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**TACAIR AND THE ARMY'S
DEEP OPERATION**

**A Monograph
by**

**Major Oliver E. Lorenz
United States Air Force**

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SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; unlimited distribution.		
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE					
4. PERFORMING ORGANIZATION REPORT NUMBER(S)			5. MONITORING ORGANIZATION REPORT NUMBER(S)		
6a. NAME OF PERFORMING ORGANIZATION School of Advance Military Studies, USAC&GSC		6b. OFFICE SYMBOL (If applicable) ATZL-SWV	7a. NAME OF MONITORING ORGANIZATION		
6c. ADDRESS (City, State, and ZIP Code) Fort Leavenworth, KS 66027-6900			7b. ADDRESS (City, State, and ZIP Code)		
8a. NAME OF FUNDING/SPONSORING ORGANIZATION		8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER		
8c. ADDRESS (City, State, and ZIP Code)			10. SOURCE OF FUNDING NUMBERS		
			PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.
			WORK UNIT ACCESSION NO.		
11. TITLE (Include Security Classification) TACAIR and the Army's Deep Operation					
12. PERSONAL AUTHOR(S) MAJOR OLIVER E. LORENZ, USAF					
13a. TYPE OF REPORT Monograph		13b. TIME COVERED FROM _____ TO _____		14. DATE OF REPORT (Year, Month, Day) 88NOV29	
				15. PAGE COUNT 42	
16. SUPPLEMENTARY NOTATION					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP			
19. ABSTRACT (Continue on reverse if necessary and identify by block number) This paper discusses Army requirements for deep operations and the TACAIR problems associated with and the systems available to support deep operations. The monograph first examines Army manuals from battalion through corps level to identify the needs each level has for deep operations, especially the requirements for Air Force assets. Then, problems TACAIR will encounter, the assets available and their characteristics are looked at to see if they can accomplish the deep operation mission. Finally, future developments that will increase TACAIRs abilities are discussed. The concludes that TACAIR is lacking the numbers and system characteristics necessary to both survive and accomplish day/night and adverse weather support for deep operations. But, the Air Force's future developments will significantly increase its capability to reach the AirLand battle goal.					
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT ☐ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION		
22a. NAME OF RESPONSIBLE INDIVIDUAL Major Oliver E. Lorenz, USAF			22b. TELEPHONE (Include Area Code) 913-684-2138		22c. OFFICE SYMBOL ATZL-SWV

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29 November 1988

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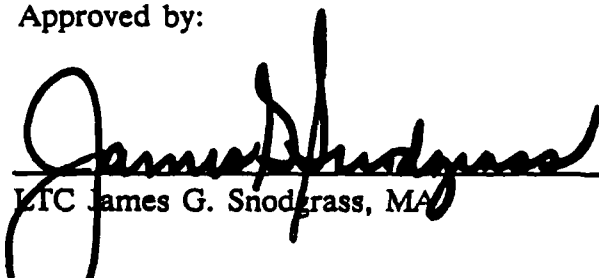
SCHOOL OF ADVANCED MILITARY STUDIES

MONOGRAPH APPROVAL

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Title of Monograph: TACAIR and the Army's Deep Operations

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Accepted this 15th day of May 1989

ABSTRACT

TACAIR AND THE ARMY'S DEEP OPERATION by Major Oliver E. Lorenz, USAF, 42 pages.

This paper discusses Army requirements for deep operations and the TACAIR problems associated with and the systems available to support deep operations.

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NTIS GRA&I	☒
DTIC TAB	☐
Unannounced	☐
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

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INTRODUCTION

AirLand Battle doctrine has had far reaching effects on the way the Army and Air Force view the modern battlefield. Army leaders in articles, exercises and conferences have devoted a considerable amount of time to the study of the fluid battlefield. Of the three areas of the battlefield --rear, close and deep-- most of the attention has been focused on deep.

There are two primary reasons for this attention. First, commanders have many weapons with which to wage the rear and close operations, but deep operations require more innovative solutions to bring this third dimension into their sphere of influence. Secondly, commanders realize that Air Force assets are one way they can attack the enemy deep. But, can tactical airpower (TACAIR) support all the requirements needed for the Army's deep operations?

To answer this question, I will first examine Army's deep operations, define it and determine why it is important at battalion, brigade, division and corps levels. Then, to understand the importance of deep operations at each of these levels, I will describe the Soviet offensive style of operations.

Once it is understood what the army anticipates

will be required for deep operations and what it might look like, I will then examine the TACAIR weapons systems available to support the specific missions that derive from the Army's deep operations.

Among the Air Force missions are Air Interdiction (AI), Battlefield Air Interdiction (BAI) and Close Air Support (CAS). Since I will be looking at deep operations at the tactical level of war, I will be concentrating on the Air Force missions which will have the greatest impact, BAI and CAS. I will examine four AI and CAS aircraft currently used by TACAIR to see if they have the characteristics needed to perform these specific missions. Most importantly, I will analyze those aircraft capabilities to determine if they can accomplish the requirements for Army's deep operation and survive in the deep arena.

The deep arena is different today because of the abundance of ground to air missiles and other air defense systems. To understand fully the problems of going deep with air assets, I will need to look at a typical laydown of Soviet air defense systems.

There are several ways to negate or at least degrade the effectiveness of Soviet air defense systems. One highly effective way is to package the air assets so that each type of aircraft can provide mutual support, so

that each can do its specific mission better. Jomini, Clausewitz, and Sun Tsu all recognized the importance of concentrating combat power. Packaging is one way that this can be accomplished. The real challenge will be to package other air assets, such as slow-moving CAS aircraft and attack helicopters or even C-130s, in order to take advantage of the mutual support provided by a package and the ability to concentrate combat power. Jomini and his contemporaries also recognized the importance of using combinations--in modern terms. packaging and combined or joint arms.

DEEP OPERATIONS

There are several differences between the former Army warfighting doctrine and AirLand Battle doctrine. The previous doctrine was oriented defensively and focused on the close battle. AirLand Battle addresses both offense and defense and encompasses rear, close and deep battles. In its defensive applications, the doctrine encourages more active measures--counter attacks, mobile defenses--than earlier doctrine did. AirLand Battle doctrine emphasizes the close cooperation between the Air Force and Army. Also, AirLand Battle stresses the need to hold the initiative through maneuver. Paramount among the differences is the need to hit the enemy deep.

The term "deep battle" was replaced with "deep operations" in the 1986 version of FM 100-5, Operations. FM 101-5-1, Operational Terms and Symbols, defines deep battle as "all actions which support the friendly scheme of maneuver and which deny to the enemy commander the ability to employ his forces not yet engaged at the time, place or in the strength of this choice,"¹ FM 100-5, Operations, states that "Deep Operations at any echelon comprise activities directed against enemy forces not in contact designed to influence the conditions in which

future close operations will be conducted."2 For all intents and purposes, the terms are interchangeable. Deep battle must be conducted continuously. The Soviet offensive style of operations does not allow the U.S. the luxury of concentrating only on close or rear operations.

AirLand Battle doctrine is the U.S. answer to the Soviet ability to use mass and momentum to seek weak points and exploit them. Also, AirLand Battle is our recognition that future battlefields, because of the range and lethality of modern weapons and the ways they can be delivered, will be fluid. Because of their experiences in the "Great Patriotic War" and their ability to provide large numbers of men and equipment, the Soviets echelon their forces. The first echelon is used to find weak points and the successive echelons are used to penetrate deep into the enemy's defenses. The goal of AirLand Battle doctrine is to prevent the enemy from applying mass at a decisive point by attacking his successive echelons, so as to provide separation between his attack forces. We need to delay, disrupt and/or destroy his follow-on forces. Therefore, commanders at all levels must attack the successive echelons in order to win the close-in battle and prepare for the arrival of the next echelon.

beyond the FEBA when the opportunity presents itself, either by maneuver or by fires only."⁴ The writer of FM 71-2J recognized that the battalion deep battle is limited in scope because its major concern was only the second echelon of the first echelon regiment. The options that could be integrated were the battalion reserve, artillery and close air support.⁵

FM 71-2, January 1988 (approved final draft), states that "The battalion has no deep fight, but may be charged with the execution of the fight against follow-on enemy battalions."⁶ Instead of using maneuver forces to attack deep, it now says to attack "the enemy beyond the range of his direct fire weapons with indirect fire."⁷

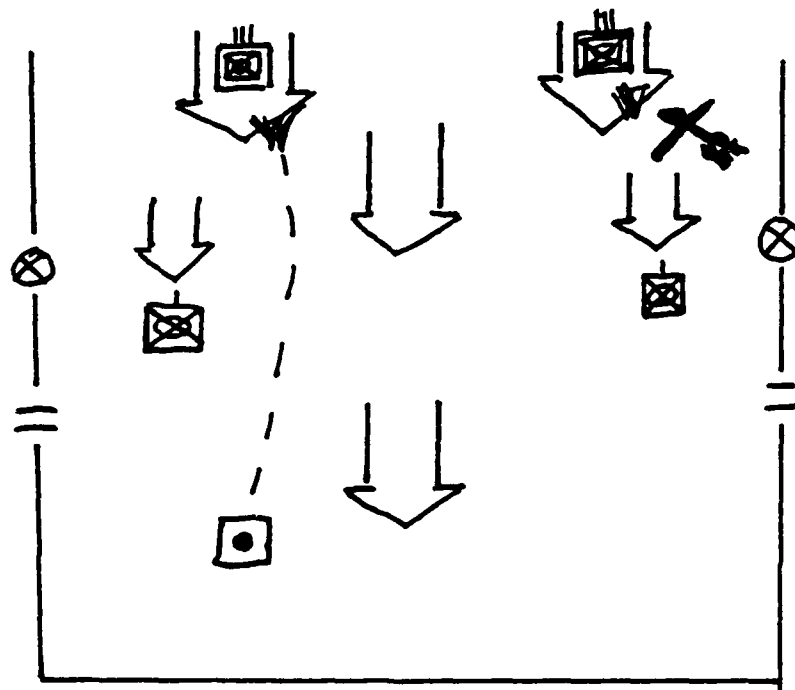


Figure 2 Battalion Deep Attack⁸

BRIGADE

Like the battalion manual, FC 71-3 states that the brigade should plan and prepare to attack the enemy beyond the FEBA with either maneuver or indirect fire assets. "Whether attacking or defending, a timely and well-executed deep maneuver against enemy forces not yet in contact is an important element of operations,"⁹ and "Our primary strike assets for deep attack at brigade level are air and artillery interdiction."¹⁰

Compared with the very limited assets the battalion has for deep attack, brigades are only slightly better off. They can use ground maneuver forces (which would have to be significantly augmented), fire support and TACAIR (BAI) in depth, to slow down and extend enemy formations and break up their mutual support. The primary aim is to prevent the enemy from concentrating overwhelming combat power.

Special care needs to be taken to use deep fires and maneuver efficiently, to obtain effects which contribute directly to the success of the deep battle and do not squander the limited assets of the brigade.

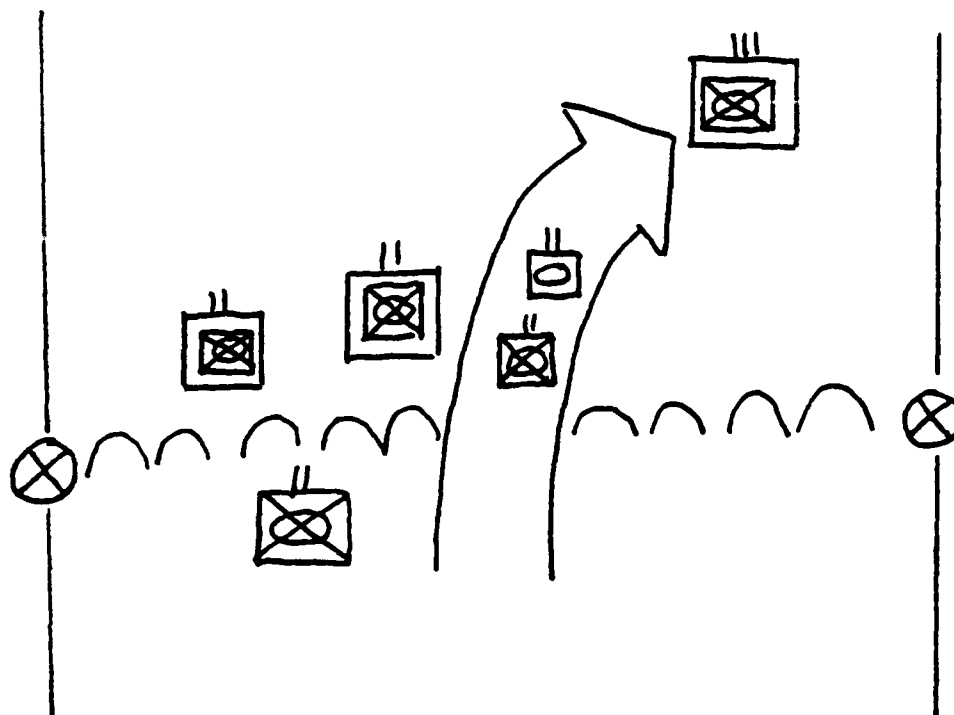


Figure 3 Brigade Deep Maneuver

DIVISION

"Electronic warfare, long-range fires, and maneuver in depth are used by the division to attack enemy forces where delay, disruption, or destruction is important to the success of the commander's plan."¹¹ In the offense, the division fights the deep battle initially to isolate, immobilize, and weaken defenders in depth. In the defense, the deep battle aim is to prevent the enemy from concentrating overwhelming combat power by creating windows for friendly offensive action.¹² Major objectives are the separation and disruption of attacking echelons, and degradation of the enemy's fire support, command, control and communications, combat support and

combat service support. By attacking deep the division can limit the enemy's freedom of action, alter the tempo of operations in favor of the division, and isolate the close operation.¹³ Divisions must fight rear, close and deep at the same time. Therefore, deep operations may be an economy of force effort conducted by fires and jamming. Division deep targets include enemy lines of communication, counter attack or follow-on forces, supply facilities and routes of withdrawal.¹⁴ Deep maneuver is not an economy of force operation and is usually done by airborne, air assault or attack helicopter units. It will be very costly and will require a great expenditure of equipment, men and combat service support in order to succeed.

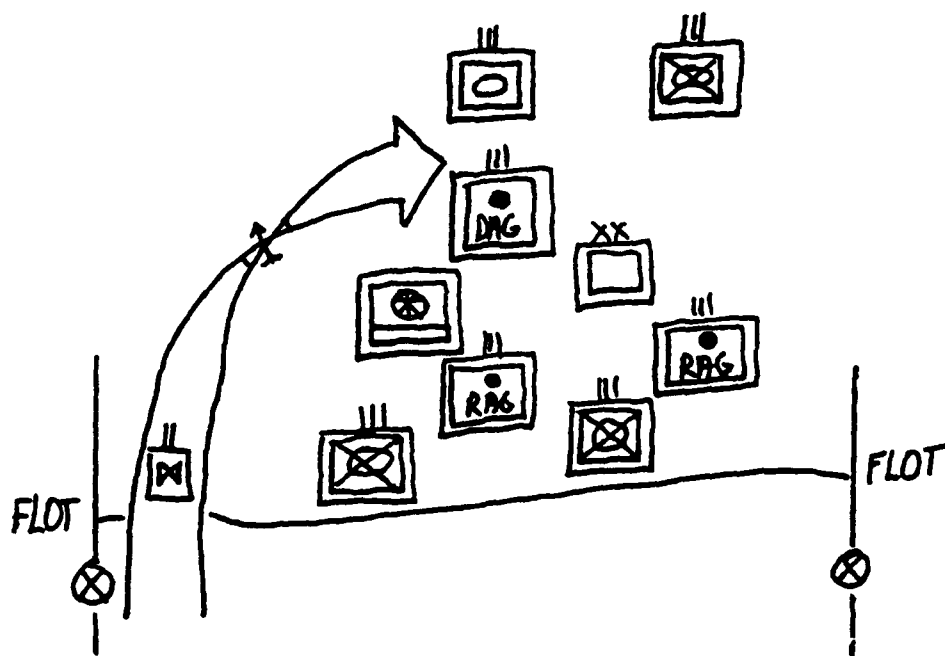


Figure 4 Example of Division Deep Battle

CORPS

The corps level has the lead in the conduct of the deep operation at the tactical level. It has the most assets and the most resources to provide intelligence about deep targets. High payoff targets, such as, selected units, C³I assets, nuclear and chemical delivery systems and special terrain targets, such as bridges or choke points are its priority. The means the corps has available include air interdiction (by Air Force assets), rocket artillery, maneuver units, special operating forces, electronic warfare, and deception.¹⁵

In offensive operation, the deep operation is fought initially to disrupt, deceive, isolate, immobilize, defeat or destroy key elements of the defense. Later its priorities shift to blocking reserves and preventing the escape of defending units.¹⁶

In the defense, deep operation's aim is to prevent the enemy from concentrating overwhelming combat power against the corps at the time and place of his choosing and to disrupt his closure rate at the Forward Line of Own Troops (FLOT).

The use of heavy maneuver elements in the corps deep operation is recognized to be risky and very complex.¹⁷ The operation would require at least a

brigade and probably a division size element and would lack support in either artillery or combat service support. Therefore, the element should be self-supporting for several days much along the lines of a "flying column." The effectiveness of the heavy maneuver element could be greatly increased if combined with an armored cavalry regiment. Light forces "can infiltrate by ground or air to block critical avenues of movement or attack vulnerable targets."¹⁸

Army aviation is well suited for quick movement, although its use deep would also have considerable amounts of risk for a high value resource. It is most effective against moving vehicles on roads or open terrain and is especially effective when used at night.¹⁹

Field artillery is the corps main resource for deep operations. Among the priority targets will be artillery (counter battery), reserves, supplies, and command centers. It is imperative because of the vast array of targets and limited ammunition that the highest payoff targets should be engaged at the proper time. Deep operations in general have to be closely synchronized to particular tactical actions in the close operation. Close coordination is necessary to ensure that multiple systems (air, assault, etc.) are not used against the same targets.²⁰

Electronic jamming is a vital part of the deep battle. It is a multiplier that should be used in conjunction with the other forms of deep battle. Jamming can disrupt enemy command and control, air defense artillery and suppress other enemy air defenses.²¹

TACAIR plays a major portion of the corps deep battle. The corps is allocated CAS sorties which it distributes to the lower levels based upon the corps priority of effort. The corps is also able to nominate BAI targets based upon its areas of interest.

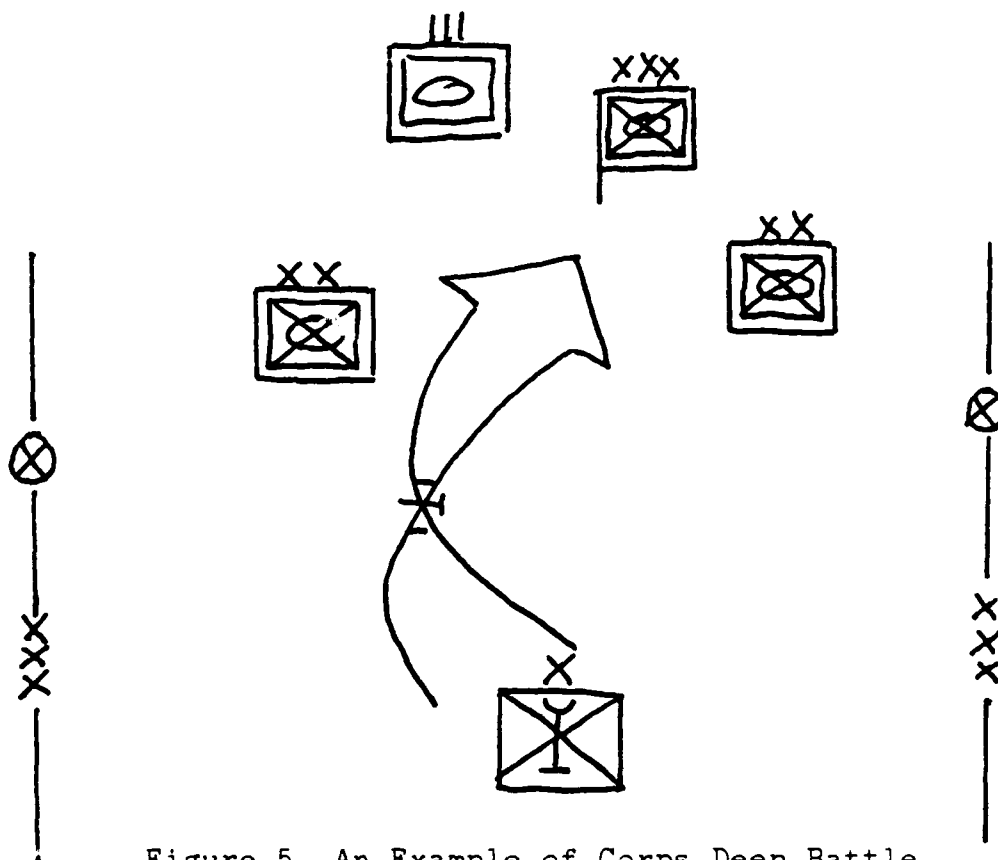


Figure 5 An Example of Corps Deep Battle

As I have looked at deep operations from battalion to corps level, I have identified several ideas that are common to them all. First, there is a great reliance on tactical air to provide a large portion of the deep attack capability. Second, maneuver assets (ground and air) have played an important role at division and corps levels for deep operations. Third, the assets each level owns are not enough to accomplish all the requirements needed of deep operations. In addition, there is an intimate relationship between close and deep operations. Both operations share the same assets, therefore deep operations must be restricted to attacks on high value targets that would have an enormous near-term impact on winning or losing the close operation.

Using ground maneuver forces, air assault forces, airborne units, or attack helicopters is very risky. Ground maneuver forces must be heavy enough to accomplish their mission. They must also be augmented with extra combat service support to ensure that, like a "Flying Column", they are self supporting for the duration of their mission. The air assets, whether Air Force or Army, are susceptible to enemy air defense artillery. Therefore, for any of these elements to be effective as a deep attack force, it is necessary to provide them with additional support (such as, electronic warfare assets)

or as I will cover later, use combined arms teams the way "packaging" does. A great deal of planning and coordination must take place so the various assets can be combined in order to succeed. The following diagram shows examples of what is available in the corps and to what depth it can strike. The quantities of Lance and MRLS are very limited.

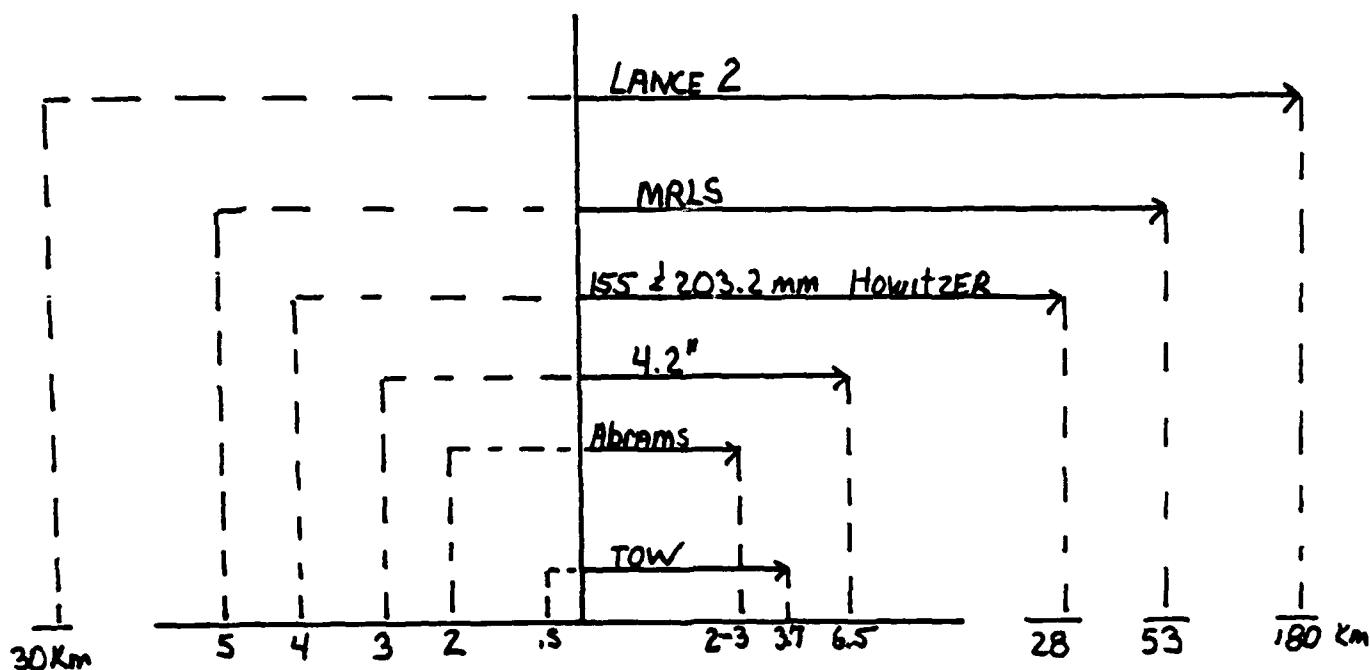


Figure 6 Weapon Ranges²²

TACAIR

Modern warfare requires the close cooperation of the air (Air Force) and land (Army) components in order to win battles. The Army needs the Air Force to attack the enemy close, deep and in the rear for several reasons. First, the Soviets have a numerically superior force that is heavily equipped. Second, because of budget constraints, the Army does not have all the systems necessary for its deep attack missions. Lastly, the Army is vulnerable to air attack. The Air Force needs the Army because the Soviets have superior ground to air systems and a multitude of aircraft that can overpower its budget constrained force. Most importantly, airpower cannot hold ground; only the Army can do that. Therefore, air and land forces must provide each other mutual support.

TACAIR missions support the Army's land battle. Counter air, air interdiction and close air support all have a direct effect on the enemy and his ability to influence the Army. Effective counter air, air interdiction and close air support demand aircraft with definable characteristics. The largest problem to overcome is to do all the missions with a limited amount of resources. There are also monetary restraints, but

those and the procurement issues that come with them are beyond this paper's scope. One answer is to design aircraft that are flexible--that can do several missions. There are limits to the number of attributes an aircraft can have; therefore, other solutions must be sought. Packaging, the grouping of several types of aircraft (refueling, electronic warfare, and attack), can increase the survivability and effectiveness of our resources. Packaging can be thought of as using combined arms teams. Since no one can stand still in this age of technological leaps, future developments will have a dramatic impact on AirLand Battle doctrine. AFM 1-1, Basic Aerospace Doctrine of the USAF, lists several missions for TACAIR--counter air, air interdiction and close air support.

Counter air's objective is to control the airspace and ultimately to gain air supremacy. Without control of the air, ground forces will not have freedom of movement or freedom from being attacked by the enemy's air resources.²³

Air interdiction is the use of air systems to delay, disrupt, divert or destroy the enemy troops and material before they can be brought to bear against friendly forces.²⁴ The operations are flown far enough away from friendly forces (beyond the Fire Support Coordination Line) so that close coordination is not

required. Interdiction is used against targets such as troop and vehicle formations, bridges, choke points, railyards, road intersections, or storage depots. A portion of air interdiction is battlefield air interdiction. The primary difference between the two is that BAI targets may have a near-term effect on the ground battle. Also, BAI targets are identified and selected by the land commanders.

Close air support is used to directly support ground forces in close proximity to the enemy.²⁵ CAS requires close coordination with ground forces to include positive control during its use. TACAIR's other missions include tactical air reconnaissance and airlift but they will not be covered in this paper.

Each of these missions--CA, AI, BAI, and CAS--require aircraft with specific characteristics. All share the characteristics of airpower -- speed, range and flexibility. Besides these three basic characteristics, AI, BAI and CAS aircraft must:

- 1.) have speed and maneuverability to defeat air to air and ground to air defense systems or avoid them.
- 2.) operate day or night.
- 3.) operate in adverse weather conditions.
- 4.) have sufficient lethality to destroy or

neutralize targets.

- 5.) be able to locate and identify targets.
- 6.) have high sortie rates with low maintenance.
- 7,) carry self protection devices (such as flares, chaff and jamming pods).

Additionally, CAS aircraft must have jam resistant radios compatible with those of Army forward controllers. CAS/BAI aircraft should be able to cover the full spectrum of rear to deep battle, thereby increasing their flexibility and adding to the support of the ground commander. Because of the probability of our airfields being attacked by Soviet deep attacks, it is important that aircraft have the ability to operate from damaged and/or austere airfields.

As previously mentioned, AI, BAI and CAS aircraft must be able to do their missions in day or night and in adverse weather. This is particularly important since night and adverse weather are logical times for an enemy to attack, because it affords him the most protection from being seen. We cannot allow an enemy sanctuaries.

The big difference between AI and CAS is the closeness of friendly troops. In addition, there is a difference in the types of targets that both will attack. Generally AI/BAI targets are area targets, while CAS targets are point targets. For instance, concentration

points of personnel or material such as depot/storage areas or troop staging areas, transportation centers, railroads, terminals and harbors are BAI/area targets. CAS, on the other hand, because of the proximity of friendly forces, is targeted against individual tanks and formations where precision, target identification, and positive final control are the most important aspects. TACAIR has the F-15, F-111, F-16, and A-10 in the active Air Force to do CA, AI and CAS.

The F-15, Eagle, is an air superiority aircraft that has been in the inventory since 1974. It is powered by two turbofan, after-burning engines, each producing 24,000 lbs. of thrust. This gives the F-15 a maximum speed of 2.5 Mach plus and a range of 2,500nm. Its radar provides it the capability of long range detection and tracking of targets down to tree top level. It has one 20mm, 6 barrel gun with 940 rounds of ammunition. It has two UHF radios. Maximum ceiling for the F-15 is 60,000 feet.²⁸

The F-111, Aardvark, is produced by General Dynamics and has been in production since 1964. This strike aircraft is powered by two after-burning, turbofan engines each providing 18,500 lbs. of thrust. The F-111 has a maximum speed of 2.2 Mach and range of 2,750nm. It has one UHF radio. Its internal bomb bay can carry

31,500 lbs. of free fall and laser guided bombs and/or dispenser munitions.²⁵

The F-16, Fighting Falcon, is a multi-role fighter produced by General Dynamics. The Falcon has been in the inventory since January 1979, and is replacing the F-4 in the Air National Guard and Air Reserve. Its radio equipment includes UHF, VHF and FM. Its single engine powers it to a speed of Mach 2 plus and a ceiling of 50,000 feet. It has a combat radius of 575nm without air refueling or external tanks. It can carry 12,000 lbs. of external ordnance including general purpose and laser guided bombs, dispenser bomblets and/or Maverick optically guided missiles.²⁸

The A-10, Thunderbolt II, (the Hog or Warthog) has been in the inventory since 1977. It is a single seat attack aircraft produced by Fairchild Republic. It is equipped with UHF, VHF, and FM radios and 30mm cannon. The A-10 is powered by two high bypass turbofan engines, each producing 9,065 lbs. of thrust. It has a maximum speed of 380 kts. and a range of 540nm with one hour loiter time. It can carry 16,000 lbs. of mixed ordnance, including the Maverick missile, and 1100 rounds of 30mm ammunition.²⁹ The following chart compares the F-15, F-111, F-16 and the A-10 to the previously mentioned characteristics needed for BAI and CAS aircraft.

Figure 7 Comparison of Characteristics

Air to Ground characteristics	F-15	F-111	F-16	A-10
Speed	Y	Y	Y	N
Maneuverability	N	N	Y	Y
Night	N	Y	N	N
Adverse Weather	N	Y	N	N
Lethality	N	Y	Y	Y
Locate/Identify Targets	N	Y	Y	Y
High Sortie Rate	Y	N	Y	Y
Carry Self-protection Devices	Y	N	Y	Y
FM Radio	N	N	Y	Y
Work From Austere Locations	N	N	N	Y

Currently, TACAIR is using the F-111 and F-16 for AI/BAI. The F-111 is the only aircraft that is currently devoted to AI/BAI. The F-15E and F-16 are dual role fighters whose primary use will be counter air, until a degree of air supremacy is gained. How many aircraft are devoted to AI/BAI will depend upon the joint force commander. The only aircraft in the active Air Force inventory dedicated to CAS is the A-10.

The Army needs TACAIR aircraft to do and support its deep battle. The F-111, F-15E and F-16 are very capable aircraft to accomplish interdiction. But only

the F-16 and A-10 have the radios and training to do CAS, and only the A-10 is dedicated to CAS. If the Army uses maneuver forces for deep battle, it will require CAS aircraft for support (deep CAS).

I envision two scenarios where deep CAS may be needed for a maneuver force. The first scenario would be a maneuver force inserted beyond the FLOT such as an air assault against an enemy's command and control center. Deep CAS would be provided by packaged F-16s. The second scenario consists of a deep penetration by a maneuver force that maintains its own lines of communication. This scenario could be supported by A-10s if the axis of advance was wide enough to provide protection from enemy air defense systems.

The biggest problem with supporting maneuver forces deep is getting air assets across the FLOT. The Soviets have a large array of air defense systems including the ZSU-23-4, ZSU-X, SA-2, SA-3, SA-4, SA-6, SA-7, SA-8, SA-9, SA-11, SA-12, and SA-13 as well as air to air fighters.

SOVIET AIR DEFENSE

The objectives of the Soviet tactical air defense system are to limit the success of enemy air attacks and to help the Soviets gain air supremacy. They recognize the vulnerabilities of ground systems to an attack and are seeking to protect their assets from attack aircraft and armed helicopters. The Soviet air defense system is made up of overlapping surface to air missiles and anti-aircraft guns.

Like their army in general, the air defense system is made up of several echelons. At the lowest level, each company has a three-man section armed with three SA-7/Grail launchers. The SA-7 is a man-portable heat seeking missile used for point defense against slow moving targets. It has a range of 4KM and a maximum altitude of 3500 meters.³⁰

The next highest level of air defense is in the regiment. Soviet motorized rifle and tank regiments have a battery equipped with a platoon of four ZSU-23-4s and a platoon of four SA-9 launchers. The regimental headquarters may have a section of SA-7 launchers. The ZSU-23-4 is a self-propelled antiaircraft gun that has four 23mm cannons mounted on a turret. (It can be used for air and ground targets.) It has an effective range

of 2500 meters and can be radar or optically controlled. (It is possible that the Soviets are fielding a new antiaircraft gun--the ZSU-X.)³¹ The SA-9/Gaskin is a short range low altitude infrared seeking missile. The missile is mounted on a BRDM-2 amphibious vehicle, which carries four missiles ready to fire and four reloads. The SA-9 has a range of 6KM and a ceiling of 5000 meters.³² The SA-9 system is being replaced by the SA-13/Gopher system which is mounted on an amphibious tracked chassis. The SA-13, unlike the SA-9, has a cooled infrared seeker, which will enable it to track cooler heat sources and not be as susceptible to self-protection flares. The ZSU-23-4 and SA-9/13 are used to cover the "dead" space in the division air defense umbrella.

The division air defense system is considerably heavier than the regiment. Each division has its own air defense regiment consisting of the SA-6/Gainful and SA-8/Gecko radar guided missile systems. The regiment has five batteries with 20 launchers.³³ The SA-6/Gainful is mounted on a three round tracked transporter-erector-launcher (TEL) on a modified tank chassis. It has a range of 24KM and a maximum altitude of 12,000 meters. It is radio command guided and has semi-active radar terminal homing. The SA-11/Gadfly is being deployed

alongside the SA-6 and has a range of 30KM and 15,000 meters maximum altitude. The SA-11 may be replacing the SA-6. An SA-8 regiment is configured like an SA-6 regiment.³⁴ The SA-8/Gecko carries six launchers on an amphibious chassis that also contains its own radar. The SA-8 has a range of 12KM and an altitude of 12,000 meters.³⁵

Army level defense is provided by a brigade of SA-4/Ganefs. The SA-4 missile is carried in pairs on a tracked launcher. It has a range of 80 to 100KM and altitude of 25,000 meters. Guidance is provided by radio-command and semiautomatic homing. The lead SA-4 battery can normally be expected to be found 30KM behind the FEBA with the additional batteries 15KM behind that. The brigade is composed of 27 SA-4 TELs--three battalions with three batteries each. The SA-4 is being replaced by the SA-12. The SA-12 has a range of 100KM and a maximum altitude of 30,000 meters. Behind the army assets, at front level, are an SA-4 brigade and fixed site SA-2/Guideline and SA-3/Goa units, which provide high altitude protection against fast movers.³⁶ Unaided A-10s and Army aviation would be too vulnerable in this intense air defense arena.

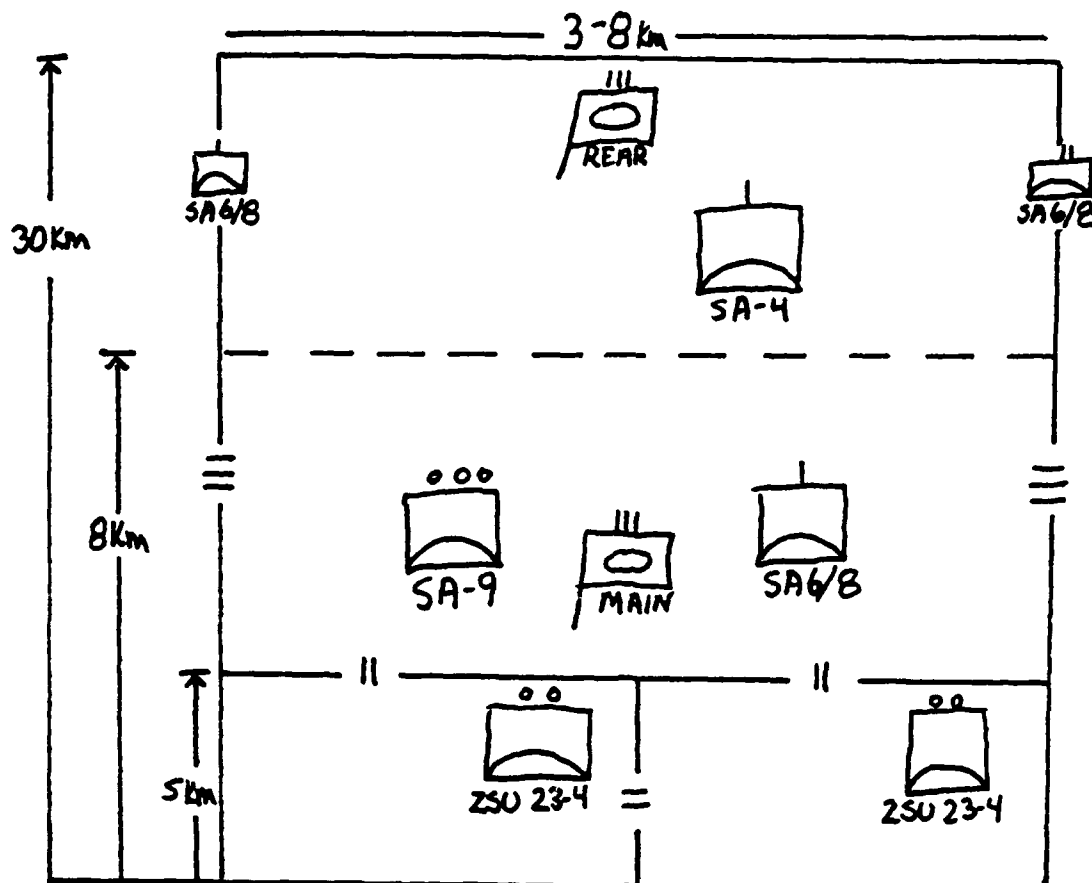


Figure 8 Air Defense in a Soviet Regiment³⁷

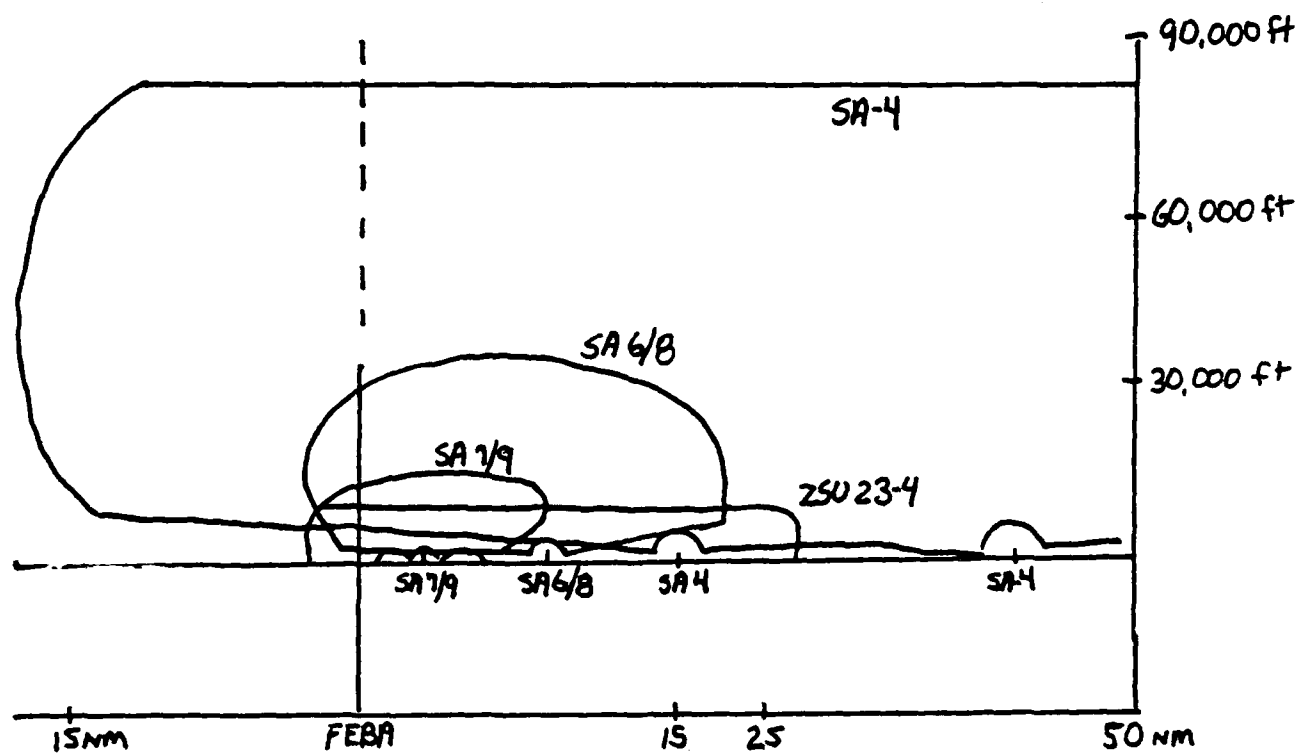


Figure 9 Mobile SAM/AAA Coverage³⁸

PACKAGING

One way the Air Force is planning to send the F-111s, F-15s and F-16s deep is by packaging them. Packaging refers to providing mutual support and cover by sending several different aircraft that together increase the survivability of the whole formation.

Packaging or an integrated strike force can provide mutual support in many ways. Counter air aircraft (F-15 and F-16) would be used to fend off enemy air. Jamming aircraft (EF-111, Ravens and EC-130, Compass Call) would degrade enemy radars and command and control centers. Wild Weasel (F-4G and F-16) would attack radars and surface to air sites along the route of flight and in the target area. Finally, the strike aircraft (F-15E, F-111 and F-16) would attack the target.

An excellent example of packaging (and deep attack) was the Libyan Raid in April 1986. Eighteen F-111 fighter bombers in groups of six attacked Sidi Bilal naval base, Bab al Aziziya barracks and Tripoli's military airfield at night and from low level (high threat tactics). The package for this attack consisted of Navy A-6s to attack additional ground targets, F-14 and F/A-18 fighters to provide combat air patrol, A-7s and F/A-18s to act as Wild Weasels using HARM and strike

missiles to knock out surface to air missiles (SAMs), EF-111s and EA-6Bs for radar and communication jamming, E-2C for command and control and KC-135s for refueling the EF and F-111s. Overall, the mission was a success despite stringent rules of engagement that required minimum collateral damage and "double lock" on all targets (double lock refers to positive identification by radar and infrared systems before a bomb could be released). Ironically, the only loss, one F-111, was probably due to a ZSU-23-4 despite the sophisticated SAMs Libya had.³⁹

A-10s and Army aviation could also benefit from packaging. Unfortunately, both are too slow to take advantage of the full coverage available to "fast movers." Slowing down would increase the vulnerability of the fast mover package. Momentary coverage, at critical times, could be provided by fast movers. For example, fast movers could be present to open a hole in the FEBA or provide mutual support over the deep attack area. The precision required takes practice. Neither the A-10 nor Army aviation practice packaging.

In a recent corps exercise at the School of Advanced Military Studies, packaging was used to attack an Independent Tank Regiment that was several hours beyond the FLOT and a threat to the flank of the Corps attacking into a salient. Sending a maneuver force (in

this case, attack helicopters) deep without some kind of support, would be suicide because of enemy air defenses. Packaging, in this case, included suppression of enemy air defenses (SEAD) provided by A-10s and artillery and long range SEAD provided by MRLS (missiles). If time or resources permitted, EC-130s or EF-111s could have been requested to provide stand off jamming of enemy command and control and radars. Realistically, this kind of support is not possible for every deep attack, but spin-off support might have been provided if a request had been made.

Army assets could piggy-back onto an Air Force strike package either by using the hole through the FLOT created by the air package, or better yet (so as not to telegraph its intentions), by attacking the target sequentially. The attack helicopters could provide SEAD for the fighters and vice versa. An excellent example of mutual SEAD is the Joint Air Attack Team (JAAT). In JAAT, attack helicopters and CAS aircraft work together to attack high payoff targets. After the main target has been located, the team works initially to destroy or at least suppress the enemy's air defenses.

FUTURE DEVELOPMENTS

There are many systems under development that will greatly expand the support TACAIR can provide for the Army and its deep operation. For example, the F-15E is in production and the first squadron will be operational in 1989. The Air Force has developed the LANTIRN system of night and adverse weather navigation and targeting. It is now being tested on the F-15E and F-16.⁴⁰

As an interim fix to the retiring of the A-10 in the next decade, the A-7 plus and A-16 are being looked at to augment the close air support fleet.⁴¹

Additionally, a new airborne targeting data system has been tested on the F-16 that will allow digital hand off of targets and friendly positions between Army observers/helicopters and the F-16. This system allows automatic hand off and presentation in the heads up display of the pilot, allowing first pass accurate weapons delivery.⁴²

The Marines have tested a forward looking infrared (FLIR) system combined with night goggles worn by the pilot of single seat AV-8s to provide night attack capabilities.⁴³

Of major significance is the decision by the Strategic Air Command (SAC) to use B-52s, B-1s and B-2s

in the tactical bombing role. This will greatly increase the number of aircraft available to accomplish AI. Lastly, the Air Force has released pictures of the F-117 stealth fighter. Speculation on the use of the F-117 is that it will be used as a deep strike/interdiction aircraft.⁴⁴ Interestingly, Tom Clancy, in his book Red Storm Rising, foresaw the use of the stealth fighter in the interdiction role.

CONCLUSION

AirLand Battle doctrine has had far reaching effects on how the Air Force and Army view the modern battlefield. Close cooperation is needed between the air (Air Force) and land (Army) components in order to win on a fluid battlefield. AirLand Battle doctrine has brought several concepts to the foreground of military discussion. The hardest idea to deal with has been deep operations.

After looking at deep battle and operations from battalion to corps level, several ideas are common. First, deep operations are specific actions against particular forces for a temporary but vital tactical purpose. Second, maneuver forces (to include ground maneuver units, air assault forces and attack helicopter units), field artillery and EW assets will make up the bulk of what the Army has for deep operations. Third, there is a reliance on the Air Force to do most of the deep operations, primarily because aircraft have the range and maneuverability to strike deep. The reliance on the Air Force is also based upon the scarcity of Army deep attack systems and to the risks and complexity of sending maneuver forces deep.

TACAIR assets available to do deep battle are also

very limited. At present, aircraft that can do AI are the F-16 and F-111. Is that enough to do all the missions required for deep battle? NO, for two reasons. First, the F-16 is not able to provide night and adverse weather weapons delivery, an important part of AI requirements. The F-111 can do AI, but there are limited numbers, not enough to cover most requests. Second, a major Army need is support for maneuver forces that are deep, or in other words deep CAS. The F-111 does not have the radios, maneuverability or trained crews to do CAS. The F-16 can do deep CAS, but only one or two squadrons are trained for CAS and it cannot provide support at night or in adverse weather. The A-10, the Air Force's primary CAS aircraft, is also limited to day-only support. Other major drawbacks to the A-10 are its inability to penetrate the FLOT on its own, because of its vulnerability to Soviet air defenses, and its being too slow for packaging with assets that could protect it. One solution would be to package A-10s and Army aviation and support them with SEAD to include direct fire support and jamming assets from both the Air Force and Army. Air Force direct packaging of A-10s and Army aviation cannot be accomplished because of speed differentials, but Air Force support could be provided by stand-off use of jammers, or momentary support to open a hole for ingress

or egress, or mutual attack in the target area.

Since future battlefields will be fluid, the roles of CAS and BAI have become blurred. Aircraft that can do both roles are needed. One possible solution is the A-16, especially since the F-16 has demonstrated its CAS capabilities. It could provide CAS to a maneuver force with a deep operation mission, whether the CAS mission was in support of an inserted force or a maneuver force that had penetrated deep into the enemy's rear.

Will the Air Force be able to do the deep battle? Things are getting better rapidly. The Air Force is catching up to the air system requirements in AirLand Battle doctrine. The F-15E and F-117 will be operational soon, probably in late 1989, which will enhance our capabilities. Once testing is complete and production has started, the F-16 and F-15E will be fitted with the LANTIRN system of night and adverse weather navigation and targeting. SAC is giving all of its FB-111s to Tactical Air Command so they can be converted to F-111s. This will add 57 aircraft to the AI role. SAC has also agreed to train and use its strategic assets (B-52, B-1, and B-2) against tactical AI targets.

ENDNOTES

1. Field Manual 101-5-1, Operational Terms and Symbols. Washington DC; HQ Department of the Army, 1985. p. 1-22.
2. Field Manual 100-5, Operations. Washington DC; HQ Department of the Army, 1986. p. 19.
3. Tactical Air Command Manual 2-1, Tactical Air Operations. Washington DC; HQ Department of the Air Force, 1982. p. 2-6.
4. Field Manual 71-2J, The Tank and Mechanized Infantry Battalion Task Force. Washington DC; HQ Department of the Army, 1984. p. 1-6. FEBA= Forward Edge of the Battle Area.
5. Ibid., p. 1-7.
6. Field Manual 71-2, The Tank and Mechanized Infantry Battalion Task Force (Approved Final Draft). Ft. Leavenworth, KS., CGSC, 1988. p. 1-7.
7. Ibid., p. 1-7.
8. FM 71-2J, p. 1-6.
9. Field Circular 71-3, The Armor and Mechanized Infantry Brigade (Coordinating Draft). Ft. Leavenworth, KS., CGSC 1985. p. 1-7.
10. Ibid., p. 1-8.
11. Field Circular 71-100, Armored and Mechanized Division and Brigade Operations. Ft. Leavenworth, KS., CGSC, 1984. p. 4-23.
12. Holder, L.D. LTC. "Maneuver in the Deep Battle". Military Review. 54-61, May 1982. p. 56.
13. FC 71-100, p. 4-23.
14. Field Manual 71-100, Division Operations (Candidate Final Draft). Ft. Leavenworth, KS., CGSC, 1988. p. 4-10.

15. Field Manual 100-15, Corps Operations (Candidate Final Draft). Ft. Leavenworth, KS.; CGSC, August 1988. pp. 3-4 and 3-5.
16. Ibid., p. 3-4.
17. Holder, pp. 59-60.
18. Ibid., p. 57.
19. Ibid., pp. 57-58.
20. FM 100-15, p. 3-25.
21. Ibid., p. 3-26.
22. Chervonobab, Davyduvs. "Military Technology." Soviet Press. 1743: 93-95, June 1988. p. 95.
23. Air Force Manual 1-1, Basic Aerospace Doctrine. Washington DC; HQ Department of the Air Force. 1987. p. 3-3.
24. Ibid., p. 3-3.
25. Ibid., p. 3-4.
26. Angelucci, Enzo. Military Aircraft. Military Press: New York, 1980. p. 423.
27. Ibid., p. 459.
28. Ibid., p. 423.
29. Ibid., p. 453.
30. Field Manual 100-2-3, The Soviet Army Troops. Organisation and Equipment. Washington DC; HQ Department of the Army, 1984. p. 5-101.
31. Ibid., p. 5-105.
32. Ibid., p. 5-103.
33. Ibid., p. 5-100.
34. Ibid., p. 5-102.
35. Ibid., p. 5-102.

36. Ibid., p. 5-59.
37. FM 71-2, p. 24.
38. TACM 2-1, p. 2-5.
39. "Regan's Raiders." Newsweek, 26-30, Apr 28, 1986. p. 29.
40. Lay, Theodore W. II LTC. "FLIR, Fast PAC, and the F-15-The Newest Fighter in Town." USAF Fighter Weapons Review, Summer 1988. pp. 21-24.
41. Correll, John T. "Thirty-seven Wings of the Best". Air Force Magazine. 46-51, Apr 1987. p. 48.
42. "AFTI F-16 Integrates Airborne Targeting Data During CAS Mission." Aviation Week and Space Technology, Nov 7, 1988. p. 51.
43. Ibid., p. 18.
44. Morrocco, John D. "USAF Unveils Stealth Fighter." Aviation and Space Technology, Nov 14 1988. pp.28-29.

BIBLIOGRAPHY

MANUALS

Air Force Manual 1-1, Basic Aerospace Doctrine.
Washington DC; HQ Department of the Air Force. 1987.

Air Force Manual 2-6, Tactical Air Operations--
Reconnaissance. Washington DC; HQ Department of the Air
Force.

Field Circular 71-3, The Armor and Mechanized Infantry
Brigade (Coordinating Draft). Ft. Leavenworth, KS., CGSC
1985.

Field Circular 71-100, Armored and Mechanized Division
and Brigade Operations. Ft. Leavenworth, KS., CGSC, 1984

Field Manual 6-20, Fire Support in Combined Arms
Operations. Washington DC; HQ Department of the Army,
1984.

Field Manual 71-2, The Tank and Mechanized Infantry
Battalion Task Force (Approved Final Draft). Ft.
Leavenworth, KS., CGSC, 1988.

Field Manual 71-2J, The Tank and Mechanized Infantry
Battalion Task Force. Washington DC; HQ Department of
the Army, 1984.

Field Manual 71-100, Division Operations (Candidate Final
Draft). Ft. Leavenworth, KS., CGSC, 1988.

Field Manual 100-2-1, The Soviet Army Operations and
Tactics. Washington DC; HQ Department of the Army, 1984.

Field Manual 100-2-2, The Soviet Army Specialized Warfare
and Rear Area Support. Washington DC; HQ Department of
the Army, 1984.

Field Manual 100-2-3, The Soviet Army Troops,
Organisation and Equipment. Washington DC; HQ Department
of the Army, 1984.

Field Manual 100-5, Operations. Washington DC; HQ
Department of the Army, 1986.

Field Manual 100-15, Corps Operations. Washington DC; HQ Department of the Army, 1985.

Field Manual 100-15, Corps Operations (Coordinating Draft). Ft. Leavenworth, KS.; CGSC, January 1988.

Field Manual 100-15, Corps Operations (Candidate Final Draft). Ft. Leavenworth, KS.; CGSC, August 1988.

Field Manual 101-5-1, Operational Terms and Symbols. Washington DC; HQ Department of the Army, 1985.

Joint Chiefs of Staff Publication 3-03.1, Joint Interdiction of Follow-on Forces (FOFA) (Test Pub). Washington DC; Operational Plans and Interoperability Directorate (J-7) Staff, 1988.

Tactical Air Command Manual 2-1, Tactical Air Operations. Washington DC; HQ Department of the Air Force, 1982.

Tactical Air Command Pamphlet 50-29, Joint Attack of the Second Echelon (J-SAK). USAF Tactical Air Command; Langley AFB, Virginia. December 1984.

ARTICLES

"AFTI F-16 Integrates Airborne Targeting Data During CAS Mission. Aviation Week and Space Technology, Nov 7, 1988.

Barger, Millard. "What USAF Has to Do to Put the "Air in AirLand Battle." Armed Forces Journal. 58-64, June 1986.

Brinkley, William A. COL. "The COST Across the FLOT." Military Review. 30-41, Sept 1986.

Canan, James W. "Sorting Out the AirLand Partnership." Air Force Magazine. 71: 50-59, Apr 1988.

Chervonobab, Davyduvs. "Military Technology." Soviet Press. 1743: 93-95, June 1988.

Cordwell, Thomas A. III, COL. "AirLand Battle Revisited". Military Review. 4-12. Sept 1985.

Correll, John T. "Thirty-seven Wings of the Best". Air Force Magazine. 46-51, Apr 1987.

Ennis, Ned B. MAJ. "Putting the Deep in Deep Attack". Army. 38:44-57, June 1986.

Fulgham, David, "F-15E Growing Pains Challenge Researchers". Air Force Times. 48: 29-30, Apr 25 1988.

"Hitting the Source", Time. 16-33, Apr 28, 1986.

Holder, L.D. LTC. "Maneuver in the Deep Battle". Military Review. 54-61, May 1982.

Jacobs, G. "AirLand Battle 2000". Asian Defence Journal. 38-53, Oct 1983.

Lay, Theodore W. II LTC. "FLIR, Fast PAC, and the F-15-The Newest Fighter in Town." USAF Fighter Weapons Review, Summer 1988.

McPeak, Merrill A. Lt Gen. "TACAIR Missions and the FACL." Air University Review, 36: 65-72, Sep-Oct 85.

Morocco, John D. "USAF Unveils Stealth Fighter." Aviation and Space Technology, Nov 14 1988.

Myers, C.E., Jr. "Air Support for Army Maneuver Forces." Armed Forces Journal, 46-47, March 1987.

Offley, Ron LTC. "Close Air Support for the AirLand Battle." Infantry, 21-25, Sep-Oct 1985.

Petersen, Phillip M. and Clark, J.P. MAJ. "Soviet Air and Antiair Operations." Air University Review, 36: 36-54, Mar-Apr 1985.

Powers, Brian E. Captain. "Soviet Ground Air Defense Organization." Air Defense Artillery, 20-23, Winter 1986.

"Regan's Raiders." Newsweek, 26-30, Apr 28, 1986.

Rhodes, Jeffery P. "Newest Eagle." Air Force Magazine, 70: 74-76, Feb 1987.

Rippe, Stephen T. LTC. "Army and Air Force Issue: Principles and Procedures for AirLand Warfare." Air University Review, 37: 60-69, May-June 1986.

Staudenmaier, William O. COL. "Deep Strike in US and NATO Doctrine." Defense and Foreign Affairs, 45: 28-31, Feb 1987.

Ulsamer, Edgar. "New Road Map for AirLand Battle." Air Force Magazine, 70: 108-113, Mar 1987.

BOOKS

Angelucci, Enzo. Military Aircraft. Military Press: New York, 1980.

Annual Report to the Congress FY 1989. Washington DC: US Government Printing Office, 1989.

Baxter, William P. Soviet AirLand Battle Tactics. Presidio Press: Novato, CA., 1986.

Simpkin, Richard. Deep Battle. London: Bradbury's Defense Publishers, 1987.

Soviet Military Power 1987. Washington DC: US Government Printing Office, 1987.

Triandafillov, V.K. Nature fo the Operations of Modern Armies. Moscow-Leningrad: 1929, translated by William A. Burhans, RUSS-ENG Translations, Inc., Woodbridge, Va.