THE TACTICAL IEW SYSTEM AND INTELLIGENCE ON THE AIRLAND BATTLEFIELD

A Monograph

by

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This monograph discusses the capability of the tactical Intelligence Electronic Warfare system to fulfill the requirements of AirLand Battle doctrine. It examines the system from corps through battalion and analyzes its ability to provide usable intelligence to tactical commanders with current collection systems. It uses a doctrinal template to examine the optimum collection capabilities of current collection systems. It then analyzes this capability against the AirLand Battlefield structure to obtain a sensing for intelligence support. Finally, this monograph argues that the tactical IEW system is one system, and must function as one system to maximize intelligence support.

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ABSTRACT

THE TACTICAL IEW SYSTEM AND INTELLIGENCE ON THE AIRLAND BATTLEFIELD by MAJ James E. Elder, USA, 41 pages.

This monograph discusses the capability of the tactical Intelligence Electronic Warfare system to fulfill the requirements of AirLand Battle doctrine. It examines the system from corps through battalion and analyzes its ability to provide usable intelligence to tactical commanders with current collection systems.

This monograph uses a doctrinal template to examine the optimum collection capabilities of current collection systems. It then analyzes this capability against the AirLand Battlefield structure to obtain a sensing for intelligence support.

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INTRODUCTION

The prevailing AirLand Battle doctrine envisions future High and Mid-Intensity Conflict as "chaotic, intense and highly destructive."1 The battle will be dominated by nonlinear operations and maneuver warfare. Each echelon of command must plan to fight one battle involving three operations; Close, Deep and Rear.2 FM 100-5 also states that "at any echelon, close operations (Ops) include the close, deep and rear ops of subordinate elements."3 The implication of these concepts on the IEW system are, just now, being fully realized.

The IEW system must provide 24 hour all around coverage to support a nonlinear, maneuver battle with three operations. Additionally, interdiction of a moving force requires real time intelligence for targeting and the decision making process. The limits on combat resources in a highly destructive battle demand precise intelligence to avoid non productive use of combat power and to protect the force.

These requirements are recognized by intelligence doctrine. FM 34-1, the capstone manual for military intelligence, states:

> "The purpose of tactical intelligence operations is to obtain and provide decision makers reliable information about the enemy, weather, and terrain as quickly and completely as possible. The results are an

essential basis for estimating enemy capabilities, courses of action, intentions, and for planning friendly operations."4

FM 34-1 also recognizes the limitations on meeting these requirements at each level of command.

"No single level of command is capable of meeting all of its requirements with organic resources. Each is dependent on higher, lower, and adjacent commands to complete the intelligence picture of the battlefield, to meet EW requirements, or to support the security needs of the command. Therefore, commanders at each echelon must ensure that their resources are integrated into the overall IEW effort."5

Essentially, the IEW system from corps through battalion must operate as one system to meet the requirements of today's AirLand Battle. This requires a structure which can focus the efforts of the system as a whole.

The current IEW system has a dual structure consisting of staff elements (G-2/S-2) from corps through battalion, and CEWI units at corps and division. The intelligence staff is responsible for planning, coordinating, processing, and disseminating intelligence. The CEWI units collect information, and provide interrogation, counterintelligence and EW support. This structure is linked and focused by the intelligence staff officer who coordinates the IEW effort in support of the commander's requirements.

The basic intelligence requirements are the same at each tactical echelon. The intelligence officer

develops the situation (integration of enemy, weather and terrain), develops targets, and provides electronic warfare (EW) and counterintelligence support.6 In order to accomplish this task the intelligence officer must exploit sources on the battlefield. He does this through traditional collection means (OP's, patrols, etc.) and technological exploitation.

To declare that intelligence is important on the battlefield would be a gross understatement. Under AirLand Battle doctrine intelligence is the key component that allows commanders to synchronize battlefield operating systems. It's that component which reduces the degree of risk a commander takes by reducing the fog and friction of war. Even Clausewitz, who warned military commanders about the dilemma of intelligence realized its potential.7 Sun Tzu stated: "Know the enenmy and know yourself; in a hundred battles you will never be in peril."8 Jomini declared that it was unthinkable that a commander would develop a plan without knowledge about his opponent.9 In short, accurate and timely intelligence about the enemy and the battlefield is important.

The problem with intelligence thoughout history has always been acquiring it and knowing that it is accurate.10 Today, this dilemma remains for commanders

to solve despite the sophisticated collection systems now available.

Current assets available in the IEW system for collection are a mixture of 50's and 70's technology. These systems were designed prior to the full evolution of AirLand Battle doctrine, and it is unclear if they can fully support its battlefield structure.

The purpose of this monograph is to answer the question: can the current tactical IEW system produce usable intelligence for the tactical commander. The methodology is an analysis of intelligence, sources of information, collection systems, the intelligence process, and Airland Battlefield structure. The criteria is a determination of the capabilities of current tactical collection systems to fulfill AirLand Battlefield requirements.

WHAT IS INTELLIGENCE

FM 101-5-1 dated October 1985 offers the following definitions and distinctions between intelligence, combat intelligence, and combat information.

Combat Information is: "unevaluated data gathered by or provided to the tactical commander that, because of its highly perishable nature or the criticality of the situation, cannot be processed into tactical intelligence in time to satisfy the user's tactical intelligence requirements."11

Combat Intelligence: "that knowledge of the enemy, weather, and geographical features required by a commander in planning and conducting combat operations. It is derived from the analysis of information on the enemy's capabilities, intentions, vulnerabilities, and the environment."12

Intelligence: "the product resulting from the collection, evaluation, analysis, integration, and interpretation of all available information concerning an enemy force, foreign nations, or areas of operations and which is immediately or potentially significant to military planning and operations."13

FM 34-1 eliminates the distinction between combat intelligence and intelligence. It recognizes a difference between combat information and intelligence. It states that "once raw data is validated, integrated, compared, and analyzed it becomes intelligence."14 The key difference separating combat information and intelligence is time and use.15 Combat information must be used immediately. Normally, it requires maneuver, the expenditure of combat power, or some action by the receiver. Intelligence, on the other hand, is the product of the analysis and verification of information. It eliminates uncertainty as to the enemy's capabilities, courses of action and intentions. It is used to help ongoing and future operations and forms the basis for our plans.16

The distinction between combat information and intelligence is an important one from three aspects. First, modernization and mechanization of the battlefield have compressed time within the same

physical space. This compression of time limits the commander's decision cycle and forces quick reaction. Commanders at the bottom of the tactical spectrum require real-time combat information to retain the initiative, while commanders at the upper end of the spectrum require it to cue the collection effort. The impact on the intelligence system is that it must be event oriented, flexible and geared to make rapid assessments along with rapid dissemination.

Second, combat information can be used to develop intelligence. Information triggering fires, maneuver or electronic countermeasures almost always provide an intelligence indicator. For example, the sighting of ten BMP's may trigger an indirect fire mission, but it is also an indicator of the enemy's scheme of maneuver. The information can lead to identification of the parent battalion which could reflect the regimental effort. If nothing else, combat information will cue the IEW system for further collection.

Third, combat information can be obtained and passed by any unit in the combat zone. Although combat information is obtained by intelligence collectors, the bulk of it is passed by front line units through operations channels. The intelligence system must be linked to the operational plan at every echelon of

command. This link provides a closed loop system which maximizes the collection effort within the IEW system.

In conclusion, it is apparent that combat information and intelligence are not the same. Intelligence may be combat information but not vice versa. It is also apparent that combat information is essential at the tactical level for the cuing of collection systems and the development of intelligence.

SOURCES

Intelligence officers today obtain information from traditional sources that have abounded since the origins of warfare; human observation, traitors, refugees, literature, maps, etc.; and from highly sophisticated electronic and photographic devices. Each source falls into one of four basic categories; Human Intelligence (HUMINT), Signals Intelligence (SIGINT), Imagery Intelligence (IMINT) and other.17

HUMINT

Tactical HUMINT sources are those derived from human sources. These include enemy prisoners of war (EPW), civilians (refugees, detainees), captured enemy documents, patrols, observation posts (OPs), guerrilla fighters, local military, long-range surveillance units, and reports from friendly soldiers. Each unit

in the tactical chain possesses the potential to collect information from human sources.

The positive aspects of HUMINT are:

1) Can be an excellent single source.
2) Can provide targetable data and battle damage assessment.
3) Good source of information concerning level I and II threats to the rear area.

The negative aspects of HUMINT are:

1) Very few assets available. Support is provided on an area basis.
2) Assets are not mobile.
3) Assets are extremely vulnerable to compromise.
4) Reliability of sources is often difficult to establish (EPWs, agents, etc.).

SIGINT

Tactical SIGINT is information derived from the collection, evaluation, analysis, integration, and interpretation of intercepted electromagnetic emissions.18 SIGINT information is divided into two groups, communications intelligence (COMINT) and electronic intelligence (ELINT).

COMINT

COMINT involves the interception and exploitation of communications. Exploitation is accomplished by collecting information from unencrypted communications (in the tactical IEW system units cannot exploit encrypted communications) and or conducting

radio direction finding operations (locating the enemy transmitter).

COMINT can provide a wealth of information which a good analyst can transform into intelligence. For example, COMINT sources can reveal order of battle information; such as, size, type, location and mission of opposing units; which can provide insight into enemy capabilities and intentions.

The positive aspects of COMINT are:

1) They are passive collectors.
2) They cue other collection systems.
3) They provide real time combat information.
4) They can provide battle damage assessment.

The negative aspects of COMINT are:

1) They are susceptible to deception particularly when used as a single source.
2) They require trained linguists.
3) Collected information is classified at the Top Secret Special Intelligence (TSSI) level.
4) VHF systems require communications line of sight.

ELINT

ELINT is the interception of noncommunications emissions (radar). Its primary purpose is to locate and type enemy radars. Again, a good analyst can determine the type of system (ADA, counterbattery, ground surrveillance, etc.) associated with the radar, its location, and unit. It can be used to cue other collection systems and or for targeting data.

The positive aspects of ELINT are:

1) They are passive collectors.
2) They can cue other collection systems.
3) They can provide the location of ADA systems.
4) They can tip off general location of C3 nodes.

The negative aspects of ELINT are:

1) These systems require line of sight.
2) Tactical systems do not provide real time DF.
3) They are susceptible to deception.
4) Information collected is classified TSSI.

IMINT

IMINT is information or intelligence taken from radar, photography, infrared, and electro-optic imagery.19 The tactical IEW system has limited capability for IMINT and relies heavily on EAC support.

The positive aspects of IMINT are :

1) They provide the location of enemy forces by type.
2) They can locate rear services, supply depots, etc.
3) They provide terrain information.
4) They can pick up the movement of enemy forces.
5) They can provide early warning.

The negative aspects of IMINT are:

1) Systems are weather dependent.
2) Photographic systems must be flown over the target.
3) Tactical photography is not real time.
4) Radar systems are active emitters.

OTHER

Other sources are friendly sources that are normally not associated with intelligence. They are

found in combat support and combat service support units. The intelligence officer can glean superb information from these sources. For example, the ADA officer can provide information on likely enemy air routes, capabilities/vulnerabilities of threat ADA; engineers can help in analysis of terrain, enemy barriers/obstacles; fire support officers can assist in analyzing the probable locations of enemy artillery etc. Finally, EW systems can be used as a source. These systems can collect information when not employed in an ECM role.20

TACTICAL COLLECTION SYSTEMS

The chart on page 11-1 shows the type, number and capabilities of SIGINT and IMINT systems. Limitations are discussed below along with HUMINT sources.

IEW SIGINT & IMINT Collection Equipment

TYPE	FUNCTION	PRIME MOVER	CORPS	DIV	ACR	RANGE
TSQ 114A	INTERCEPT HF/VHF/UHF VHF DF	M1015		1		30KM
TRQ 32V	INTERCEPT HF/VHF/UHF VHF LOB	CUCV	3	3	2	30KM
TRQ 30	INTERCEPT HF/VHF VHF LOB	MAN PACKED	3	3	2	30KM
MLQ 34	INTERCEPT HF/VHF VHF ECM	M1015	3	3		30KM
TLQ 17A	INTERCEPT HF/VHF HF/VHF ECM	CUCV	3	3	2	30KM
MSQ 103	INTERCEPT NONCOMMS	M1015	3	3		30KM
QUICKFIX	INTERCEPT HF/VHF VHF DF HF/VHF ECM	EH-60		3	3	50KM ESM 30KM ECM
GUARDRAIL	INTERCEPT HF/VHF/UHF VHF DF	RU-21H	6			100KM
QUICKLOOK	INTERCEPT NONCOMMS	RV-1D	6			100KM
MOHAWK	MOVING TARGET INDICATOR PHOTO	OV-1D	10			100KM

NOTES: TSQ 114 ONE SYSTEM FIVE VEHICLES
Quickfix collection range is 50km, while its communications jamming range is 30km

HUMINT

As mentioned earlier, corps and division have the potential to exploit HUMINT sources. The specific IEW assets used are counterintelligence agents, interrogators and Long Range Reconnaissance and Surveillance Units (LRSU). For the purposes of this monograph only the LRSU capabilities and limitations will be discussed.

The allocation of Long Range Surveillance and Reconnaissance teams available to the corps and division are 18 and 6 respectively.21 These teams operate as six man units which can be split into three man teams for limited periods. Currently, teams are authorized the PRC 70 HF radio which is a heavy battery operated or hand cranked system.

Doctrinally, corps teams operate out to 150km and division teams 50km in front of the FLOT/FEBA. They can be inserted through a variety of ways but the primary means is by helicopter. LRSU teams are superb assets for watching chokepoints, observing road movement, or observing the battlefield from enemy held terrain. Their most significant limitation is their lack of mobility and recoverability.

SIGINT

Primarily these systems are used in general support of subordinate commands to provide early warning, real time combat information, and assist in the close, deep and rear operations.

Limitations of the SIGINT platforms are listed below.

Corps Airborne COMINT

Guardrail has a 350km line of sight range to its ground control facility (the Intelligence Processing Facility, IPF).22 It relies on contact with the facility to pass real time intelligence to subordinate units.

The IPF is not highly mobile. Its forty foot trailers are pulled by five ton tractors which can only move the system at ten to twelve miles per hour on paved roads.

The trailer mounted microwave antennaes require a minimum of twenty feet of elevation above the surrounding ground and unobstructed line of sight to the aircrafts operational flight path.23

Guardrail is a slow flying aircraft susceptible to Soviet air and ADA threat.

Corps Airborne ELINT

ELINT data is collected by the RV-1D and transmitted to a ground processing station for the development of intelligence. It takes 2-4 hours to get the data from the aircraft to the user after it is intercepted.24

The RV-1D is also susceptible to Soviet air and ADA.

Division Airborne SIGINT

The division Quickfix system is susceptible to Soviet air and ADA, and it possesses limited intercept range.

Ground Based SIGINT

Ground based COMINT and SIGINT systems for the corps and division have the same limitations.25

1) All have limited intercept range.
2) All require LOS and must operate close to the FLOT/FEBA.
3) The systems cannot collect while moving.
4) The systems lack mobility to keep pace with the M1/M2.
5) The TSQ 114 is linked through a continuous UHF signal which produces a unique battlefield signature that can be DF'd. This system must move frequently.
6) The TRQ 32v and TRQ 30 cannot provide targetable DF's; i.e., locations of enemy transmitters with enough accuracy to fire on.
7) The MSQ 103 (ELINT) cannot provide automated DF. However, the line of bearings can be ploted on a map by

hand, thus producing a target; provided that three LOBs are obtained for each potential target.

IMINT

The tactical IEW system has very few IMINT assets assigned to it. The photographic capability is limited to the OV-1D (Mohawk) aircraft. The system is limited by weather and Soviet air and ADA. During wartime this system will be restricted to those areas free from enemy air and ADA.

Airborne Radar

The corps has one airborne radar system. This is the Side Looking Airborne Radar system designed to pick up movement. It is limited in:

1) Range.
2) Ability to track multiple targets.
3) It is not an area search system.
4) It is an active emitter.

Ground Surveillance Radar

These assets are located in the division CEWI battalion and normally pushed down to maneuver battalions. Their limitations are:

1) They are active emitters
2) They must be employed on the FLOT/FEBA.

Other

Airborne ECM (Quickfix) limitations are:

1) Limited range.
2) Limited standoff.
3) Susceptible to enemy ADA.

Ground based EW limitations are:

1) Limited range
2) Must locate 1-2km from the FLOT/FEBA to conduct VHF ECM operations.26
3) Systems lack mobility.
4) They can interfere with friendly communications.

In summary, the collection systems available in the tactical IEW system cover all potential sources of information. Each collection system operates on a particular source and under certain limitations which affect their employment. These limitations must be considered when planning the collection coverage.

INTELLIGENCE PROCESS

The intelligence process is guided by the intelligence cycle (directing, collecting, processing, disseminating and using). The process is the same at each echelon of command only differing in scope, time and tools available for completion. Essentials to the process are Intelligence Preparation of the Battlefield (IPB), the collection plan, reports, the communications system, and trained military intelligence personnel.

IPB has been the most significant development impacting on the intelligence process since WWI. Since it was created, IPB has evolved into a significant tool that can help the commander and staff visualize the battlefield. Its event orientation makes it an ideal tool for use on the AirLand Battlefield.

Intelligence officers from battalion through corps coordinate the IPB process. The minimum requirements to initiate an IPB are a designated area of operations, a time frame for the operation, and information on size and type of enemy. Technically, it is initiated by the commander's restated mission and priority intelligence requirements (PIR).27 Its purpose is to integrate enemy doctrine with the weather and terrain to determine and evaluate enemy capabilities, vulnerabilities and intentions.28 Conducted properly IPB assists in the formulation of friendly courses of action, allocation of combat power, situation development, identification of high priority targets and high value targets, and development of the intelligence collection plan.

The collection plan is a management tool used by all intelligence officers to manage requirements, collection assets, and time. It is developed around the commander's PIR/IR which are then translated into indicators, and specific information requests. Organic

assets are tasked to collect specific information based on each system's particular capability. For example, a commander may state as his PIR; when will the enemy attack, where and in what strength? Indicators which could answer this PIR are: movement of forces forward, changes in the enemy communications posture, forward stockpiling of supplies, repositioning of artillery and air force assets, etc. SLAR would be directed to cover routes searching for movement, ELINT systems would look for changes in the ADA disposition, COMINT assets would look for the location and identity of critical C3 nodes, etc. Those collection requirements that cannot be answered by organic or subordinate units are passed to the next higher command and as reports are obtained the collection plan is adjusted.

Reports are an integral part of the intelligence process. Each collection discipline uses established report formats recognized throughout the tactical IEW system. These reports are not command dependent. Intelligence officers and analysts know what reports are required based on the information received. These reports are contained in FM 34-1, FM 34-80, and FM 34-10. The methods of transmission depend on criticality of information and circuit path availability.

Communications link the intelligence system from corps to battalion. The corps G-2 is linked to the division G-2 via multichannel and RATT. Additionally, the corps Guardrail system can transmit directly to the division ALL SOURCE INTELLIGENCE CENTER (ASIC) and the corps CEWI brigade provides backup ground courier service for TSSI material.

Divisions rely on multichannel, VHF and RATT to communicate with brigades. Brigades are linked to battalions through VHF and RATT. MI assets use VHF, RATT and HF radio for internal and external connectivity. The major deficiency of the communications system is that it does not allow for TSSI skip echelon communications (corps G-2 talking directly to a brigade S-2).

Inherent to the intelligence process is an overall requirement for skilled individuals fully trained in peace time for war. The complexities of the IEW system demand professional intelligence officers, non commissioned officers, and soldiers. These individuals must know enemy doctrine, have an appreciation for the effects of weather and terrain on military operations, know the capabilities of collection systems, understand reporting requirements, and know the IEW communications system. Plus, they must know friendly doctrine and equipment.

Overall, the intelligence process provides a logical systematic format for planning the collection and processing of information into intelligence. Its weakness is its reliance on time. It takes time to analyze and integrate information into intelligence to support current and future operations.

THE BATTLEFIELD

Using an IPB technique, we can get a sensing of the collection coverage current tactical IEW systems can provide on the AirLand Battlefield. This template should reveal capabilities and vulnerabilities of the IEW systems.

Although doctrinal manuals no longer provide recommended frontages for areas of operations, we can obtain a frontage by matching Soviet attack doctrine with the U.S. echelon opposing the Soviet attack. Prevailing concepts state that a battalion is expected to defeat a Soviet regiment, a brigade a Soviet division, a division a Soviet army, and a corps a Soviet front.29

A template of a Soviet front of four armies advancing with three armies on line against prepared positions shows the following frontages:

front zone of advance 180 km

breakthrough army zone 50 km

division zone 20-30 km

regimental zone 3-8 km. 30

Using a U.S. corps with four heavy divisions and three on line, and assuming two up one back down to battalion U.S. frontages are:

corps 180 km

division 60 km

brigade 30 km

battalion 15 km

The area of interest for each U.S. echelon is: Bn 5 kms, Bde 15 kms, Div 70 kms, Corps 150 kms.31 The depth of the corps combat zone will be 175-250 kms; the bulk of which covers the zone of rear operations. The corps rear encompasses 100-120 kms, and division rear covers 35-50 kms. The remaining area is divided between the main battle area (MBA) 20-30 kms and the Forward Line of Troops (FLOT) 20-50 kms.32 Depth, as with frontage, is not assigned by U.S. doctrine to maneuver units. However, the above distances are good estimates based on previous doctrine and complete the analytical templates.

Diagrams 1-4 on the following pages are templates which reflect the intelligence collection systems that are found in corps and division CEWI units. The

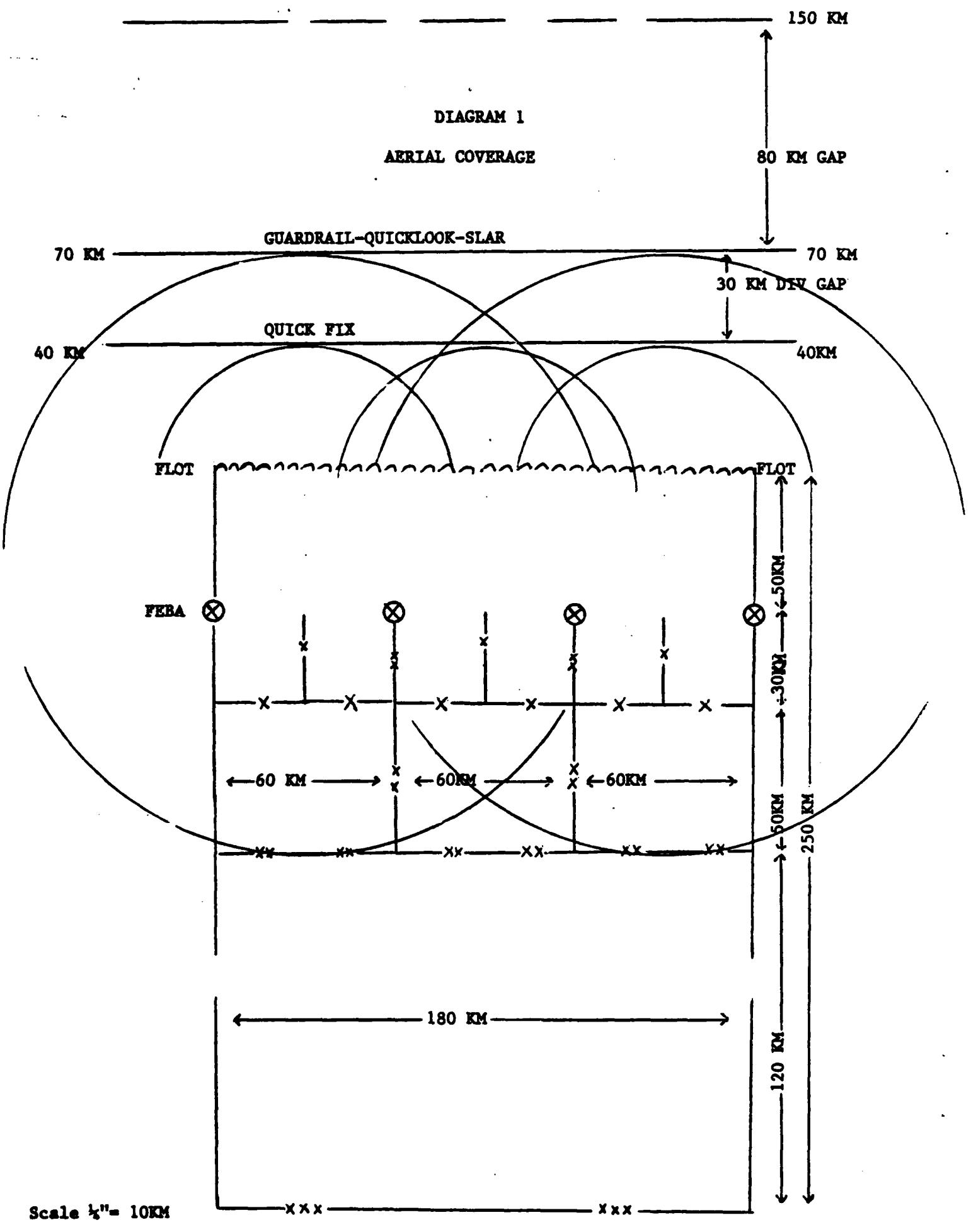


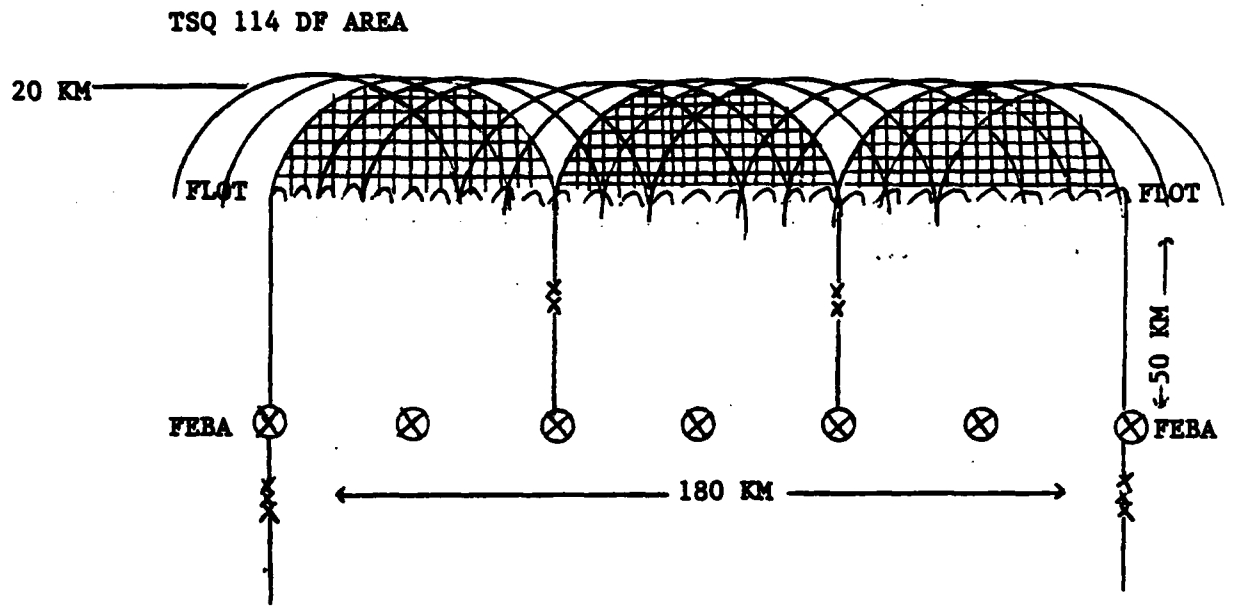
DIAGRAM 1

AERIAL COVERAGE

Scale ½"= 10KM

DIAGRAM 2

TSQ 114 COMINT DF COVERAGE



NOTE DIAGRAM REFLECTS 15xTSQ 114 ON LINE

5 KM behind FLOT

CROSSED# AREA SHOWS DF COVERAGE by DIV

OPEN AREA SHOWS POSSIBLE ADDITIONAL DF AREA IF DIV SYSTEMS ARE INTEGRATED

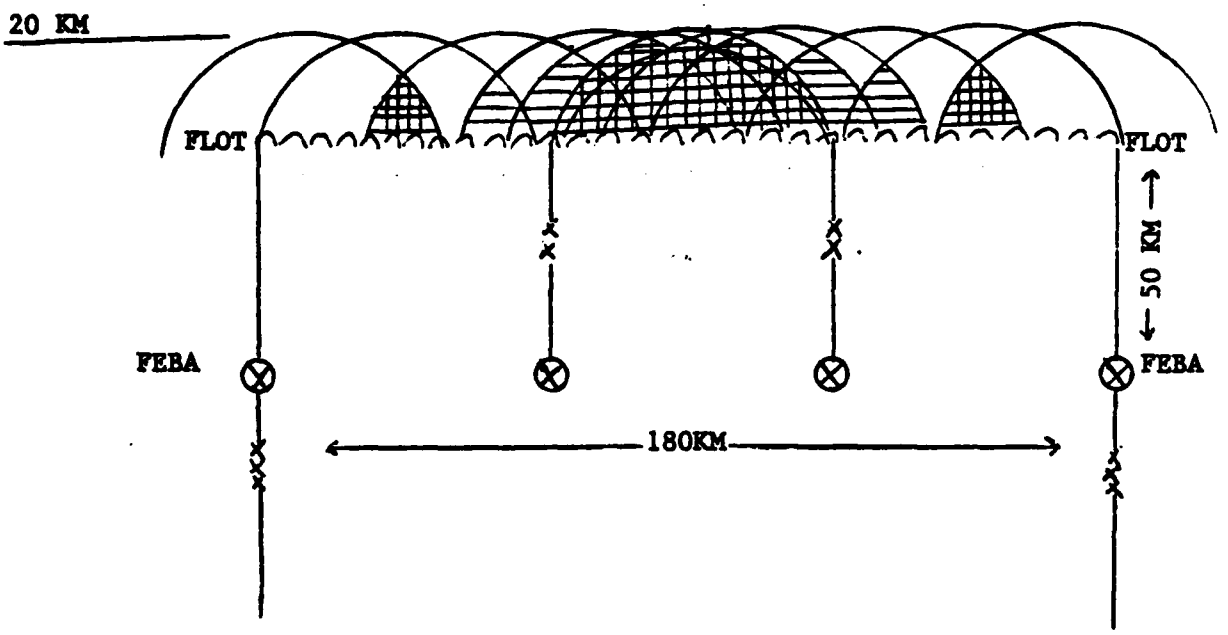
DIV BOUNDARIES ARE WEAK SPOTS
COVERAGE BREAKS DOWN AS BATTLE becomes mobile

GAPS COULD BE PLUGGED BY TRQ 32V

Scale ½" = 10 KM

DIAGRAM 3

GROUND BASED COMINT
TRQ 32V/TRQ 30



NOTES

DIAGRAM SHOWS AREA COVERAGE OF TRQ 32/30
CENTER DIVISION HAS CORP SYSTEMS IN DS
SYSTEMS 5 KM BHIND THE FLOT

CROSSED # AREA IS POSSIBLE DF COVERAGE
WITHIN EACH DIV AO

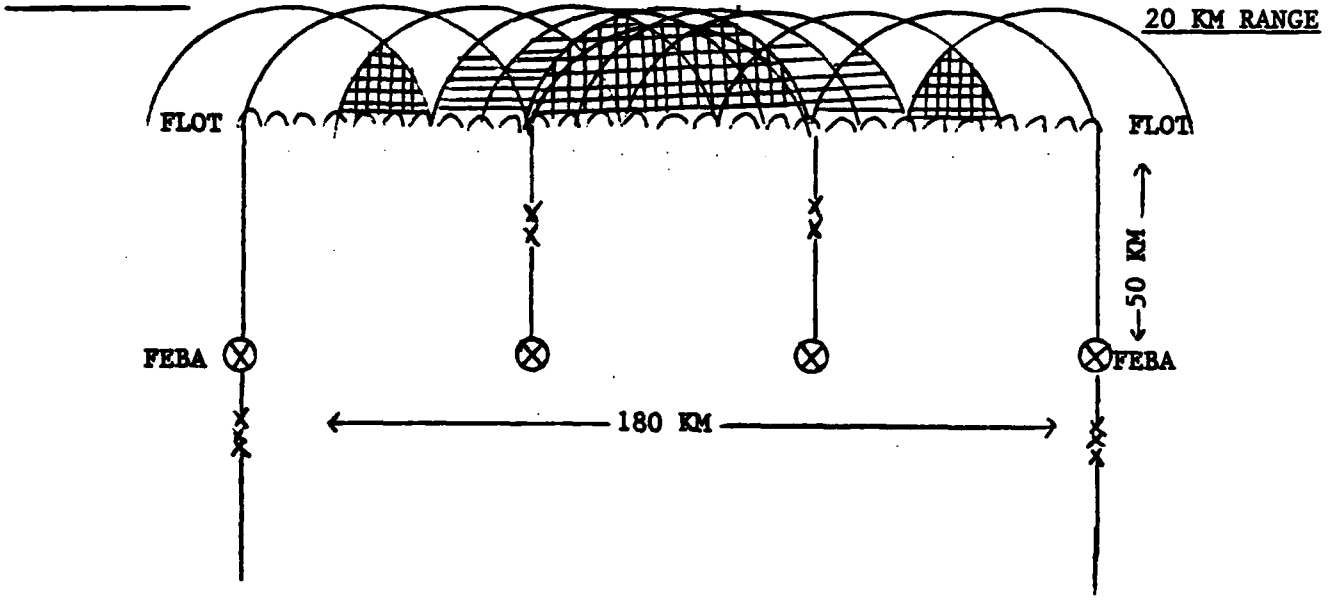
LINED AREAS SHOW POTENTIAL DF IF SYSTEMS
ARE INTEGRATED

Scale ½"= 10 KM

DIAGRAM 4

GROUND ELINT COVERAGE

MSQ103 ELINT DF



NOTE DIAGRAM SHOWS 12xMSQ 103
CORPS AUGMENTS THE CENTER BDE
SYSTEMS 5 KM BEHIND THE FLOT

CROSSED # AREAS SHOW DF CAPABILITY
LINED AREAS SHOW POTENTIAL DF IF
SYSTEMS ARE INTEGRATED

DF IS NOT POSSIBLE IN ANY OPEN AREA
AGAIN FLANKS/BOUNDARIES ARE WEAK SPOTS

Scale ½" = 10 KM

diagrams show a best case doctrinal deployment for these systems based on the frontages and depth discussed in the preceding paragraphs.

ANALYSIS

The templates show that the aerial systems of the MI Bde can provide coverage out to 70 km beyond the FLOT. Although the unclassified range is 100 km for each system, enemy ADA capabilities force a 30km stand off; hence the reduced coverage. Two Guardrail aircraft are needed to provide continuous mission coverage of the corps front. Coverage on the flanks would be minimal reaching out only 50km, and rear coverage reaching the rear boundary of each division. The corps rear could not be covered from the front for VHF emissions. However, Guardrail could intercept HF emissions deep in the corps rear but could not DF them. The intercept of HF emissions is critical to support rear operations because Soviet reconnaissance units and covert agents rely on HF communications.33

Division airborne systems flying 10km behind the FLOT could reach out 40km into enemy territory. One helicopter per division would be sufficient to provide continuous mission coverage of each division's front. As with the corps airborne coverage, division flank coverage would be minimal; at best reaching 20km beyond

the flanks. Rear area coverage would fall well short of the division rear reaching only to 10km behind the FEBA. Again, this only affects VHF intercept which could be covered by Guardrail.

Diagram two reveals that the ground DF system (TSQ 114) can provide COMINT DF 20km beyond the FLOT across each division's front. This requires that all five parts of each system are operating, on line, and within communications line of sight of each other.34 The template also reveals that huge gaps will exist on the boundaries of each division and the corps flanks.

Template three shows that the ground based COMINT coverage provided by the TRQ 32v and TRQ 30 is sufficient to cover each division's front. Used alone this system cannot provide a targetable DF capability. In fact, the template shows that only a 10 X 20km patch of the division front could be DF'd. This requires all three systems to be operational, on line, and within radio line of sight. However, the division provided direct support by the corps ground based systems could expand DF coverage across its front out to 20km.

The TRQ 32v could be used to supplement the baseline of the TSQ 114.35 Placing one on each flank would be sufficient to close the DF gaps previously mentioned.

The ELINT coverage shown on diagram four is similar to that of the TRQ 32v and TRQ 30. Unfortunately, ground based ELINT cannot merge with another system to extend its baseline. Therefore, only the division receiving augmentation from the corps can obtain adequate DF coverage of its front. Again, to obtain this minimum coverage requires all systems functioning, on line, and within communications line of sight.

Put together, the surveillance belt displayed by the templates show the maximum coverage beyond the FLOT/FEBA. Based on the doctrinal area of interest this reveals a corps shortfall of 80km, a division shortfall of 30km, a brigade shortfall of 10km, and no shortfall for the battalion. These gaps can be made up in two ways. First, corps and division can deploy their LRSU assets to fill in the open areas. Unfortunately, this is a better option in the offense then in the defense. Teams deployed deep during the defense will be difficult to recover and reposition. The second and more viable solution is for each higher headquarters to cover the subordinate's area of interest with EAC covering the corps area of interest.

This analysis shows that corps deep operations cannot be effectively covered without extensive help from EAC and National systems. Also, the second weakest area of intelligence collection occurs on friendly

flanks. These issues take on added significance in a combined environment because allied armies rely on U.S. intelligence collection.

Corps can cover the division deep operations and provide timely, accurate targeting data from Guardrail and SLAR. ELINT coverage does not appear to be timely with corps airborne collectors. However, if integrated into one system a ground based ELINT DF capability could be possible out to 20km beyond the FLOT/FEBA.

Brigades cannot cover beyond 5 km without displacing combat power forward. Corps and division will have to provide SIGINT and HUMINT coverage of the brigade's area of interest. Brigades will have to generate targeting data with ground reconnaissance means; i.e., OP's, patrols, etc.

Rear operations can be supported by the IEW system with counterintelligence and signal security teams on an area support basis. Also, intercept of HF communications is possible in the Rear area. However, HF DF is not. EAC would have to perform that function. Early warning of enemy attack aircraft, air assault, or airborne forces must come from EAC. Guardrail can intercept air-air communications, but requires tip off from EAC.

A very positive strength of the tactical IEW system is obviously the capability to intercept communications

and develop a data base for ECM operations. The IEW system will have intelligence with which to plan and conduct EW. However, these operations will be risky. As noted in section four, ground jammers will need to operate within 2km of the FLOT/FEBA. This places those systems in visual range of the enemy and makes them vulnerable to Soviet radio electronic combat (REC), which can DF communications of 20-30 seconds and place artillery fire on the location within three minutes.36 Ground based jamming will be risky requiring synchronization, flexibility, mobility and superbly trained personnel.

Airborne jamming will face similar problems. Quickfix must avoid enemy air and ADA by using standoff, nap of the earth flying and pop up techniques. Again, pilot training and mission synchronization is critical for success.

CONCLUSION

The purpose of this monograph was to answer the question: can the current IEW system provide useable intelligence to the tactical commander? The approach was to analyze sources, collection assets and battlefield structure to obtain a sensing of collection capabilities. The analysis discovered significant shortfalls between requirements and capabilities.

However, this does not negate the system's ability to produce intelligence. The current tactical IEW system can provide usable intelligence to the commander, but not in the depth that AirLand Battle doctrine demands.

The IEW system breaks down when asked to provide 24 hour, all around, precise intelligence support for deep, close and rear operations. It does not falter because of structural or procedural problems, but through the physical ability of current collection systems. These systems were not designed to look deep, operate in a mobile environment, or provide 24 hour continuous coverage.

A review of the templates show that the ground based tactical IEW equipment is best suited for positional warfare. The limited range of each system requires a linear deployment across the front. The implications are that IEW equipment will compete with each other, as well as with combat systems, for choice terrain; and by placing all systems on line the intelligence officer creates a cordon type collection net. This type of collection coverage, similar to a cordon defense, is shallow and only works well during non mobile positional warfare.

The airborne systems cannot provide 24 hour coverage because there are not enough of them, and with the exception of Guardrail, they are technologically

old. Both Quicklook and the OV-1D (SLAR) need to be replaced.

Although there are shortcomings to the system, hope is on the horizon. The fielding of the All Source Analysis System (ASAS), Mobile Subscriber Equipment (MSE), and the Joint Surveillance Tactical Attack Radar systems (JSTARS) will overcome some deficiencies. These systems will increase the speed of information processing, provide rapid communications, and improve collection range. However, with new technology comes new problems. It will take time to fully learn the limitations and capabilities of these new systems and how to apply them on the AirLand Battlefield.

Until better systems are fielded to support mobile, continuous, nonlinear warfare; current systems must be used. These systems are best employed against specific targets. The efforts of entire collection systems need to focus on one high priority target or high value target at a time, in order to exploit or destroy it. Mass, economy of force and depth should reign supreme when planning the collection coverage. To accomplish this requires, intelligence officers at each echelon of command who are knowledgeable, imaginative, and aggressive. It also requires a thorough IPB and, as much as it may hurt, a best estimate on enemy intentions.

The implications of this analysis confirm that MI doctrine is correct in attempting to mold the tactical IEW system into one functioning system. This cannot work unless each intelligence staff element supports both lower and higher echelons. The corps G-2 has a responsibility to conduct a complete IPB that can be used with little modification by subordinate units. The corps IPB should make the division effort easier, divisions should make the brigade effort easier and brigades should make the battalion S-2's job bearable. Conversely, battalions must report up the chain to keep the flow of combat information and intelligence cycling. Information is the lifeblood of the IEW system; without it, the system loses focus on who and what it needs to support.

Combat information is important to the production of intelligence. Commanders cannot rely solely on the collection capabilities of the IEW system. Whenever and wherever possible ground reconnaissance must be conducted to supplement, verify, and in some cases to make up for the lack of intelligence. This is especially important in a mobile situation when eyes on the ground are the best single source of information for a commander.

Finally, the analysis also revealed that the future battlefield extends space while compressing time. It is

this feature of future war that will stress the IEW system's ability to gather information and produce accurate intelligence. In a mobile environment time is an uncontrolled commodity, that favors the side that reacts the quickest. The faster accurate intelligence can be produced; the faster commanders can confidently adjust their plans/actions and concentrate combat power at the decisive point.

The underlying requirement for the IEW system is to effectively plan for the collection of information through a flexible collection effort that can rapidly be refocused as the dynamics of the battlefield dictate. This can only begin to happen if the IEW system functions as one system integrated from top to bottom and left to right. This requires well trained intelligence professionals from top to bottom who are thoroughly knowledgeable of the IEW system, the battlefield, enemy and friendly doctrine.

RECOMMENDATIONS

The following recommendations are made based on the implications of the analysis and conclusions in this monograph.

1. The IEW system needs dedicated communications from battalion to corps. A common skip echelon system is

needed for high priority and early warning traffic particularly at the TSSI level.

2. Corps airborne platforms require greater collection range. Guardrail, Quicklook and SLAR need a minimum range of 300km to support the corps deep operations. Quicklook requires real time processing capability and Slar needs the ability to track multiple targets.

3. The communications link between the IPF and Guardrail aircraft needs increased range and a secondary means of control when the IPF moves.

4. The IPF needs improved mobility; replacement of the five ton tractor with a fourteen ton tractor can achieve this.

5. Corps needs an airborne jammer to support its ECM operations.

6. Corps needs systems to receive real time SIGINT and IMINT support from EAC and National assets. These systems must be self-contained, mobile systems.

7. Divisions need six Quickfix systems to provide 24hr coverage.

8. Brigades require improved ground reconnaissance and over the hill eyes due to the requirement to look out

15kms. The RPV can be the answer if an inexpensive throw away system can be developed. The RPV should serve three functions: see deep (out to 15-20km), relay communications, and provide Jamming.

9. LRSU teams need light weight high quality HF/UHF communications.

10. All ground based SIGINT and EW equipment requires improved collection capabilities and mobility. All systems need ranges out to 100 km and the mobility to keep up with the M1 and M2; perferrably, a common carrier such as the M2 can be used.

Systems such as the Trailblazer which give off a unique signature need the signature eliminated or masked.

Consideration should be given to a common sensor system to eliminate battlefield clutter. Divisions require a minimum of ten common sensors or ten COMINT and ten ELINT systems to obtain all around coverage and provide support during mobile operations.

11. Jamming doctrine is grossly neglected. A wholesale effort directed towards verifying and validating use of ground based and helicborne jammers in a mid to high level war is long over due.

12. It is obvious that the complexity of IEW operations require skilled personnel. MI officers must remain as brigade and battalion S-2's. These officers are trained for the position, highly dedicated and motivated. They will grow up to be G-2's and need the battalion and brigade experience.

13. Until new systems are fielded and validated, the division intelligence collection focus should be at the 4-20km belt beyond the FEBA. The bulk of high value and high priority targets will be in that zone;i.e., regimental cp's, Div fwd and main cp's, RAGs, DAGs, AAGs, ADA sites, MRL bn's, and elements of the second echelon. Corps assets should cover from 20km and beyond.

There is a need for formalized intelligence hand off between each echelon of command to track enemy units as they move through different belts of intelligence collection. For example, a Soviet division is tracked by EAC assets until that division moves into corps coverage and is formally handed off. The delineation of where on the ground or air that occurs needs to be operationally clear.

14. Training of military intelligence personnel needs to be arduous and realistic. For example, soldiers assigned to operate MSQ 103's must take those systems

to the field and collect against radar emitters. Hopefully, radars that provide the same signature as Soviet radars. This applies equally to COMINT and IMINT systems.

Classified regulations that classify almost all tactical SIGINT activity as TSSI need a total review and if possible modified to help units train in a less constrained environment.

Training devices that simulate Soviet communications and noncommunications systems need to be developed for field training.

Jammers need to train against DF systems to learn how to survive in a mid-high level threat environment.

The IEW system must train as a system and learn to operate as one system.

ENDNOTES

1FM 100-5, Operations (FT. Leavenworth: CGSC, May 1986), p. 2.

2This concept is not yet in doctrinal manuals. However, it is being briefed and taught at FT. Leavenworth.

3FM 100-5, Operations, p.19.

4FM 34-1, Intelligence and Electronic Warfare Operations (FT. Huachuca: US Army Intelligence Center and School, July 1987), p. 2-11.

5Ibid., p. 2-6.

6FM 34-1, Intelligence and Electronic Warfare, p. 2-11

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9Baron De Jomini, The Art of War, trans. CPT G. H. Mendell and LT W. P. Craighill (Connecticut: Greenwood Press, 1977), p.268.

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11FM 101-5-1, Operational Terms and Symbols (FT. Leavenworth: CACDA, Oct 1985), p.1-15.

12Ibid., p. 1-15.

13Ibid., p. 1-39.

14FM 34-1, Intelligence and Electronic Warfare, p. 2-13.

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16Carl von Clausewitz, On War, p.117.

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21SIS 04430, Tactical MI Organizational Charts (FT. Huachuca: US Army and Intelligence Center and School, May 1987), p. 11,47.

22Telephone interview with MAJ. Jim Boland, former commander of the 330th Aerial Electronic Warfare Co., 14 Nov 1988.

23The limitations on mobility and those of the microwave antenaes were discovered during fielding of the Improved Guardrail V system in Germany in 1985. This author was the 207th MI BDE's project officer for fielding of that system to the 2nd Aerial Exploitation Battalion.

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27TC 34-130, Intelligence Preparation of the Battlefield, Coordinating Draft (FT. Huachuca: US Army Intelligence Center and School, DEC 1987), p. 12.

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32FM 63-3J, Combat Service Support Operations--Corps (Washington D.C.: HQ Department of the Army, August 1985), p.2-7.

33FM 100-2-1, The Soviet Army Operations and Tactics, p. 7-2.

34FM 34-80, Brigade and Battalion Intelligence and Electronic Warfare Operations, p. 2-43.

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