions which range

throughout enemy territory and are generally conducted at the initiative of the friendly forces.[5] Further, OCA is an operation mounted to destroy, disrupt, or limit enemy air power as close to its source as possible.[6] Several common elements are contained in OCA operations. First, operations are in enemy territory. Second, operations may attack aerial platforms in the air or on the ground. Third, ground based systems -- missiles or rockets -- can contribute to the operation. Finally, OCA objectives include reduction in enemy air defense, reconnaissance, attack, C3, electronic warfare and logistic support capability.[7] OCA, however, is only half of the counterair effort. The other element of overall counterair operations is defensive counterair (DCA) or air defense.

Defensive counterair is defined by joint doctrine as the protection of assets from air attack through both direct defense and destruction of the enemy's air attack capacity in the air.[8] Joint doctrine further states that air defense should be developed to permit the interception of intruding enemy aircraft and missiles as early as possible and as far forward as feasible.[9] DCA operations must defend friendly lines of communication, protect friendly bases, and support friendly land and naval forces while denying the enemy the freedom to carry out offensive air operations.[10] The Air Force

defines DCA as operations to detect, identify, intercept, and destroy enemy aerospace forces that are attempting to attack friendly forces or penetrate friendly airspace.[11] Several generalities can be expressed regarding DCA. First, it addresses platforms in the air. Second, it endeavors to engage early, prior to the attacking platforms impacting on friendly operations. Third, it is conducted by employment of air-to-air and surface-to-air systems. Finally, operations are not doctrinally limited to friendly airspace. In fact it is implied that "the earlier, the better" applies when engaging enemy aircraft.

There is a level of uncertainty regarding the categorization of cross FLOT operations as OCA or DCA. An argument could be made for each mission. OCA advocates might argue that it takes place in enemy airspace and that enemy activities such as reconnaissance, electronic warfare, and C3 are disrupted. These results tend to support a characterization of cross FLOT third dimension operations as OCA. Conversely, an argument could be offered that addressal of platforms in the air prior to their affecting friendly operations is DCA. Further, DCA operations should not be limited to friendly airspace; particularly if enemy operations from his own airspace are directly impacting friendly operations.

Characterization of the subject cross FLOT operation is critical to further addressal. It is critical primarily from a political or parochial stand point vice as an operational issue. The engagement of airborne platforms in enemy airspace was historically an Air Force mission. Given the potential impact of enemy air operations from sanctuary, however, the joint force commander will want the threat neutralized regardless of Service preferences. The historical air-to-air approach in countering the threat has tended to stifle the development of our surface-to-air weapons systems. Thus, alternate solutions to addressing airborne threats across the FLOT have not been explored. The combination of an increasing threat and expanded technological opportunities existing today dictate a redefinition of traditional roles and missions.

A second doctrinal issue is the characterization of cross FLOT fires as close or deep operations in the context of the Army's AirLand Battle doctrine. Field Manual 100-5 defines close operations as operations at any echelon comprised of current activities. Activities are part of close operations if they are designed to support the current fight.[12] Deep operations comprise those activities directed against enemy forces not in contact but designed to influence the conditions in which future close operations will be conducted. Deep operations include efforts at the operational level to isolate

current battles and shape the battlefield for future engagements.[13] Third dimension cross FLOT operations can be categorized as both close and deep.

A close or deep determination is a function of one's perspective. Though AirLand Battle applies from squad to echelon above corps levels, this discussion will focus on division and above. Below division level the close, deep, and rear operations are practically indistinguishable and are conducted with the same assets.[14]

The attack of reconnaissance and surveillance, electronic combat and C3 platforms appear to contribute to both the ongoing fight and tomorrow's activities. Certainly an airborne jamming platform which is denying communications connectivity on the fire support and C3 links of our brigades in contact is a close target. Similarly, the application of real-time or near-real time data transfer from an airborne reconnaissance platform to enemy attack means presents a significant problem to the current fight. Conversely, the jamming of theater level surveillance and early warning radar assets which contributes to a successful rear area attack by threat bombers tends to affect tomorrow's campaign. The same is true of a relentless, wide-spread reconnaissance and surveillance effort which provides the enemy clues to our

future intentions and capabilities. The impact of enemy activities from sanctuary can affect both today's and tomorrow's battlefield. Therefore, attack of those platforms could be categorized as both close and deep operations.

The attack of the close battle platforms is by nature very time sensitive. A central issue of this entire paper is whether current systems can realistically counter the threat responsively. There can be little argument that if a ground based system can see, identify, and reach a stand-off threat, it can attack that threat more readily than friendly aircraft. Certainly, the occasional chance encounter between a friendly aircraft on a fighter sweep or escort mission and a threat aircraft could result in the destruction of an enemy stand-off threat. However, the combination of insufficient responsiveness and aircrew survivability seems to mitigate against depending upon an air-to-air response to an immediate threat.

A more classical application of an air-to-air solution would be the addressal of such threats in a deep operations context. The deliberate or on-call missioning of assets to counter stand-off threats as they are detected can be combined with an attack of their ground based support. Such an OCA approach is consistent with currently accepted doctrine.

Again, consideration should be given to the economics of the solution. Articulation of a ground based system requirement to counter cross FLOT threats may provide a less expensive solution. Obviously such an approach requires a review of technological opportunities to provide a new materiel solution to the threat.

The development of materiel solutions must address the detect, identify, intercept and destroy elements of defensive counterair operations.[15] The requirements to see the airspace of concern; to sort through the various platforms and identify the highest priority; to select the target and engage as part of a C3 network; and, to deliver lethal effects on the target will stress technological capabilities.

The ability to see the airspace will require a combination of active and passive detection technologies. The acquisition means could be organic to the air defense network or be independent of but digitally connected to an extant C3 network. Thus, the search for a "see" solution may simply require improved connectivity among current and future acquisition means rather than development of a new system

The "sort" function is by far the most technologically challenging. The positive identification of aircraft has been and continues to be the primary limiting factor in air defense

operations. The inability to identify platforms we can detect tends to inhibit weapon employment as we are forced to artificially constrain our engagement ranges until identification is positive. Technological options to be explored include automatic target recognition, laser, radar, and non-cooperative identification techniques in combination with computer and information processing technologies.[18] The linking of multiple detection means into highspeed processing networks may have promise for deriving identification with sufficient reliability to conduct engagements.

Given that targets can be seen and sorted, the decision to engage must be made based on attack means availability. Selection of a capable weapon system and pairing of that system to a specific target is a C3 function. This requires the linkage of detection and identification means with systems of sufficient range to engage targets across the FLOT. Materiel programs to be explored may include long range missiles, loitering RPVs on-call, or more exotic solutions. Propulsion and aerodynamics technologies may well contribute to extending missile ranges to needed levels.

Once the defense system has developed the capability to see, sort, and select, lethality must be assured. In order to optimize lethality, technology efforts in guidance, warhead

fuzing and warhead type would apply. Particularly attractive is the option to launch and guide a kill mechanism into the area of the target and then let the mechanism do on-board processing to accomplish terminal guidance and identification.

The opportunities for materiel solutions are many and vary in risk. It would seem prudent to explore such options in search of a way to preserve our ability to execute our doctrine. Specific solutions could range from product improvement of existing systems to new system development. Certainly, the cost of any solution must be ascertained and a cost effectiveness analysis performed. Assuming that a materiel solution is to be fielded, the issue of force structure and organizational relationships should be considered.

The force structure limitations in today's Army will almost certainly not be relaxed. At best, any materiel solution to a cross FLOT mission must be a zero sum game with regard to force structure. Whether a product improvement to a fielded system or a new system development, the total personnel requirements cannot be assumed to increase. This presents a dilemma. The air defense force must retain its current capability against threats operating in friendly airspace; grow to meet increasing threats; add a cross FLOT

capability; and, do so with equal or less personnel. This challenge creates demands for technological improvements in areas such as mobility, survivability, lethality, and endurance which enable equal production with less manpower. In reality, sufficiently documented and articulated requirement solutions will generally be resourced if only at the expense of a less pressing need.

The organizational affiliation of a cross FLOT Army system should be the source of joint discussions. The issue is one of who has operational control of the surface-to-air forces capable of conducting operations across the FLOT. The area air defense commander, normally the Air Force component commander in joint operations, historically has had operational control of longer range systems and less restrictive procedural control over short range systems.[17] However, in the mid 1980's the Army began establishing air defense brigades organic to each Corps. Such brigades would contain a mixture of short and longer range air defense systems. In 1986, the JCS decided that air defense elements organic to Corps and below maneuver echelons would remain under the operational control of the ground commander. Other higher level air defense assets would be placed under the operational control of the area air defense commander.[18]

Assuming the spirit of that decision is maintained -- that a commander is allowed to employ his organic resources in his own defense -- a case could be made that cross FLOT forces could be under the operational control of the Corps commander. Such a situation would increase the need for close, real-time coordination of joint force activities. The conduct of interdiction, offensive counterair, and other activities in enemy airspace would have to be integrated with ground based fires into that airspace. A description of such coordination would require another separate indepth study and discussion.

The options and implications discussed here must be addressed in the joint arena. As mentioned in the introductory chapter, the Army and Air Force have always had to cooperate in counterair operations. That approach must continue. However a combination of a changing threat; technological evolution; and, a commitment to joint operations combine to offer new potential solutions to the requirements of the future battlefields.

ENDNOTES

1. U.S. Department of the Army, Field Manual 100-15, p. 4-24.

2. Ibid.

3. U.S. Department of the Air Force, Air Force Manual 1-1, p. 3-3.

4. Joint Chiefs of Staff, JCS Publication 3-01.2, p. IV-6.

5. Ibid., p. IV-1.

6. Joint Chiefs of Staff, JCS Publication 1-02, p. 260.

7. JCS Publication 3-01.2, p. IV-1.

8. Ibid., p. B-5.

9. Ibid., p. V-7.

10. Ibid., p. V-1.

11. AFM 1-1, p. 3-3.

12. U.S. Department of the Army, Field Manual 100-5, p. 19.

13. Ibid.

14. Ibid.

15. AFM 1-1, p. 3-3.

16. U.S. Department of Defense, Soviet Military Power 1988, p. 148.

17. JCS Publication 3-01.2, p. 4.

18. Ibid., p. V-11.

CHAPTER V

CONCLUSIONS

The issues raised in this paper are doubly appropriate for discussion in this era of jointness. As technological advancements provide greater flexibility in the application of destruction, the occasions of mission area capability overlap will increase. In short, the old way of doing things is finished. The traditional division of labor among branches of each Service or among the Services themselves can come under scrutiny in a search for efficiency and effectiveness. Counterair operations, historically joint, will not be immune to these pressures given threat and technology imperatives.

The threat described in Chapter Two is technologically feasible. The investments by the Soviet Union in platforms capable of disrupting our doctrinal execution while operating from sanctuary are documented in open literature. Equally disturbing is the proliferation of military technology world-wide. Such proliferation increases the likelihood that the U.S. could face highly sophisticated threats in areas outside Western Europe.

The U.S. does not have a robust capability today to delay, disrupt, or destroy threats operating in enemy airspace. Current surface-to-air defenses lack sufficient

acquisition, identification, and range capabilities. Our air-to-air assets are not responsive in terms of close operations and may be an

inefficient or costly solution in terms of survivability and sustainability. Expecting or planning to use Air Force assets for these missions would seem to exacerbate the current limitations which already dictate a sequential approach to the air war. That is, we must focus on air superiority prior to an interdiction or close air support operation being feasible.

As the threat's investment in airborne platforms becomes more universally recognized and the impacts of those forces on our ground operations is fully appreciated, doctrine, organizational and materiel solutions will be analyzed. Hopefully, such searches will include joint concept and doctrine development and a sharing of technological options. Efforts to address the threat should certainly follow an accepted pattern.

Using a system similar to the Army's Concept Based Requirement System, current mission area concepts could be updated to reflect a commitment to countering the third dimension threat. Given acceptance of the threat, shortfalls in addressing that threat can be identified. Analysis of potential solutions should lead to the most efficient

combination of means to reduce the effectiveness of the

enemy's investment in third dimension operations.

Programs developed to contribute to new concept execution will compete with numerous other programs of equal value and urgency. The end result should be the development, fielding, and sustainment of a viable, credible, and survivable Army.

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