PHOTOGRAPH THIS SHEET

AD-E750 002

AD A089530

DTIC ACCESSION NUMBER

III

LEVEL

I

INVENTORY

AGSCC, Ft. Leavenworth, KS

"Requirements and Capabilities of the Land Force Commander for Timely Intelligence in a Hostile Air Defense Environment"

DOCUMENT IDENTIFICATION

Thomas, James Taylor 1974

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

DISTRIBUTION STATEMENT

ACCESSION FOR	
NTIS GRA&I	X
DTIC TAB	☐
UNANNOUNCED	☐
JUSTIFICATION	
BY Per Ltr. on file	
DISTRIBUTION /	
AVAILABILITY CODES	
DIST	AVAIL AND/OR SPECIAL
A	

DISTRIBUTION STAMP

DTIC
ELECTE
SEP 24 1980
S D
D

DATE ACCESSIONED

80 9 10 067

DATE RECEIVED IN DTIC

PHOTOGRAPH THIS SHEET AND RETURN TO DTIC-DDA-2

DTIC FORM OCT 79 70A

DOCUMENT PROCESSING SHEET

(6) REQUIREMENTS AND CAPABILITIES OF THE LAND FORCE COMMANDER FOR TIMELY INTELLIGENCE IN A HOSTILE AIR DEFENSE ENVIRONMENT

A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements of the degree

MASTER OF MILITARY ART AND SCIENCE

by

(10) JAMES TAYLOR THOMES, MAJ, USAF
B.S., United States Naval Academy, 1962
M.S., University of Pittsburgh, 1964

Fort Leavenworth, Kansas
1974

THESIS APPROVAL PAGE

Name of Candidate: James T. Thomes

Title of Thesis: Requirements and Capabilities of the Land Force Commander for Timely Intelligence in a Hostile Air Defense Environment.

Approved by:

_____, Research and Thesis Advisor

_____, Member, Graduate Research Faculty

_____, Member, Graduate Research Faculty

_____, Member, Graduate Research Faculty

Date: _____

The opinions and conclusions expressed herein are those of the individual student author and do not necessarily represent the views of either the U. S. Army Command and General Staff College or any other governmental agency.

ABSTRACT

This thesis examines the requirements of the land force commander for timely intelligence of the battlefield when engaged in combat operations with a highly mobile enemy. The capabilities of the organic Army agencies and USAF Tactical Reconnaissance forces are addressed in light of a typical enemy maneuver and air defense environment. The thesis is UNCLASSIFIED. The theoretical capabilities of the enemy have been extracted from Field Manuals 102 and 103, relating to Aggressor, The Maneuver Enemy, the characteristics of whom are used by the U.S. Army in training exercises. Characteristics of all the systems available to the land force commander were extracted from unclassified Field Manuals, pamphlets, and recently declassified test reports.

General conclusions reveal that:

1. the commander will not be capable of acquiring timely order of battle and target acquisition intelligence throughout most of his areas of interest and influence.

2. intelligence derived through existing Tactical Reconnaissance procedures will not be sufficiently timely to meet the requirements of a typical tactical situation.

3. developmental USAF capabilities for timely surveillance /reconnaissance could be sufficient to collect and process tactical information, and the US Army Battlefield Information Control Center could be sufficient to produce timely intelligence, provided the two capabilities were integrated.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER I

THE MOBILE THREAT

A. THE MOBILITY OF AGGRESSOR FORCES

1. Aggressor Maneuver Doctrine. The Aggressor tactical doctrine is founded on three basic principles of war -- speed, shock, and surprise. To achieve these fundamental goals, the Aggressor places a heavy reliance on dispersion, mobility, tactical cover and deception. Some characteristics of the Aggressor tactical doctrine which serve to highlight these principles are listed below:

a. Seizing and maintaining the initiative is considered an indispensable ingredient of success in battle with surprise used as a means of shifting the balance of combat in the Aggressor's favor.

b. Emphasis is placed on speed in overcoming natural and manmade obstacles, such as rivers and artificial obstructions.

c. Aggressor advances on a broad front. Where heavy defenses require a concentration of force, Aggressor assembles sufficient mass to accomplish the objective and continues the advance on a wide front after defenses are breached.

d. A standard procedure is often to bypass or envelope strongly held points or areas.

e. Tactical cover and deception is considered tantamount to success in the doctrine of shock and surprise. Every effort is made to exploit the advantage of weather, night, camouflage, security and electronic counter measures to deceive the enemy.[1]

---

[1] Department of the Army, FM 30-102 Handbook on Aggressor, June 1973, pp. 5-1,5-3

2. Aggressor Ground Forces. Aggressor has developed a modern, highly mobilized, and well-balanced fighting force to fulfill the mobilitiy requirements of his tactical doctrine. Enemy forces have been motorized to the maximum degree. Out of approximately 225 ground divisions, only 42 are pure infantry, and these are reserved for special missions such as mountain or jungle warfare and airborne operations.[2] Examples of the movement times for representative Aggressor motorized and tank units are presented below in Figure 1. These figures were computed from FM 30-102 and represent the movement time, including stops, and closing time preparatory to combat. Aggressor forces are assumed to have night infrared capability. Times have therefore been appropriately selected for day or night vision movement. and are expressed in hours.[3]

MOBILITY OF AGGRESSOR MANEUVER FORCES

UNIT	ROADS	CROSS COUNTRY
MOVEMENT -- 10KM		
Battalion	.4	1.0
Regiment	1.1	2.0
MOVEMENT -- 25 KM		
Battalion	.9	2.2
Regiment	1.6	3.3
Division	5.5	9.5
MOVEMENT -- 50 KM		
Battalion	1.6	4.3
Regiment	2.4	5.4
Division	6.3	11.7

Figure 1

[2] Department of the Army, FM 30-103 Aggressor Order of Battle June 1973, p. 1-4

[3] Department of the Army, FM 30-102 Handbook on Aggressor, October 1969, pp. 22-1, 22-6.

Inherent in the Aggressor maneuver doctrine is the tactic of advancing on a broad front and clustering in assembly areas when required. The second echelon of the Combined Arms Army is given a mission and is not normally used as a reserve in the classical sense of the word. As such, it is assumed that in a nuclear environment, the minimum time in the assembly area will be that required to close and deploy in combat formation. It is also assumed that the perishability of the intelligence governing the position of missile units is also a function of their closure time; although, it is acknowledged that certain radar and communications dependent systems may require more time to set up, function and tear down, prior to movement. Representative closure times for typical tactical targets are shown in Figure 2.[3]

CLOSURE TIMES FOR TYPICAL UNITS (MINUTES)

Motorized Battalion	5.2
Tank Battalion	3.5
Air Defense Battalion	7.8
Anti Tank Battalion	4.1
Motorized Regiment	47.0
Tank Regiment	29.0
Arty Regiment	29.5

Figure 2

[3] Department of the Army, FM-30-102 Handbook on Aggressor, October 1969, pp. 22-4,5.

3. Aggressor Air Defense. To protect the movement of his ground forces and to deny the enemy the knowledge of their position, the enemy has established a mobile air defense system which moves with the attack. This system includes Air Defense Artillery (ADA) and sophisticated fighter-interceptor aircraft.

a. Air Defense Artillery. Aggressor ADA consists of cannon, surface-to-air-missiles (SAM), and air defense machine guns. Elements of ADA are found down to the battalion level. Deployment and fire plans are designed to insure two-thirds overlapping coverage for cannons and small missiles, and one-third overlap for major SAM systems.[4] ADA is characteristically employed as far forward as possible so as to insure coverage well beyond the forward edge of the battle area (FEBA). Figures 3 and 4 graphically portray the Aggressor air defense environment. Figure 3 represents the typical ADA composition and employment of the Aggressor forces as determined from Aggressor Order of Battle. Figure 4 shows a similar environment with major SAM systems decentralized to a greater degree as demonstrated on recent Middle East conflicts.

---

[4] Department of the Army, FM 30-102 Handbook on Aggressor, June 1973, pp. 6-5.

AGGRESSOR ADA EMPLOYMENT --I

ORGANIZATION	ADA COMPOSITION	DISPOSITION	MAX WEAPON	RANGE	MAX ALT(ft.)
Battalion	36 Rogues, (2)14.5	.3-.4KM	14.5 mm	2.4KM	1400
Regiment	36 Rogues, 4 Rovers, (6)14.5, (6) 57mm	2-3 KM	57mm	14KM	4500
Division	(17) 14.5,(10)Quad 23mm,(28)57mm	5 KM	57mm	14KM	4500
CAA SAM Brig.	144 Rgs,16 Rov,(16)23mm,(72)57mm,24 Raiders	12-15KM	Raider	6KM	6000
Group SAM Brigs.	288 Rgs,32 Rov,(32)23mm,(144)57mm,24Rdrs,24Rammers	20-30KM	Rammer	36KM	50,000

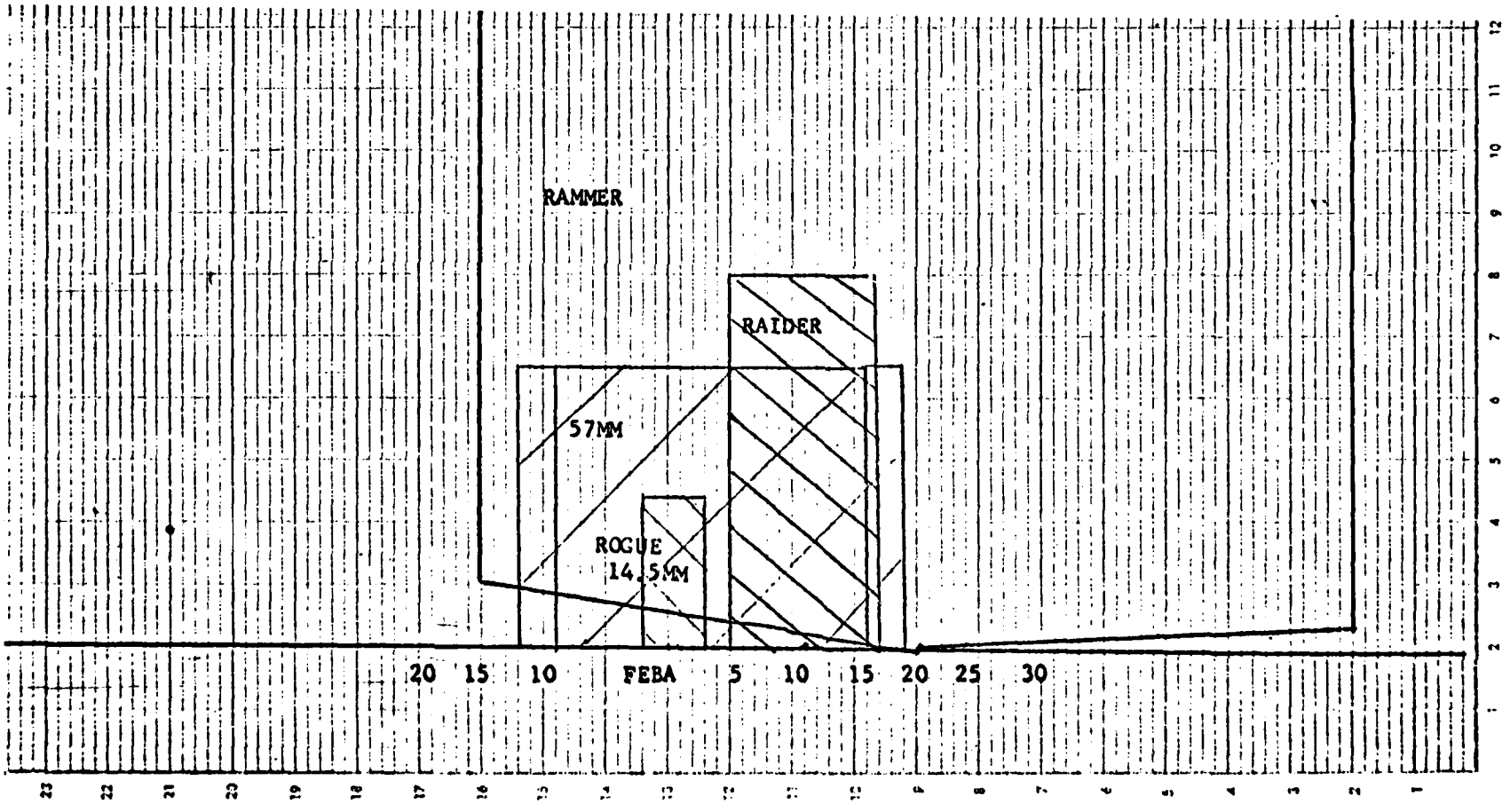


Figure 3

AGGRESSOR ADA EMPLOYMENT -- II

ORGANIZATION	ADA COMPOSITION	DISPOSITION	MAX WEAPON	RANGE	MAX ALT(FT)
Battalion	36 Rogues, (2) 14.5	.3-.4KM	14.5mm	2.4 KM	1400
Regiment	36 Rogues, 4 Rovers, (6)14.5mm, (6) 57mm	2-3 KM	57mm	14 KM	4500
Division	(17)14.5mm,(10)Quad 23mm,6 Raiders	5 KM	Raider	6KM	6000
CAA SAM Brigade	144 Rgs,16 Rovs,(16)23mm,(72) 57mm,24 Rammers	12-15KM	Rammer	36KM	50,000
AG SAM Brigades	288 Rgs,32 Rovs,(32)23mm,(144)57mm,24 Rms,24Rascal	20-30KM	Rascal	60KM	90,000

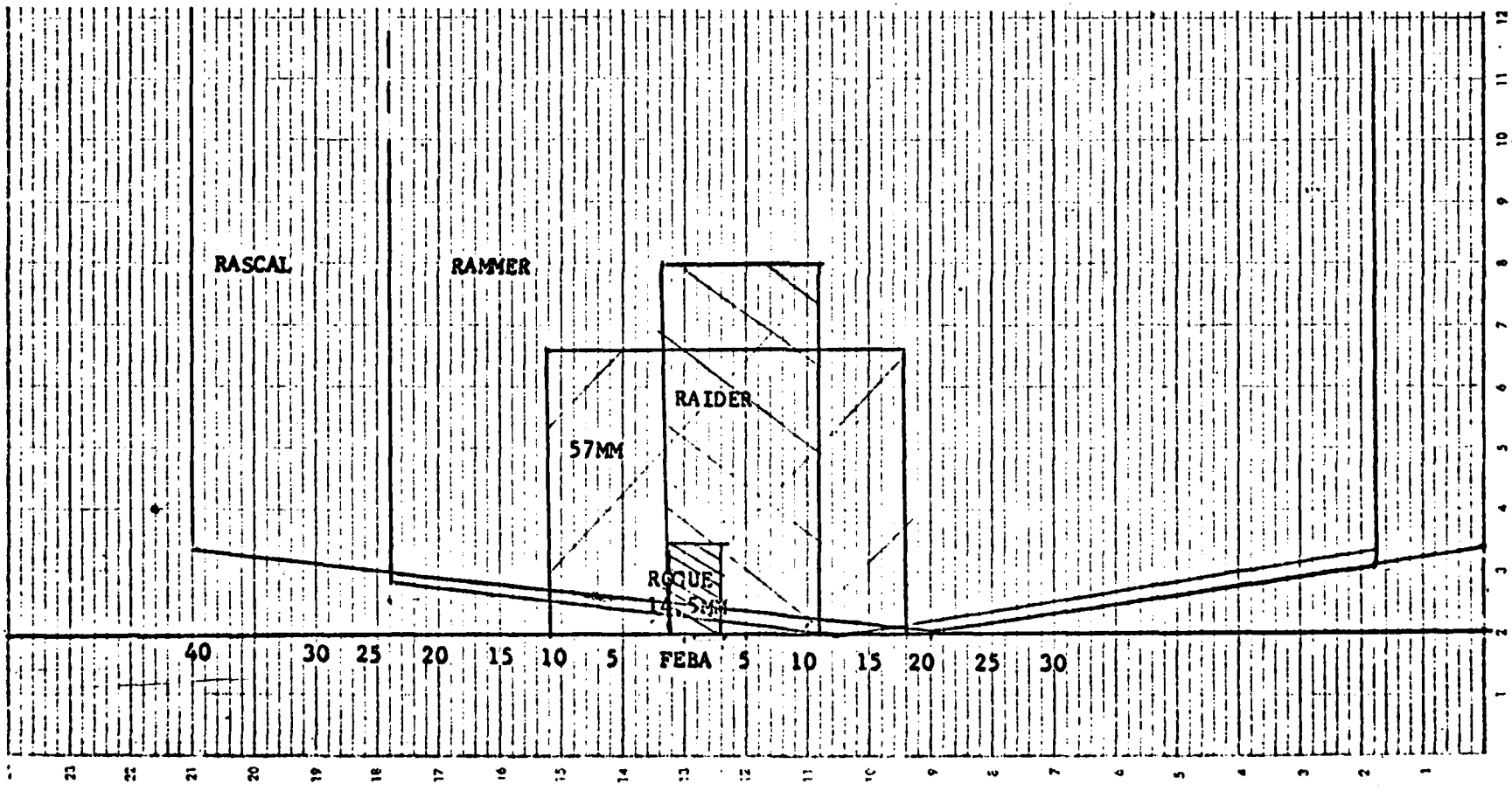


Figure 4

b. Fighters. Two Aggressor Air Armies are generally assigned to each Aggressor Army Group. A typical Air Army would contain at least one fighter-interceptor division with the primary mission of the air defense of the battlefield.[5] Each fighter division typically has three fighter regiments, similar to the US Fighter Wing, and each regiment has three to five squadrons.[6] This distribution divides the Aggressor interceptor assets to three fighter regiments of approximately 36-60 aircraft for each two Combined Arms or Tank Armies, similar to US Corps. These fighters do not include the attack fighters used in the close air support role. Although the question of air-superiority will not be specifically addressed, it is assumed that the Aggressor interceptor forces will remain a considerable threat to friendly air operations in the combat area.

B. THE GROUND COMMANDERS REQUIREMENT FOR TIMELY COMBAT INTELLIGENCE.

To counter the Aggressor mobile threat with maneuver or fires, the tactical commander has an increased requirement for timely combat intelligence. Considering the Aggressor tactical doctrine of mobility, tactical cover and deception, it is assumed that this combat intelligence must be provided under all conditions of darkness and severely reduced visibility. With further consideration to the air defense capability of the Aggressor, it must also be assumed that the airborne information collection systems must also operate in an extremely hostile environment.

---

[5] Department of the Army, FM 30-103 Aggressor Order of Battle, June 1973, pp. 7-1,7-23

[6] Department of the Army, FM 30-102 Handbook on the Aggressor, June 1973, pp. 4-11,4-12.

1. Timely Combat Intelligence. Combat intelligence is that knowledge of the enemy, weather and geographical features required by the commander in the planning and conduct of tactical operations. The major functional categories of combat intelligence are: Order of Battle (OB), Technical, Target Acquisition (TA), Terrain, and Weather.[7] Although all categories are time-sensitive to a greater or lesser degree, elements of Order of Battle and Target Acquisition are considered to have the most significant requirement for timeliness.

a. Order of Battle. OB intelligence consists of those factors concerning the composition, disposition, strength, tactical doctrine, training, logistics and combat effectiveness of the enemy.[8] Of these, composition, disposition, and strength are considered to be the most likely to change rapidly.

(1) Composition is the identification and organization of units. The Aggressor composes his forces in structured tactical units, similar to the US.[9] Although these units may be disposed in maneuver, once they are initially identified, composition as such is relatively insensitive to rapid change. Thus the time-sensitivity of composition is primarily concerned with the rapid detection and identification of new units into the battle area so as to infer the disposition of their parent units.

---

[7] Department of the Army, FM 30-5 Combat Intelligence, February 1971, pp. 2-1,2-2.

[8] Ibid., p.7-1.

[9] Ibid., p.7-2

(2) Disposition consists of the location of enemy units and the manner in which these units are tactically deployed.[10] The time sensitivity and significance of the information is a function of the mobility of the tactical unit of concern to the commander. For example, the location of an enemy battalion which can move cross-country to a combat location 10KM in one hour is much more significant and time-sensitive to the Brigade and Division Commanders than the Corps commander who would be concerned with regimental size reinforcements (10KM = 2.0 Hours). See Figure 1, page 2.

(3) Strength covers the description of a unit or force in terms of men, weapons and equipment.[11] This characteristic is considered time-sensitive in nuclear or heavy conventional artillery fires, when it is subject to change rapidly.

b. Target Acquisition (TA). TA is that part of combat intelligence that pertains to the detection, identification, and location of a target in sufficient detail to permit the effective employment of weapons. TA is thus associated with field artillery, aerial artillery,[12] and tactical air strikes. Because TA is directed towards subsequent fires, the timeliness and location accuracy are a function of the mobility of the target and the responsiveness of the fires.

(1) Mobility of the Target and Location Accuracy. Targets can be classified as fleeting, which means presently moving, transient, targets which can be moved in a short period of time, and fixed,[13] or stationary. These factors, and the subsequent response to

---

[10] Department of the Army, FM 30-5 Combat Intelligence, February 1971, p. 7-2

[11] Ibid., p. 7-3

[12] Ibid., p. 4-27

[13] Department of the Army, FM 31-100(Test) Surveillance, Target Acquisition and Night Observation (STANO) Operations, May 1971, p. 3-7

the target acquisition, weigh heavily on the required location accuracy. If the target can be engaged immediately, the location accuracy must logically be sufficient to place it within the lethal destructive radius of the weapon employed. When the target has moved (or could move) sufficiently to preclude direct or indirect fires within the time available, the information of initial target location is nevertheless valuable for reacquistion and strike by aerial artillery or tactical air; however, the accuracy need only be sufficient for reacquisition of the target within the constraints of fuel and survivability of the aircraft. In logical consideration of the functional categories of combat intelligence and the necessary response of the commander, the primary time-sensitive requirements are summarized in Figure 5 as to their requirements for location accuracy at Corps level and below.[14]

LOCATION ACCURACY

SUBJECT	RESPONSE		
	ARTILLERY	AERIAL ARTILLERY TACTICAL AIRSTRIKES	MANEUVER
COMPOSITION	N/A	N/A	IDENT.
DISPOSITION	100M	200M	500M
STRENGTH	----------	N/A	----------
FIXED TARGETS	50M	200M	100M
TRANSIENT	50M	200M	100M
FLEETING	EXACT	200M	500M

Figure 5

[14] Department of the Army, FM 30-5 Combat Intelligence, February 1971, Derived from Appendix Q

2. Areas of Intelligence Operations. Areas of intelligence operations are assigned to units as "areas of influence" and "areas of interest".

a. Area of Influence. This area is that portion of the assigned zone of operations in which the commander is capable of directly affecting the course of combat by the employment of his organic combat power.[15] In most cases the forward limit of the area of influence is set by the effective range of the specific commander's organic weapons. Common usage is to place the area of influence 2/3 the range of the artillery available, since artillery is positioned behind the FEBA. Figure 6 represents the areas of influence of the tactical commander at various echelons.

AREAS OF INFLUENCE[16]

Missiles and Artillery

UNIT	ORGANIC WEAPON	RANGE	INFLUENCE
Division	8"Howitzer	16.8KM	10.2KM
Corps	Lance (Nuclear)*	110.0KM	73.2KM
	(Nonnuclear)	65.0KM	43.2KM
Group/Army	Pershing*	740.0KM	492.0KM

Artillery

UNIT	ORGANIC WEAPON	RANGE	INFLUENCE
Division	8"Howitzer	16.8KM	10.2KM
Corps/Group	175MM Gun	32.7KM	21.8KM

Figure 6

---

[15] Combat Intelligence, op.cit. p. 2-2

[16] US Army Command and General Staff College, G-3 Worksheet Organization for Combat, page 4,* Assumed unclassified range for instruction

b. Area of Interest. This area includes the area of influence plus that area outside the area of influence containing enemy forces which, if employed in the area of influence, could jeopardize the accomplishment of the mission.[17] STANO operations further define the area of interest to be 200KM forward of the FEBA. The area of interest is subdivided in STANO operations to Current Planned Operations (60KM), and Current Operations (50KM).[18]

c. Summary of Areas of Intelligence Operations. The Army commander has interest out to 200KM, Planned Operations to 60KM, Current Operations to 50KM, NonNuclear Lance Influence to 43.2KM, Corps Gun Influence to 21.8KM, and Division 8" Influence to 10.2KM. These areas are shown in Figure 7.

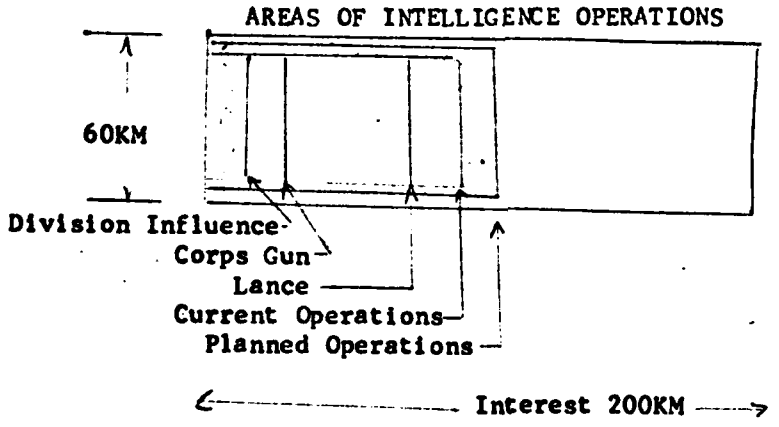


Figure 7

---

17 Department of the Army, FM 30-5, Combat Intelligence, February 1971, p.2-3.

18 Department of the Army, Surveillance, Target Acquisition and Night Observation (STANO) Operations, FM 31-100(Test), May 71, p.3-10.

C. TYPICAL SCENARIO

A typical scenario is presented in Appendix A, Tab 1. The situation represents typical doctrinal disposition of forces and will be used throughout the paper to discuss various requirements and capabilities of intelligence collection.

1. General Situation. I US Corps is part of a Theater Army Delay in Europe. Corps is presently defending against two Combined Arms Armies of Aggressor Army Group Occidento.

2. Friendly Forces.

a. Composition. I Corps, supported by elements of 9AF consists of the major combat units below:

(1) 23 Armor

(2) 52 Mechanized Division

(3) 53 Mech

(4) 54 Mech

(5) 55 Mech

b. Disposition. I Corps is disposed in a Mobile Defense[18] in accordance with doctrine. Divisions on the flanks are Defending, 53rd Mech is Delaying. GOP has been withdrawn, and forces are in contact along the FEBA,

c. Theater Army Reinforcements. III Corps is in reserve, located 100KM to the West.

---

[18] Department of the Army, FM 100-15 Larger Units: Theater Army -- Corps, April 1973, p.8-22(A non-nuclear formation is used)

3. Enemy Forces.

a. Composition. 2 CAA and 4 CAA of Army Group Occidento

Composition of forces presently opposing I Corps is:

(1) 2 CAA

(a) 9Fusileer Motorized Rifle Division (Mtz R)

(b) 18 Mtz.R.D

(c) 22 F Mtz.R. D.

(d) 2 F Tank Div.

(2) 4 CAA

(a) 12 Mtz.R.D.

(b) 13 Mtz R.D.

(c) 14 Mtz R.D.

(d) 5 Tank Div.

b. Disposition. The 2 and 4 CAA of Army Group Occidento are disposed as the first echelon of the Army Group attack in accordance with Aggressor doctrine. Within the zones of the 2CAA and 4CAA, the divisions are disposed in two echelons.[19]

c. Army Group Reinforcements. The second echelon of Army Group Occidento consists of the 8 CAA and the 5 Tank Army, located in accordance with doctrine,60-75 KM to the rear of the FEBA.[20]

---

[19] Department of the Army, FM 30-103 Aggressor Order of Battle, June 1973, pp. 7-19,7-20.

[20] Department of the Army, FM 30-102 Handbook on Aggressor , June 1973, p.9-19.

CHAPTER II

THE IDEAL SYSTEM

A. GENERAL. From the standpoint of time-sensitive intelligence, the ideal intelligence system has the following requirments.

1. Satisfy the time-sensitive intelligence requirements of the commander with regard to:

   a. Detection
   b. Location Accuracy
   c. Identification
   d. Description

2. Operate under conditions of day, night, and all-weather

3. Operate within the commander's area of interest.

4. Operate with minimum degradation caused by enemy countermeasures.

5. Operate within the restrictions placed by enemy air and ground defenses.

6. Function with sufficient timeliness to counter the mobility of enemy ground forces.

B. CHARACTERISTICS. The hypothetical characteristics of an ideal system will be discussed in the traditional context of the intelligence cycle--Direction, Collection, Processing, and Dissemination.

1. Direction. This step involves the tasking of agencies to collect information of tactical significance for subsequent analysis and intelligence production.[21] In an on-going tactical operation, this step is the least time-consuming of the intelligence cycle; nevertheless, certain actions are required for proper execution. To satisfy the requirements of an ideal system, Direction must be timely. Timeliness is achieved by minimizing the specific requests for direction, thus minimizing the requirement for coordination

[21] Department of the Army, FM 30-5 Combat Intelligence, February 1971, p.4-21

between agencies. This would indicate that surveillance of the battlefield should be conducted continuously by the appropriate agencies with a minimum of specific tasking. Those reconnaissance requests not covered by routine surveillance would be performed by forces on an alert status. Other non-time-sensitive collection would be handled by specific direction through pre-planned missions. Responsiveness to direction is another characteristic of the ideal system. The agencies tasked for collection of time-sensitive information must respond to this direction with a minimum of coordination and time loss. Thus Direction in the ideal system would have the following characteristics:

a. Routine Surveillance Conducted by SOP

b. Alert Forces for Collection of Specific Time-Sensitive Reconnaissance Information

c. Responsive Collection Systems and Procedures

2. Collection.

a. Characteristics. To satisfy the requirements of the ideal system for collection, the agencies and systems must have the following characteristics:

(1) Mobility ----------Moving rapidly to a location
(2) Range ----------Within range of the target
(3) Survivability ----------Remaining to collect
(4) Acquisition ----------Collection capability
(5) Communication----------Reporting rapidly

b. Discussion of Characteristics. The above characteristics are somewhat dependent. That is, a system with sufficient range to operate out of a hostile environment logically has a less stringent requirement for survivability. A system with sufficient range to operate directly with the decision-maker requires less communciation. It appears logical that any system which lacks sufficient performance

capability in one area, must compensate in another -- or fail to reliably provide sufficient information content or timeliness for the requirments of the total system.

3. Processing.

a. Characteristics. The processing sub-system of the ideal system will have the basic function of receiving the collected information, converting the information into intelligence, and formatting the intelligence for dissemination. The ideal processing sub-system will have a vast dissimilar input of tactical information from many different sources and sensors. Simplification of correlation and filtering of this information may be accomplished by standardizing a common input from all sensors. Processing of vast amounts of data is best handled by automatic data processing (ADP); thus, both the input and the output of the Processing sub-system should ideally be compatible with a digital format. For those systems which require manual processing from input to output, such as imagery interpretation, sufficient personnel must be allocated to perform the task in a timely manner. The ideal Processing sub-system will have the following characteristics:

(1) Standard Input Compatible with ADP
(2) Maximum Use of ADP
(3) Sufficient Personnel for Timely Processing
(4) Standard Output Compatible with ADP and Data Transmission

4. Dissemination.

a. Characteristics. The Dissemination sub-system must receive the intelligence, select the proper user(s), communicate the intelligence to the user, and display it in a format compatible with rapid decisions. The ideal Dissemination sub-system would

have the following characteristics to meet the timeliness and information requirements of the commander:

(1) Standard Input Compatible with ADP and Other Services Cillection/Processing Systems

(2) Automatic Selection of User(s)

(3) Adequate Jam-resistant Communications

(4) Standard Output Compatible with Display Input

(5) Displays Appropriate for Immediate Decisions.

CHAPTER III

THE HYPOTHESES

A. GENERAL.

There are three major hypotheses examined herein. They are all concerned with the capability of the ground force commander to counter the Aggressor mobility with maneuver or fires, with the surveillance and reconnaissance assets assigned, attached or supporting the Theater Army.

1. Hypothesis I. "In a mid-to-high intensity conflict with a normal Aggressor air defense, the surveillance assets organic to the Army will be inadequate to meet the commander's requirement for timely intelligence within his area of interest."

2. Hypothesis II. "The existing USAF equipment and the existing Army/USAF doctrine are presently inadequate to perform this mission with sufficient timeliness to meet the requirements of the tactical situation."

3. Hypothesis III. "Developmental USAF reconnaissance systems could be adequate to collect the information as required, and the developmental Army Battlefield Information Control Center could be adequate ot process and disseminate the intelligence [illegible]."

B. ANALYSIS OF THE HYPOTHESES

To examine these hypotheses in depth the following analysis will be conducted:

1. The existing and developmental systems will be examined with specific regard to the time-sensitive requirements of the ground commander. (Chapter IV)

2. The characteristics of the existing and developmental systems will be compared to the theoretical characteristics of the Ideal system. (Chapter V)

3. The systems organic to the Army will be tested against a typical scenario to determine the Army surveillance capabilities available in a normal Aggressor air defense environment. This analysis is performed to satisfy to examine the first hypothesis that the systems organic to the Army will be inadequate to meet the land force commanders requirement for timely intelligence.

4. The capabilities presently available to the land force commander through the USAF will be tested against typical enemy maneuvers to determine if existing equipment and procedures are sufficiently timely to meet the needs of the tactical situation. This analysis will satisfy the second hypothesis.

5. The capabilities of the Battlefield Information Control Center and the Quick Strike Reconnaissance system as discussed in Chapters IV and V will then be applied to the tactical situation to satisfy the final hypothesis.

CHAPTER IV

THE EXISTING AND DEVELOPMENTAL SYSTEMS

A. GENERAL. This chapter contains a detailed explanation of the information flow through the existing US Army and USAF intelligence cycle. Throughout this chapter, primary emphasis is placed on those systems and doctrinal procedures which deal with the time-sensitive intelligence requirements of the commander as addressed in Chapter I. Numerous developmental systems have been devised to improve the effectiveness and timeliness of the cycle. Where appropriate, these systems will be integrated into the existing cycle.

B. THE BATTLEFIELD INFORMATION CONTROL CENTER AND THE BATTLEFIELD INFORMATION CENTER (BICC/BIC).

The tactical commander of the future will operate through the Integrated Battlefield Control System (IBCS). The IBCS is the structural framework of personnel, organizations, concepts, doctrine and equipment integrating the functions of combat into a coherent system.[22] One of the four sybsystems of the IBCS is the Intelligence subsystem, which will be managed by the G-2. A central element supporting the Intelligence subsystem will be the BICC. The BICC will aid the G-2 in directing, coordinating and scheduling the information collection effort as well as processing and disseminating the intelligence. A BICC will be located at each command echelon from maneuver battalion through Corps, with various degrees of automation as required. The Battlefield Information Center (BIC) will support the field artillery battalion, division artillery, and armored cavalry units.

---

[22] Department of the Army, FM 31-100(Test) Surveillance, Target Acquisition and Night Observation (STANO) Operations, May 1971, p.6-2.

The BIC differs from the BICC in that it does not direct or control the collection resources of the supported units. The BIC will be primarily concerned with the acquisition and processing of target information for engagement. The BIC will coordinate with its parent BICC for integration of the target information acquired into the total intelligence collection effort.

C. PLANNING.

The general steps in planning the collection effort are designed to satisfy the commander's requirements for intelligence upon which to base decisions concerning maneuver and fires. The orders resulting from this planning process are primarily the Intelligence Annex and the Surveillance and Target Acquisition Annex, if required.[23] Derivation of these plans and orders follows a logical sequence.

1. Determination of the intelligence required. From the stanpoint of the overall mission, the most critical items of information to the accomplishment of the mission are termed "Essential Elements of Information"(EEI). Additional significant items are termed "Other Information Requirments"(OIR). An example of EEI is,"Will the enemy reinforce with elements of the 5 Tank Army in the zone of the 4 CAA; if so when, and in what strength?"

2. Determination of the priority of need for each of the intelligence requirements.

3. Determination of those enemy activities which would indicate an answer to the EEI and OIR. (Enemy moving lead elements forward)

---

[23] Department of the Army, FM 30-5 Combat Intelligence, February 1971, pp.4-1,4-26

4. Determination of those items of information which would affirm or refute indications (Enemy bulldozers clearing roads to the front or enemy preparing defensive positions to the rear.)

D. DIRECTION

1. Sources. After specific indicators have been selected to determine the action or intention of the enemy, the G-2 prepares a collection plan which directs subordinate elements and requests higher and parallel units to report selected items of information. At this point, the G-2 considers the sources of information available to the subordinate and higher agencies.[24]

a. Enemy Activity	Surveillance
b. POW'S	HUMINT
c. Civilians	HUMINT
d. Recovered Military	HUMINT
e. Captured Documents	
f. Enemy Materiel	Technical Intelligence
g. Enemy Signals	SIGINT
h. Enemy Supporting Fires	
j. Imagery	
k. Ground Surveillance	
l. Enemy Electronic Emissions	ELINT
m. Maps	
n. Weather Forecasts	

2. Timely Sources. Although all of the above sources could be expected to provide timely information upon occassion, the most consistently reliable sources of timely information are assumed to be:

a. Enemy Activity	Air and Grnd. Surveillance
b. Enemy Signals	SIGINT
c. Enemy Electronic Emissions	ELINT
d. Enemy Sypporting Fires	Shell Fragments
e. Imagery	Photo,Radar, Infrared(IR)
f. Ground Surveillance	Visual (IR aided), Radar
g. Unattended Ground Sensors(UGS)	

---

[24] Department of the Army, FM 30-5, Combat Intelligence, February 1971, pp. 4-17 through 4-29.

3. Agencies. After the sources are considered, the agencies which are most suitable and capable of obtaining the information are then tasked to provide the requested item(s) of information. The agencies appropriate to the timely sources above are considered to be:[25]

a. Troops	Surveillance, UGS
b. Military Intelligence Batt.	Imagery
c. Army Security Agency(ASA)	SIGINT,ELINT
d. Special Security Det.	SIGINT,ELINT
e. Special Army Intl. Coll.(SAIC)	
f. Artillery	Ground and Air Surveillance
g. Long Range Recon.Patrols(LRRP)	"
h. Special Forces	Ground Surveillance
i. OV-1	Imagery,Enemy Activity
j. USAF Tactical Air Recon.	Imagery, Enemy Activity, ELINT, UGS

4. Tasking of USAF. If a combat commander cannot expect to meet the collection requirements within the agencies organic or attached to his unit, the request is passed to Corps. If the mission cannot be performed by Corps assets, the USAF Tactical Reconnnaissance forces may be directed through the Direct Air Support Center (DASC) and the Tactical Air Control Center (TACC).[26]

5. Timeliness of Direction. At the onset of an operation, the planning of intelligence collection begins immediately upon receipt of the mission. The EEI are issued in the Coordination Instructions of the Ops Order and the direction of agencies in the accompanying Intelligence Annex. Tasking of USAF Tactical Reconnaissance is generally done for preplanned sorties through the TACC, after the approval of the Intelligence Annex. In an ongoing operation, the G-2 is constantly revising the collection plan and tasking agencies for information using Fragmentary Operations Orders (FRAG).

---

[25] Department of the Army, FM30-5, Combat Intelligence, February 1971, pp.4-17 through 4-29.

[26] Department of the Army, FM 100-26 The Air-Ground Operations System,March 1973, pp. 4-7,4-10.

E. COLLECTION.

The collection capabilities of the agencies available for time-sensitive information are discussed in this section. Only time-sensitive information collected forward of the FEBA will be considered.

1. Troops. The maneuver battalions and artillery forward observers accomplish information collection as a collateral function of combat; whereas, the cavalry units assigned have a primary mission including both reconnaissance and surveillance.

a. Ground Surveillance assets. Presently the troops have available:[27]

(1) Night vision sight; individual and crew weapons
(2) Searchlight, infrared and visible light
(3) Metascope
(4) Periscopes, electronic and optical
(5) Binoculars, electronic and optical
(6) Night observation device, (N)D)
(7) Ground Surveillance Radars
(8) Infrared viewers
(9) Unattended ground sensors and receivers
(10) Laser rangefinders

b. Range. The range of the optical, electronic, and infrared devices is a function of line-of-sight, visibility, and target size.[28] They are effective in the immediate vicinity of the FEBA. The ground radar organic to the company extends to 6 KM, the battalion, 18KM, and the division, 20KM.[29]

---

[27] Department of the Army FM 31-100(Test) Surveillance, Target Acquisition and Night Observation (STANO) Operations, May 1971, p.5-1.

[28] Line of Sight for communications, or radar sensor systems, is a function of a straight line across a curving earth. With no intervening obstructions and systems unrestricted by power output, a rule of thumb is 10 miles for ever 50 feet of altitude. Visually aided night vision devices are limited by visual acuity and visibility.

[29] US Army Combat Surveillance Agency, Combat Surveillance Handbook, February 1961.p.20.

c. Air Surveillance Assets. Visual observation both day and night is possible with army aviation organic to the Corps and Division. Both visual and infrared observation are constrained to clear air conditions. The range of these systems vary according to the specific aircraft.

2. Special Forces and Long Range Reconnaissance Patrols (LRRP) One of the missions which may be assigned Special Forces personnel is unilateral deep penetration to conduct reconnaissance, surveillance, and target acquisition.[30] Special Forces are provided the capability for communication at both short and long range. This communication is performed from the obserer to the Special Forces Group HQ and then back to the appropriate command post. Both the range and timeliness of the information are undefined. LRRP have a similar mission; however, their control is organic to the Corps and below. The range of LRRP is a function of the Corps area of influence and it's capabilities to deploy, communicate with, and retract the unit.

3. Army Security Agency(ASA). Detachments attached to the Corps and/or the Division can provide immediate SIGINT and ELINT support to the commander. Their range is limited by line-of-sight in most instances.

4. Army Aerial Reconnaissance/Surveillance. The OV-1 is organic to the Corps and can provide Side Looking Airborne Radar (SLAR) imagery, infrared imagery, and voice reports of enemy activity through an appropriate Military Intelligence Battalion. After processing of the imagery the information is passed to the G-2 in the format of a Hot Photo Report (HOTPHOTREP) or Initial Photographic Interpretation Report (IPIR).

---

[30] Department of the Army, FM 31-21 Special Forces Operations, February 1969, pp.1-2,9-3

a. Side Looking Airborne Radar (SLAR). This system, as installed in the OV-1D, includes the AN/APS 94 SLAR, the AN/AKT -18 Data Transmission Set, and the AN/TKQ-1 Data Receiving Set as the gound terminal. The system was designed for ranges of 25,50, and 90KM to produce radiographic imagery and moving target indications(MTI), under conditions of day, night and all-weather. The data transmission capability provides the interpreter in the ground terminal the capability to immediately view the imagery. Although the system was designed for ranges out to 90KM, evaluation of the system under operational conditions have limited the maximum operating range to 50KM. "Analysis of imagery taken during the test reveals that the greatest percentage of terrain detail and MTI is between 0-50KM. Beyond this range a great deal of distortion and loss of resolution occurs."[31] Further limitations to operation of the system restrict the OV-1 to altitudes above 7500 feet with no maneuvering. " During the ALAR run the Automatic Pilot must be used. 190 KTS TAS is required, and the angle of bank during the run cannot exceed 15°."[32] This severe constraint to maneuvering limits visibility and survivability to the degree that operations within a SAM envelope are not considered. tactically wise. The aircraft is operating at the worst possible profile, and at 190 KTS, it would require 15 minutes to transverse the RAMMER envelope 20 KM away.

---

[31] Seventh Army, Test and Evaluation of the AN/APS-94 SLAR, May, 1963, Annex A, p.4

[32] Ibid., p. 34.

b. Infrared Imagery. Immediate transmission of infrared imagery is possible from the OV-1C aircraft. This imagery is transmitted to the ground terminal(VRC-46) where it is processed by the AN/TAQ-1 for immediate viewing and interpretation. Considering the resolution capability of the IR sensor, the mission profile provides for flight to the target at cruise altitudes, a let-down to less than 2000 ft. and overflight of the target.[33]

c. Optical Photography. Oblique or vertical photography can be acquired from the OV-1. The imagery is available for viewing in approximately 30-45 minutes after the aircraft has landed. Conventional planning times are predicated on 1-3 hours for preparation of a dry negative and one print per negative.[34]

d. Voice Reports. Voice spot reports can be transmitted by FM from the mission aircraft directly to an element of the supported unit provided a dedicated radio set is available to receive the transmissions.

---

[33] US Army Combat Surveillance Agency, Combat Surveillance Handbook, February 1961, pp 17.

[34] Ibid.,p.24

5. Military Intelligence Battalion. This unit supports the G-2 with varied types of tacitcal information. It includes an imagery interpretation facility and personnel which process imagery from the OV-1.

6. The Battlefield Information Center (BIC). The Artillery BIC will coordinate information acquired by ground and air target acquisition units with the Division and Corps BICC.

7. USN and USMC Tactical Reconnaissance. Tactical information emanating from these units must presently be processed through their organic channel. The timeliness of this information is a function of the sensor and can reasonabley be expected to approximate that of the USAF present operations.

8. USAF Tactical Reconnaissance. Tactical reconnaissance wings of the tactical air force normally support Army operations. A minimum of one air reconnaissance squadron supports the Corps with interdiction, counter-air, and close air support missions. The missions are performed using day and night photography, infrared imagery, SLAR and visual reconnaissance.

a. Information Flow. USAF is generally tasked for pre-planned missions through the TACC. After the mission is flown, the tactical information finally reaches Army channels in the form of an interpretation report at the BICC/BIC of the Corps. As such from the Army standpoint, the information flow including the direction of a sortie, take-off, flight to the target area, acquisition of imagery, return, processing of the film, interpretation, and dissemination of the report and the accompanying imagery to the Military Intelligence Battalion Air Reconnaissance Support (MIBARS) is all considered part of the Army Collection phase.

b. Existing Capabilities for Time-sensitive Collection.

(1) Surveillance. In the traditional meaning of the word surveillance is conducted by USAF Tactical Reconnaissance using the missions of Search and Cover on route and area targets.

(a) Route or Area Search. Search implies a visual coverage of the area or route with imagery of targets detected by the aircrew if and when feasible. Voice reports follow to the DASC through the air reconnaissance request channels.[35] Timeliness is good with only coordination between ground agencies as a limiting factor. The high-speed/low-altitude mission profile limits the aircrew to the detection and general identification of tactical targets in the open. Although precise target location compatible with artillery can be determined for a few lucrative targets by reference to large scale maps in the aircraft, multiple target detection characteristic of a large area can yield only general target accuracies. Route and Area Searches are severely limited by conditions of darkness and poor visibility.

(b) Route or Area Cover. Cover implies imagery of the target area or route. SLAR, IR, and photographic coverage are possible in both day, night, and certain conditions of adverse weather (SLAR has an all weather capability, other imagery can be acquired by the RF-4C at ceilings of 500 Feet and above.)[36] Converse to Searches which provide timely, but constrained detection and location accuracy, Covers can provide excellent accuracies with a major time delay. A typical area coverage using the infra red sensor is shown in Figure 8. As depicted, time from scramble of aircraft to a target

[35] Department of the Army, FM 100-26 The Air-Ground Operations System, March 1973, p.4-10.

[36] Tactical Reconnaissance Student Study Guide RF-4C, Vol V October 1968.

130KM away could require .13 Hours. Assuming two targets were covered total mission time would be 1.35 hours averaging 530 knots. This would provide coverage of two regimental size avenues of approach behind the FEBA.

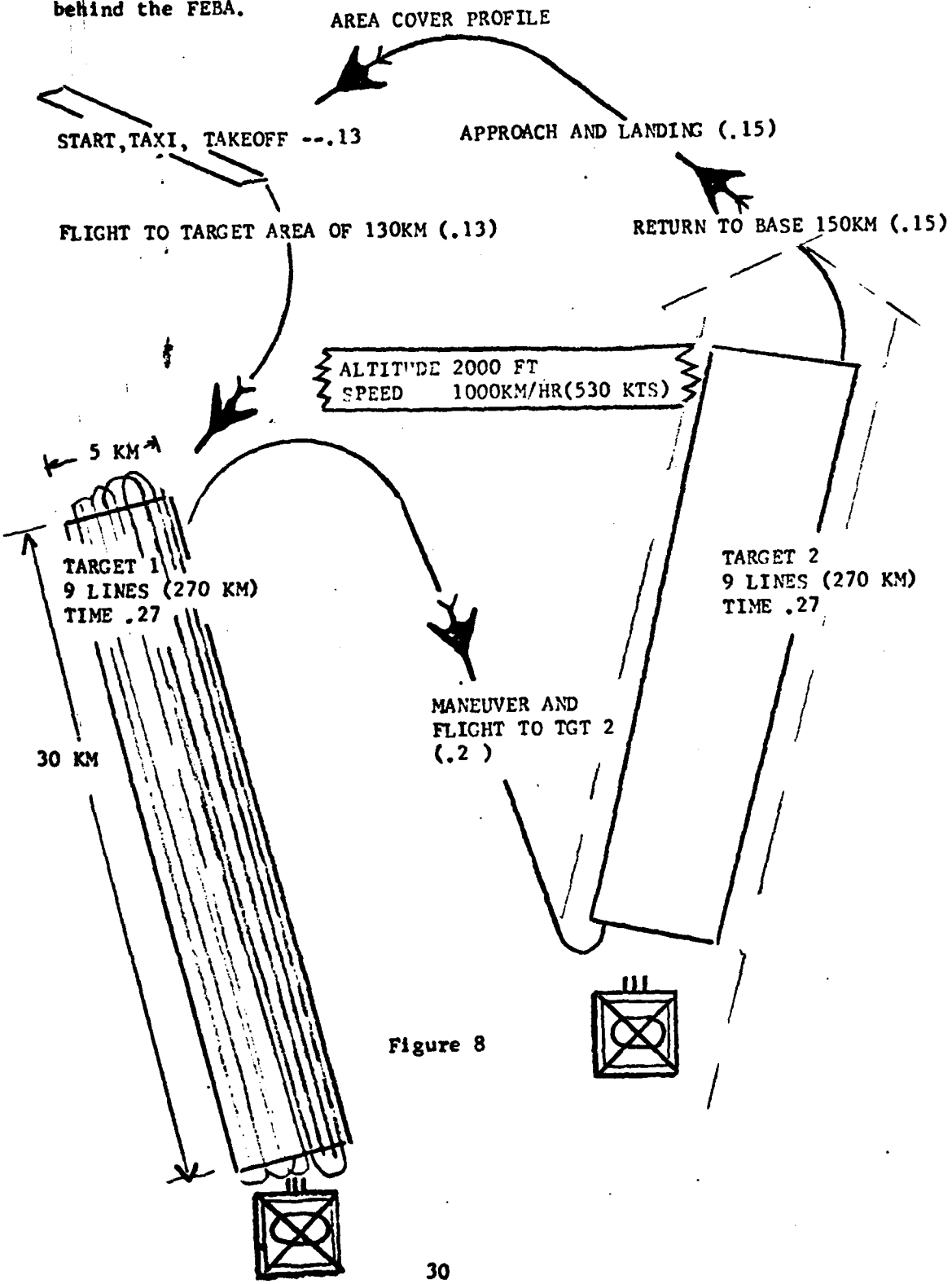


Figure 8

(c) Processing. USAF processing and reporting will be considered part of the Army collection phase. After the aircraft has landed, time-sensitive missions are immediately down-loaded by USAF ground crew and delivered to a Photo Processing and Interpretation Facility (PPIF), where the information is processed and viewed by USAF image interpreters. " When processing Army-requested photography, the Air Force processing facility will be tasked to provide a duplicate negative of each frame to the Army Military Intelligence Battalion Air Reconnaissance Support (MIBARS)...." [37] The MIBARS is located on the USAF base. In actual practice, the original negative is not viewed by the MIBARS interpreters until after the USAF interpreters have completed the mission, although USAF interpreters can and often do prepare a HOTPHOTOREP or an Initial Photographic Interpretation Report (IPIR) for dissemination through Army channels as well as through USAF channels. The mission depicted in Figure 8 would require approximately 250 - 276 feet of film according to variance in scale. Representative processing times for the Kodak Versamat installed in the PPIF are 8 minutes for the first print and 10 feet per minute thereafter.[38] Assuming the mission is Priority 1, the negative will be viewed wet as it comes from the processer. Production of a duplicate negative will require a similar time. Analysis of the entire processing and reporting times is presented in Figure 9

AREA COVER TIME ANALYSIS

MISSION TIME	1.35	
DOWNLOADING	.2	
FIRST PRINT	.1	
250 Ft. @ 10/MIN	.4	
HOTPHOTOREP	.1	(Possible first report) @ 2.05
DUP. NEG	.4	
DELIVER TO MIBARS	.1	
IPIR - ARMY	.5	(Must view film at 10 Ft/Min)
TOTAL	3.05	

FIGURE 9

(2) Reconnaissance. Specific reconnaissance of targets can be conducted using either visual reconnaissance or imagery coverage. Imagery coverage is termed the pin-point cover, and is designed to provide for the identification or description of fixed or transient targets previously detected. Visual reconnaissance is reported in the same manner as the area or route search; however, it is limited to general characteristics of the target which can be rapidly acquired from the high-speed/low-altitude profile of the RF4-C under daylight clear air conditions. The classic example of visual reconnaissance used in the interdiction role is the single high-speed pass to determine whether"the bridge is up or down." Pinpoint coverage is appropriate for both day and night photography or infrared. Processing times are somewhat shortened as the aircraft does not have to remain in the target area, and vast amounts of film need not be processed. A typical time analysis of pinpoint coverage is presented in Figure 10.

PINPOINT TIME ANALYSIS

START, TAXI, TAKEOFF	.1	
FLIGHT 130 KM @ 530 Kts.	.13	
RETURN TO BASE	.14	
DOWNLOADING	.2	
FIRST PRINT	.1	
HOTPHOTREP/IPIR -- USAF	.1	(Possible first report--.78)
DUP. NEG	.2	
DELIVERY TO MIBARS	.1	
HOTPHOTOREP --ARMY	.2	
TOTAL	1.27	

Figure 10

---

37 Air Ground Operations System, op. cit., p 4-10

38 Reconnaissance Reference Manual, op. cit., p.74

c. USAF Quick Strike Reconnaissance (QSR) Program.[39]

(1) The Quick Strike Reconnaissance (QSR) program was conceived within the Tactical Air Warfare Center at Eglin AFB. It is designed to develop a fully integrated, night-capable system which directly interfaces with the automated Tactical Air Control System. QSR will detect and identify tactical targets for rapid commission of airstrikes. The system consists of a multi-sensor RF-4C operating through a data link system to a Forward Reconnaissance Reporting Post (FRRP). The proposed detection sensors in the RF-4C will provide a cockpit display of the position of the target. Subsequent overflight will produce high resolution infrared imagery which will be data-linked to the FRRP. Interpreters in the FRRP are to be specifically trained to rapidly detect, identify, and assess tactical targets. They are equipped with a digital message encoder which transmits the tactical information in Tactical Digital Information Links (TADIL) format.[40] This format has been specified by the JCS for interservice transmission of tactical information and is presently used by both the USAF and the USN. It uses existing TRC-97 and HF communications gear.

(2) Collection Capabilities. The systems in the aircraft will collect and data link targets detected by MTI, SIGINT, ELINT, and UGS monitoring in all weather conditions to location accuracies compatible with the sensor and the navigation system on board the aircraft. The duration of the aircraft on station is limited only by fuel. The RF-4C sensor aircraft has an in-flight refueling capability which extends the time on station to the limitations of the aircrew.

---

[39] James T. Thomes, The Tactical Air Warfare Center Review, Vol III, No 3. , August 1972, pp 6-9.

[40] Joint Chiefs of Staff, JCS Pub. 10 Tactical Digital Information Links, 1971.

(3) Timeliness. The targets detected by the multi-sensor aircraft are relayed immediately to the FRRP, where the message is encoded in TADIL format and transmitted immediately to the Control and Reporting Center (or the notional All Sensor Reporting Post). The digital format of the message allows automated processing and filtering. The display is instantly in a format for an immediate decision at the scene of the decision. Overall timeliness from time over target to display is less than 12 minutes. (See Figure 11)

QUICK STRIKE RECONNAISSANCE MISSION PROFILE

FLIGHT TO TARGET AREA	0.00	(Surveillance in area)
DETECTION OF TARGET	.05	
TRANSMISSION OF INITIAL MESSAGE	.05	
TRANSMISSION/VIEWING OF IMAGERY	.05	
ENCODING/DISPLAY OF TADIL MESSAGE	.05	
TOTAL TO DISPLAY	.2 Hours	

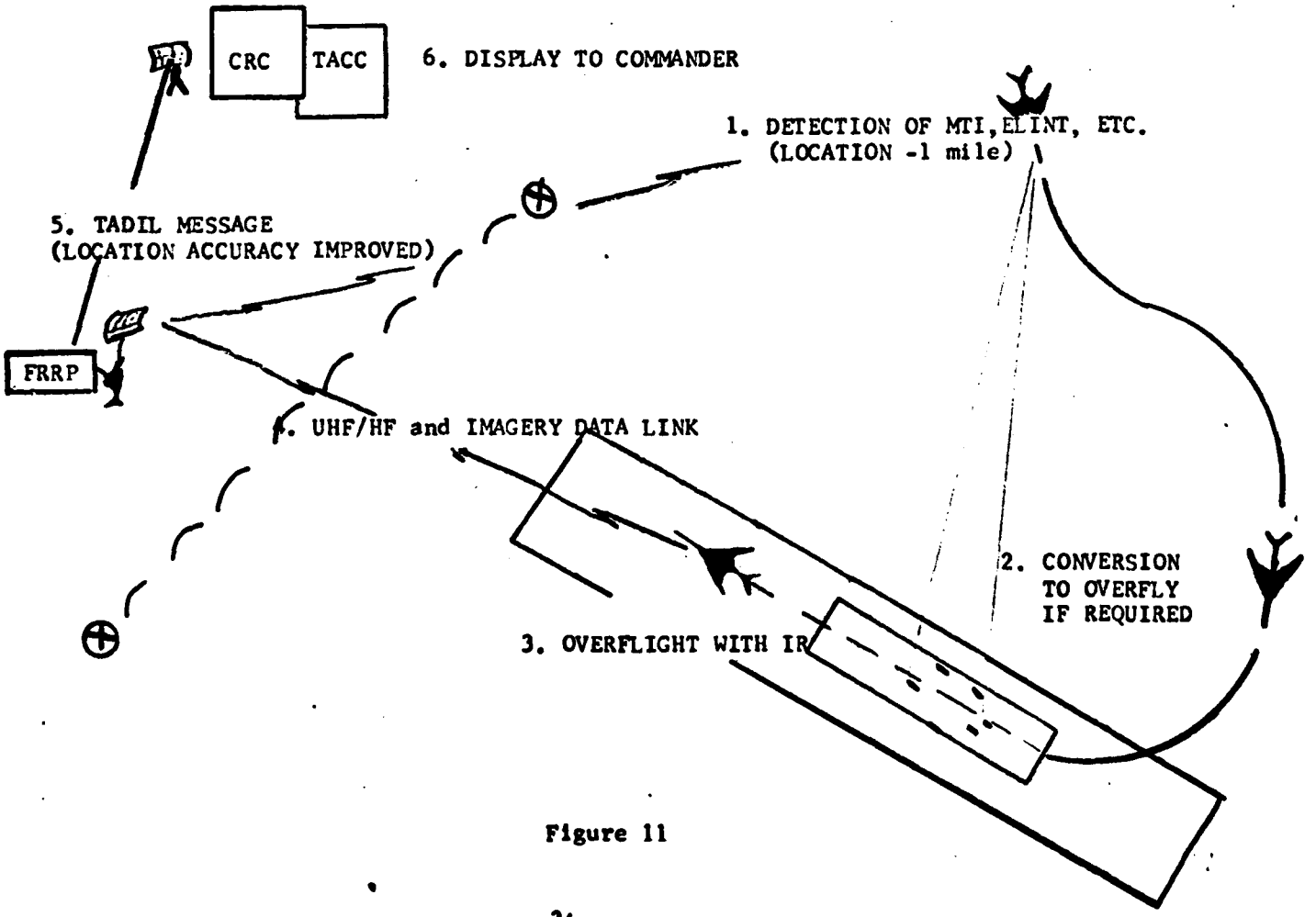


Figure 11

CHAPTER V

COMPARISON

A. GENERAL. This chapter compares the characteristics of the ideal system, with regard to time-sensitive information capability, with the existing and developmental capabilities of the Army and Air Force. The comparison is made through an analysis of the traditional steps in the intelligence cycle. The capabilities of the assets are compared in Appendix B to the characteristics of the ideal system. To simplify identifications of strengths and shortfalls, a judgemental system of rating is used with regard to each characteristic:

(++)	Meets or exceeds requirement in all cases
(+)	Marginally meets requirement in all cases
(-)	Occasionally meets requirement
(--)	Does not meet requirement

B. DIRECTION. This step involves the tasking of agencies to acquire information concerning current order of battle (OB) and target acquisition (TA). The ideal system had the characteristics of:

Continuing Surveillance as SOP
Significant Alert Posture for Specific Requests
Responsiveness to Tasking

1. Troops. The troops, with the capability for visual (aided) detection, ground radar surveillance, UGS, and aviation, have a responsibility for continuing surveillance (++), and are responsive immediately for specific reconnaissance requests (++) for targets within their range. An alert posture is inherent in some cases and is maintained by organic aviation assets (++).

2. Long Range Reconnaissance Patrols /Special Forces. These units, if assigned or attached, are immediately available for alert (++). They have a continuing responsibility for surveillance (++), but a limited capability to respond to specific reconnaissance requests (+).

2. Long Range Reconnaissance Patrols / Special Forces. These units, if assigned or attached, are immediately responsive (++). They have a continuing responsibility for surveillance (++), but a limited capability to respond to specific reconnaissance requests (+).

3. ASA/SSD. These units have a responsibility for continuing surveillance (++); however, they are limited for specific reconnaissance requests (+), because of coordination problems with their parent agencies.

4. Special Army Intelligence Collection. These units conduct continuing surveillance (++); however, they are not responsive to specific reconnaissance requests (-). No Alert posture (--).

5. OV-1. This unit and its supporting personnel conduct continuing surveillance as SOP (++). They are responsive within the time necessary to scramble and fly to the target area.(+). A minimum alert posture is dictated by limited assets (-).

6. USAF Existing Tactical Reconnaissance. Continuing surveillance is not appropriate because of the requirement to return to base and download film. This would require numerous flights back to the target area or continuing scheduled sorties (-). Visual Reconnaissance with inflight refueling provides a good capability for continuing surveillance(++). A minimum alert posture is presently dictated by limited assets (-). Tactical Reconnaissance forces are generally responsive to direction in approximately 30 minutes.[41] (+)

7. Developmental USAF Quick Strike Reconnaissance [illegible]. Continuing surveillance is appropriate for this system, because of its non-requirement to return for film, and its in-flight refueling capability (++). Responsiveness(+) and Alert(-) are similar to existing capabilities of USAF Tactical Reconnaissance.

---

[41] The 45th Tactical Reconnaissance Squadron in SEA maintained one aircraft on a daily alert, with a 30 minute scramble posture.

C. COLLECTION. This step involves the collection of information for further processing. The ideal system had the somewhat dependent characteristics of:

MOBILITY ----------Moving rapidly to a collection point
RANGE ----------Operating within range of targets
SURVIVABILITY----------Remaining in the area to collect
ACQUISITION ----------Detection, Identification, Location
COMMUNICATION----------Send information to Processing

Additionally the overall system required the capability for its elements to operate in day, night, and all-weather conditions. The addition. Systems with a day capability only,occasionally meet the overall requirement (-). Systems with a day or night capability, such as Troops augmented with night vision devices, are assigned a (+). All weather systems such as MTI,ELINT,SLAR,etc are assigned (++).

1. Mobility. Generally speaking, systems which are immediately available, that is, they do not have to move to a collection point, are assigned (++). Aerial systems are considered very mobile (+). Certain LRRP/SF and UGS operations which require prior emplacement in enemy territory are considered less mobile (-).

2. Survivability. Passive ground agencies located behind the FEBA are rated (++). Ground surveillance radars, which require emission, are rated (+). Ground agencies located forward of the FEBA , and which must of necessity transmit information, are considered to be relatively poor risks for continuing surveillance (-).

a. Air Survivability in ADA Employment (Figures 2 and 3) In the immediate area of the FEBA, with four aggressor battalions on line, four in the second regimental echelon, and the ADA organic to the regiment considered, there are 216 Rogues and 8 Rovers (equivalent to REDEYE), twenty 14.5MM, and twelve 57mm. Considering a division front of 15 KM and regimental ADA 3 KM to the rear, there is an average

of five ADA weapons in every square kilometer within the immediate vicinity of the FEBA.

(1) Army Aviation. Nap-of-the-earth flight may be possible in the face of the Aggressor ADA; however, surveillance profiles, requiring higher altitudes are considered an extremely high risk to survivability (--) throughout the enemy division zone.

(2) OV-1 SLAR. In ADA Employment I(page 3), the OV-1 is vulnerable to the RAMMER and 57MM when within 15KM of the FEBA. This vulnerability is primarily due to the rstricted medium altitude flight profile discussed in para. IV,E,4,a. The OV-1 is then considered survivable in ADA Employment I at 15 KM behind the FEBA (++). In ADA Employment II, the RAMMER is organic to the CAA vice the Army Group and the Army Group has the RASCAL organic. This employment allows complete survivability (++) at 40 KM behind the FEBA and somewhat survivable operation beyond the range of the RAMMER, (25KM) (+).

(3) USAF Visual Reconnaissance and QSR are considered survivable (+) from 20KM forward of the FEBA out of the extreme density of the front line units; however, the traditional imagery area cover, as depicted in Figure 8, page , is considered less survivable even in this area because of the necessity for continuous parellel overflight of the target area. (-).

6. Range. Range figures are specified as range forward of the FEBA, from at least a survivable (+) location for airborne surveillance.

a. Visual and aided systems. These systems operate in the immediate vicinity of the FEBA. Ranges are classified, short range, and irrelevant to this study.

b. LRRP . These units are generally under the control of the Corps or Division and operate within range of their Artillery, within the area of influence of the commander. (Corps 175MM,21.8)

c. Aviation. Range is equivalent to type of aircraft and fuel. 100KM will be used in this study.

d. Ground Surveillance Radars. The TPS 25 has the maximum range of currently operational ground radars. It is specified at 20 KM;[42] however, evaluations of the capability have indicated,"normal average target distance during a tactical excercise is 5000 meters, based on enemy capability to avoid line-of-sight contact with friendly forces."[43]

e. OV-1 SLAR. In consideration of paragraph IV,E,4,a, the SLAR has an operational capability out to 50KM. When employed in ADA Employment I,(15 KM stand-off), range forward of the FEBA is 35KM. When employed in ADA II, range forward of the FEBA is 25KM

d. ASA/SSD. Range is classified

e. SAIC. Range is essentially unlimited

f. USAF. Range is a function of time on target and distance from target to base. For a surveillance mission at low altitude which uses all available film in one sensor, range is estimated at 300KM.

---

[42] Combat Surveillance Handbook. op cit., p.24

[43] USA Combat Surveillance Agency, Radar Set AN/TPS -25 (U) Management Manual, 1961. para.5

7. Acquisition.

a. Detection. All systems with the exception of SLAR and USAF Visual are considered to be adequate for detection of targets in their medium. (++) SLAR because of its inherent noicse and low resolution is considered marginally acceptable(+). USAF Visual is also considered limited by the high-speed low altitude mission profile necessary for survivability. (+)

b. Location Accuracy. Visual detection, imagery, and radar are considered adequate for spot location (++). UGS,ELINT, HUMINT, SLAR and USAF Visual are consider adequate for general target location (+).

c. Identification. Visual sources, ELINT, HUMINT, SIGINT and all imagery is considered adequate for identification (++). Some types of UGS are also acceptable (+), SLAR, because of its low resolution, is considered poor (-). Ground Radar is occasionally capable of identification, with corellary information (-).

8. Communication

a. Timeliness. All systems organic to the ground troops are considered to have an immediate reporting time.[44] Special Intelligence is classified. OV-1 SLAR and IR can be transmitted immediately. USAF QSR is available in 12 minutes and USAF photo reports in approximately 3+00 Hours.

b.Reliability. Ground systems located behind the FEBA are considered to have reliable communications (++). Aerial systems operating forward of the FEBA are considered to have more vulnerable systems (+). LRRP and UGS located on the ground forward of the FEBA are vulnerable to destruction and jamming (-).

---

[44] Combat Surveillance Handbook. op cit., p.24

D. PROCESSING AND DISSEMINATION.

Processing has the function of receiving the collected information from the agencies, converting the information into intelligence, and formatting the intelligence for use by the dissemination system. In the dissemination phase, the intelligence is received from the processing sub-system, proper users are selected, the information is disseminated to the users, and the information is displayed in a format compatible with a decision by the commander. As such, these two functions blend together in a common continuum and should ideally be colocated. Characteristics of the ideal systems were:

Processing
- Standard Input Compatible with ADP
- Maximum use of ADP
- Sufficient Personnel for Manual Tasks
- Standard Output Compatible with ADP and Dissemination

Dissemination
- Standard Input Compatible with Processing and Other Sources
- Automatic Selection of Users
- Adequate Communications
- Standard Output Compatible with all Displays
- Displays Appropriate for Immediate Decisions

1. The Battlefield Information Control Center/Battlefield Information Center (BICC/BIC).

The BICC/BIC concept is designed to process and disseminate tactical information and intelligence. The BICC/BIC is still in the developmental stage, and various degrees af automation are being demonstrated. The initial stages of the development of the concept is presented in Figure 12. With regard to the standard input and output of the ideal system, the BICC/BIC concept has partially automated the inputs from TACFIRE[45] and UGS by the implementation of a digital message entry device. All other inputs to the BICC/BIC are presently voice or teletype. It is assumed herein that the final system will appropriately handle all Army inputs with the automation feasible in a tactical situation. The major shortfall implicit in the system is the BICC/BIC inability to process tactical information when transmitted in TADIL, which as discussed previously is the approved format for joint service transmission of time-sensitive tactical information.[46] Although the TADIL system is certainly not the only alternative for data transmission of tactical information, no provisions have been made within the USAF or Army for an inter-service digital link of any kind.

---

[45] TACFIRE is a limited operational system which uses a digital transmission system to communicate from the forward observer and his artillery. It includes a fixed format message entry device which transmits a brief 1.3 second digital transmission over existing radio or wire lines. The transmission time is so short that it is virtually impossible for the enemy to locate or jam the transmission site. Data Systems Division, Litton Industries, TACFIRE, An Automated System for Artillery Fire Control, page 8

[46] It is interesting to note herein that the USAF, USN, and USMC all use TADIL for transmission of both aircraft control and surface target information. The Navy Tactical Data System uses the system for processing of surface ship, submarine and aircraft threat locations. The Tactical Air Control System (USAF/TACS) uses it primarily for air control, with only a limited capability for surface targets detected by the developmental QSR system.

BATTLEFIELD INFORMATION CONTROL CENTER
COMMUNICATION LINKS

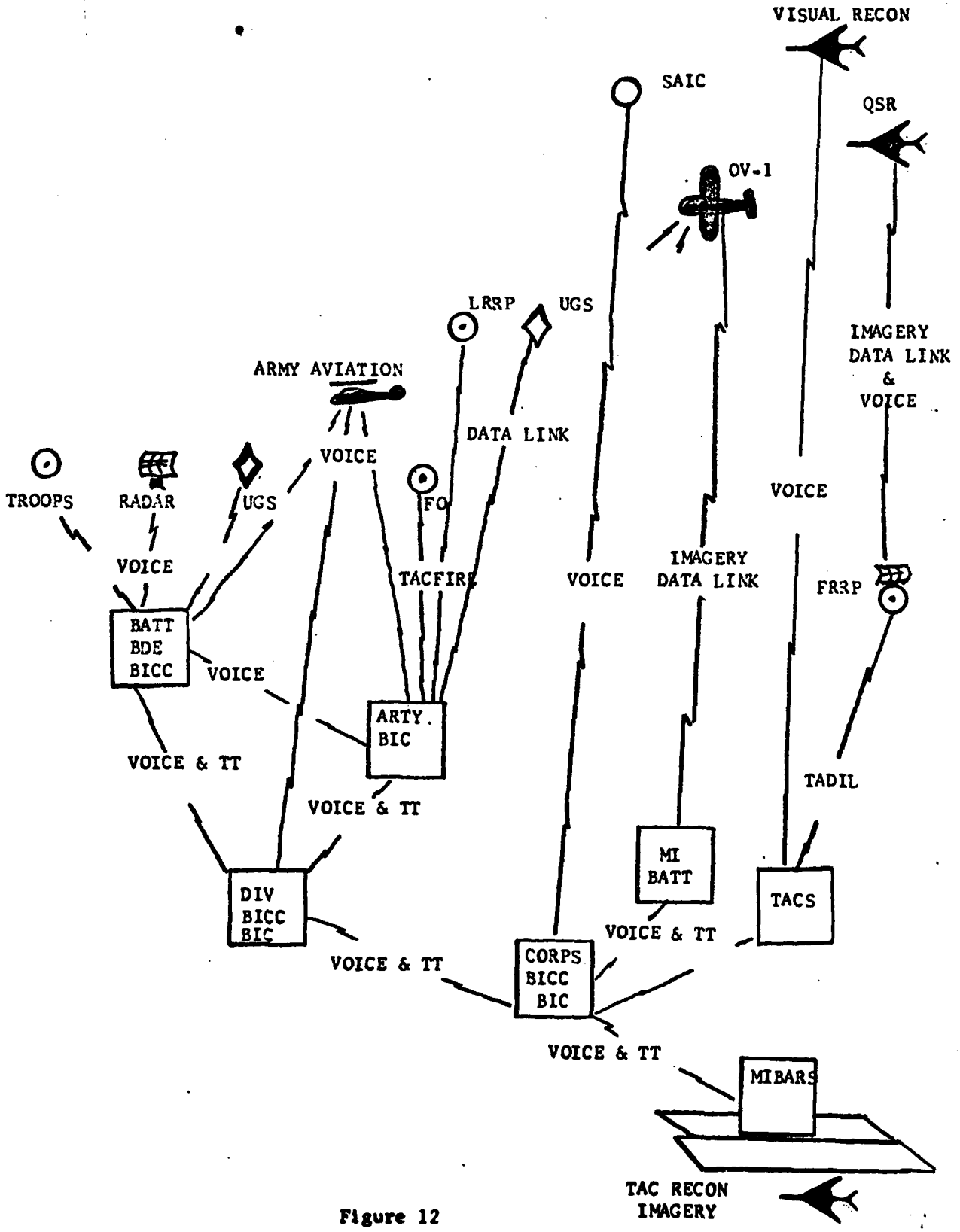


Figure 12

CHAPTER VI

TEST AND CONCLUSIONS

A. GENERAL. Analysis of the existing and developmental systems in Chapter V has revealed numerous shortfalls from the characteristics of the ideal system. This chapter applies the existing and developmental capabilities and their shortfalls to a typical scenario as discussed in Chapter I "The Mobile Threat". The hypotheses will be addressed sequentially.

B. THE GROUND COMMANDER'S REQUIREMENT FOR TIMELY INFORMATION AND ASSUMED SURVEILLANCE CAPABILITIES.

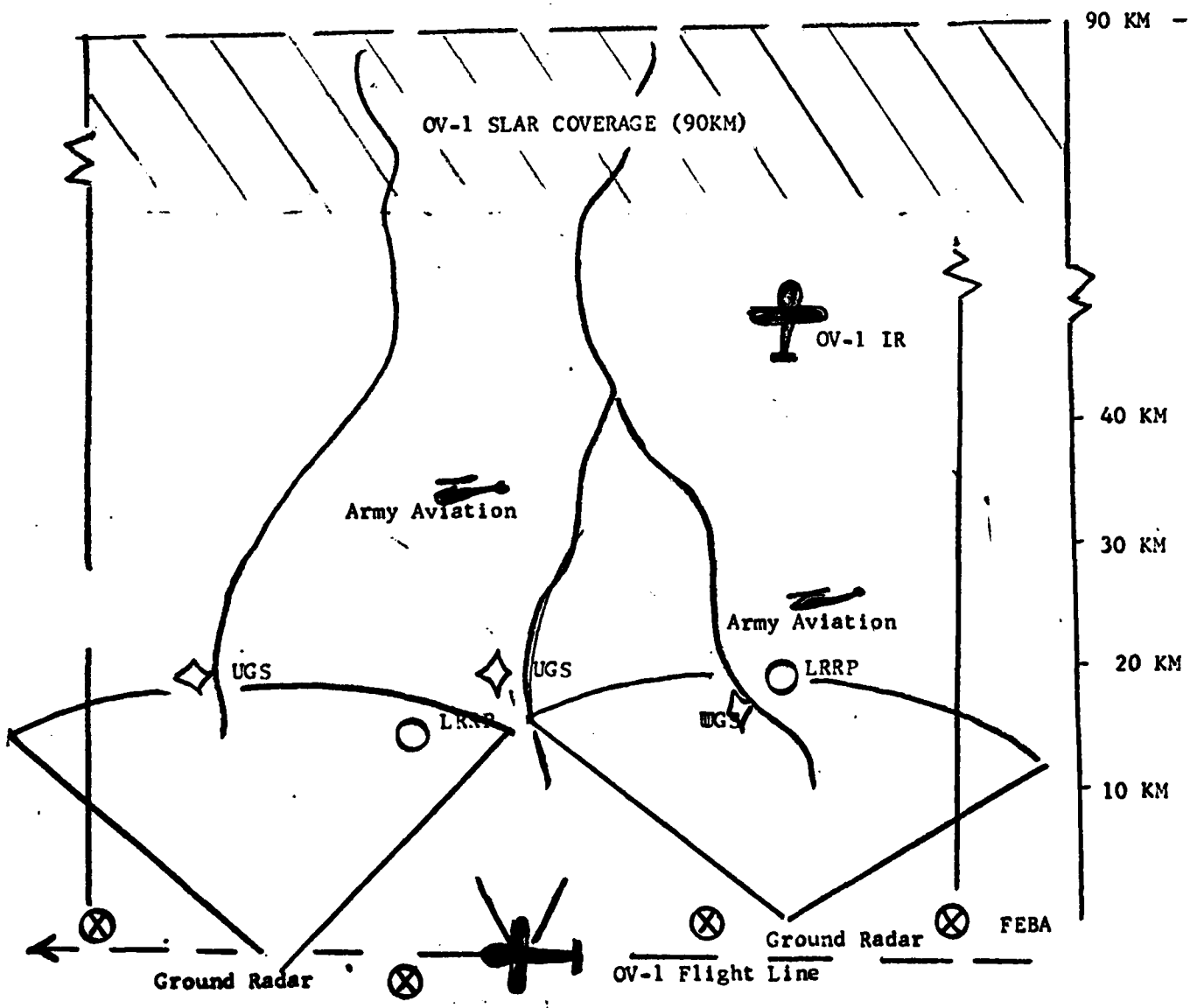
As shown in Figure 7, the ground commander has an area of interest out to 200KM, planned operations to 60KM, and current operations to 50 KM . From the FEBA to these ranges, he has the requirement for the current knowledge of the general location (500 M), as well as the composition and strength of enemy forces. Additionally, within this area of interest lies the area of influence. For the Lance (non-nuclear) the area of influence extends to 43.2 KM, the 175MM Gun, 21.8 KM, and the 8" Howitzer, 10.2 KM. From the FEBA to these ranges, the commander has the requirement for precise location of enemy targets. To satisfy these requirements, the ground commander establishes a surveillance plan utilizing Army resources. The assumed coverage as derived from Appendix A is depicted in Figure 13. This assumed capability extends to 90 KM, utilizing organic Army aviation assets.

---

47 Combat Surveillance Handbook., op. cit., page 20. (Not included are UGS, ASA, and LRRP)

Figure 13

DOCTRINAL COVERAGE OF ARMY SURVEILLANCE ASSETS
ASSUMING NO AIR DEFENSE THREAT



C HYPOTHESIS I

1. " In a mid-to-high intensity conflict with a normal Aggressor air defense," The Aggressor air defense, as discussed in paragraph IA3, is intense over the battlefield and extends well over friendly forces. As discussed in paragraph VC2, this constraint will severely limit continuous surveillance by observation helicopters or the OV-1 over the battlefield. It will further restrict the OV-1 to operate on SLAR missions 25 KM or more behind the FEBA.

2. " the surveillance assets organic to the Army will be inadequate to meet the commander's requirement for intelligence within his area of interest." As discussed previously the operational range of the SLAR has been demonstrated to be 50 KM, vice 90 KM as designed. Organic ground surveillance radars have been demonstrated to have consistent ranges of 5 KM vice 20 KM under typical tactical conditions. Reference Appendix B , this leaves LRRP,UGS,ASA, and SAIC with ranges beyond that of the radar, all of which have been shown to have major weaknesses in mobility, survivability and or communications vulnerability. For planning purposes it is logical to deduce that the actual surveillance capabilities of the ground commander with a normal Aggressor Air Defense would more closely approximate that of Figure 14, leaving the area from approximately 20 KM to the extent of influence or interest not covered by Army assets. Also the area from 5KM to 20KM will lack much of the assumed target acquisition capability previously performed by aviation.

3. Conclusion. "In a mid-to-high intensity conflict with a normal Aggressor air defense, the surveillance capabilities organic to the Army will be inadequate to meet the commander's requirement for order of battle information beyond 20 KM from the FEBA and target acquisition beyond 5 KM from the FEBA .

OPERATIONAL COVERAGE OF ARMY SURVEILLANCE ASSETS ASSUMING AGGRESSOR ADA EMPLOYMENT II

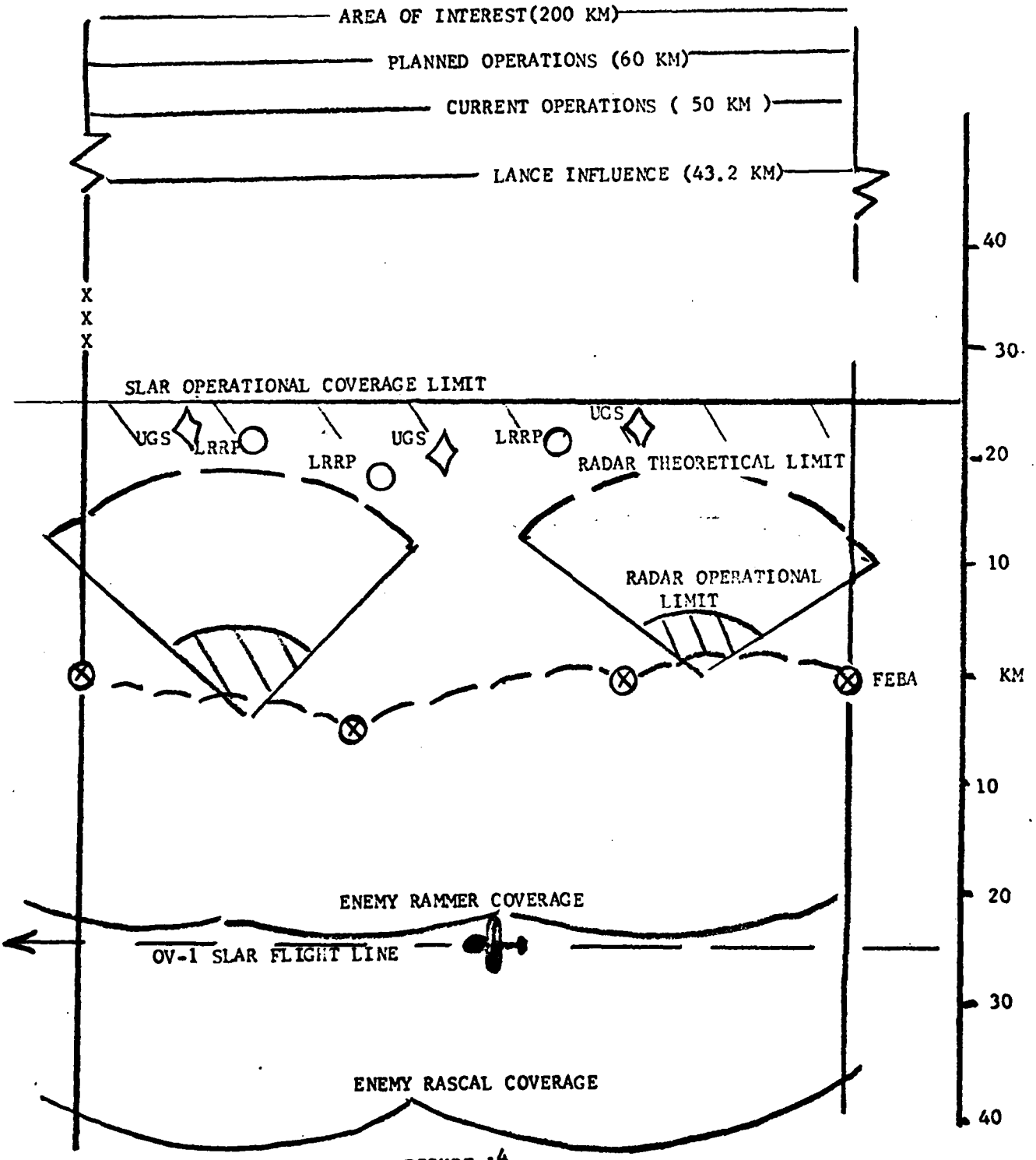


FIGURE 14

D. HYPOTHESIS II.

" In formulating the surveillance plan, organic Army aircraft are considered for all missions which fall within their capabilities ... Missions which cannot be accomplished by organic means will be tentatively identified for accomplishment by the Air Force."[46]

1. "The existing USAF equipment and the existing Army/USAF doctrine are presently inadequate to perform this mission with sufficient timeliness to meet the requirements of the tactical situation."

a. Order of Battle (OB). From the standpoint of OB information, the question is, " If the enemy changes his composition, disposition, and/or strength with sufficient magnitude to seriously affect combat operations, can this change be detected by the USAF and forwarded to the commander with sufficient timeliness for him to effectively maneuver his forces?"

(1) Disposition. Reference Appendix A, Tab 1, In the typical sceneario, the Aggressor divisions average a 17KM front. The Aggressor divisions in the second echelon can move 10 KM laterally into another division's prepared assembly area. This move would likely be performed cross-country at night by regiments and would require 2.0 hours. (Appendix A, Tab 2)

(2) Composition. Reference Tab 3, the introduction of the 5 Tank Army into areas 10 KM from the FEBA in the zone of the 2CAA and the 4 CAA can be performed at night with night vision devices (organic to the Aggressor tanks) and on roads, the lead divisions could be in position, closed and deployed in combat formation, ready to attack through elements of the 12th and 18th Divisions in 5.5hours.

---

[46] Aerial Surveillance-Reconnaissance, op. cit., p. 5-5.

(3) Strength. Reference Tab 4, assuming nuclear fires were employed on a limited basis in the area of the 54th Mech Division, and the 54th Mech commander received the bomb damage assessment in 1.27 Hours by scrambling a Tactical Reconnaissance sortie (See Figure 10, page 32). The BDA revealed that three battalions had been destroyed. If the Aggressor chose to maintain the strength of his combat divisions by replacing by battalions from the 5th Tank Army 60-75 KM to the rear, this movement by battalions to the division areas could be performed at night on roads with night vision devices 50 KM and then 10 KM cross-country to the front. A total of 2.6 Hours would be required to replace the battalions leaving approximately 1 hour 45 minutes to maneuver.

(4) Summary. Reference Tab 5, if the enemy were to choose to reinforce his attack or exploit with the 5th Tank Army in accordance with his doctrine, he would coordinate the maneuver by :

(a) Maintaining the strength of his front line units.
(b) Moving by divisions of the 5th Tank Army at X-5.5 Hours.
(c) Moving the second echelon divisions of the 4th and 2nd CAA by regiments at X-2.0 Hours
(d) Splitting the divisions in contact to the North and South at approximately X-1 Hours.
(e) Attacking at X - Hour.

b. Existing USAF Tactical Reconnaissance Employment. USAF Tactical Reconnaissance forces are not now employed for continuing surveillance of the battlefield; therefore, assuming the worst case, the 5th Tank Army attack will not be detected until X-1 Hours when the divisions in contact maneuver to accomodate the 5th Tank Army, and the lead forces of the attacking Army come within the range of the Long Range Reconnaissance Patrols and the UGS.

A typical Tactical Reconnaissance Squadron has 18 aircraft. Assuming an operational sortie rate of 100%,[47] 18 sorties per day will be available. Further assuming that from 40 to 60% of the available sorties will be dedicated to USAF missions such as interdiction and counter-air bomb damage assessment and 10% are on alert, the ground commander could expect to have available approximately 6-8 sorties for surveillance, with one sortie into the area every three to four hours around the clock. The movement of the Aggressor would be detected, on the average, 1½ to 2 hours after it had begun (X-4). If the movement were to take place in the daytime, the information would be relayed almost immediately through the TACS to Army G-2 channels, and the commander would have approximately 4 hours to react. However, as previously addressed, visual reconnaissance is not effective at night on unlighted (night vision) targets, so the traditional route and area covers with imagery would be required (3 Hours), leaving the commander approximately 1 hours to maneuver to meet the attack. Assuming a normal periodic surveillance at night by USAF Tactical Reconnaissance Route and Area Covers, several sub-conclusions may be drawn concerning order of battle intelligence:

(1) Battalion and Regimental movements will either not be detected or reported 1 to 2 hours after completion of the maneuver.

(2) Divisional maneuvers from the Army Group second echelon will be detected and reported at X-1 prior to an attack by a new Combined Arms or Tank Army.

E. HYPOTHESIS III.

1. "Developmental USAF reconnaissance systems could be adequate to collect the information as required,"

Reference Table A, the Quick Strike Reconnaissance System under development has a day/night and limited adverse weather capability. It is mobile and can operate survivably in a hostile air defense environment. Range capability is more than adequate for surveillance from beyond the FEBA to the limits of the Army commander's area of interest. The multi-sensor configuration peculiar to the QSR aircraft provides a real-time detection capability, the image transmission system provides a precise location and identification capability. Communications from the system are reliable and timely (12 minutes) and are in a format for immediate data processing and display. Similar to Visual Reconnaissance, the system is capable of continuing surveillance with inflight refueling, because there is no requirement to return for film.

2. "and the developmental Army Battlefield Information Control Center could be adequate to process and disseminate the intelligence.

As discussed in paragraph IV B, the BICC/BIC concept is geared to processing of time sensitive information. Specifically, it has the capability to process and disseminate the most time-sensitive of information -- that concerning target acquisition, emanating in TACFIRE and UGS channels from the Artillery BIC. It is therefore concluded that similar information from USAF channels could be processed and disseminated in a like manner.

3. However, there are no provisions under consideration for integration of these capabilities.

Because of the develpmental status of the QSR and the BICC/BIC concepts, each system is being designed to primarily satisfy the needs of its parent service. Thus, the BICC/BIC concept uses a digital data link common to the TACFIRE and other organic Army communications systems in order to integrate with maneuver and artillery fires. Similarly, the QSR system uses Tactical Digital Information Links (TADIL) which is compatible with the 407L Control and Reporting Post(or the notional All Sensor Reporting Post)digital processing and communications equipment -- in order to integrate with Interdiction and Counter-Air strikes. Development continues to this date on the hardware and software of the systems with no provisions made for the integration of future capabilities or identification of mutual goals and/or overlapping interests.

F. CONCLUSIONS

1. In a mid-to-high intensity conflict with a normal Aggressor air defense, the surveillance capabilities organic to the Army will be inadequate to meet the commander's requirement for order of battle information beyond 20 KM from the FEBA and marginal for target acquisition beyond 5 KM from the FEBA.

2. With the exception of the use of Visual Reconnaissance under daylight conditions, the existing USAF equipment and USA/USAF doctrine are presently inadequate to perform this mission with sufficient timeliness and location accuracy to meet the requirements of the tactical situation.

3. Developmental USAF reconnaissance systems could be adequate to collect the information required, and the developmental Army Battlefield Information Control Center could be adequate to process and disseminate the intelligence, provided the two systems were integrated.

b. Target Acquisition (TA). From the standpoint of TA information, the question is, " If the enemy were to move his high value targets according to doctrine, can their positions be detected by the USAF with sufficient accuracy and timeliness for the ground force commander to effectively engage with artillery?" Reference Appendix B, and paragraph IV,E,8,b,(1), the only existing Tactical Reconnaissance capability with a rapid communication time is Visual Reconnaissance used in the route or area search. Reference Figure 2, it is possible, even likely than in a nuclear environment, most of the Aggressor assembly areas and targets will have a perishability of less than one hour. Visual reconnaissance has an extremely limited capability for functioning in other than daylight conditions on unlighted targets. Also, Visual Reconnaissance has an extremely limited capability for precise target locations compatible with unobserved artillery fires. Targets plotted from imagery will be approximately 3 Hours old under best case conditions, and Aggressor doctrinal maneuver will theoretically preclude effective artillery fires until detection by Unattended Ground Sensors or Long Range Reconnaissance Patrols.

2. Conclusions. "With the exception of the use of Visual Reconnaissance under daylight conditions, the existing USAF equipment and Army / USAF doctrine are presently inadequate to perform this mission with sufficient timeliness and location accuracy to meet the requirements of the tactical situation."

CHAPTER VII

RECOMMENDATIONS

A. GENERAL. The conclusions have generally shown that the Army commander can reasonably be assured of timely order of battle intelligence within 20 KM of the FEBA, and good target acquisition within 5 KM of the FEBA, degrading to a marginal capability at 20 KM as his resources are limited to UGS and Long Range Reconnaissance Patrols. His area of influence, current and planned operations extends to 60KM.

B. Increase Organic Army Capabilities to 60KM.

1. Requirements. Assuming the US Army will not be allocated high speed jet aircraft which are relatively survivable in the enemy air defense environment beyond the FEBA, reasonable requirements for extending the range of organic Army resources are limited to:

a. Increasing the density of Long Range Reconnaissance Patrols or Special Forces organic to the Corps.

In the conventional warfare scenario discussed herein, it is recommended that Special Forces personnel be specially trained and equipped for order of battle intelligence and target acquisition for the 175MM , the Lance, and the Pershing. It may prove desirable to attach these units to Corps Artillery with their target information flowing to the Arty Battlefield Information Center (BIC) in TACFIRE channels and thence to the Corps BICC. Long Range Reconnaissance Patrols must be attached with sufficient density to compensate for the loss of target acquisition capability from aerial sources.

b. Increasing SLAR survivability and/or range.

As the only all-weather image sensor capable of stand off surveillance, the development of SLAR should be focused on less restrictive flight profiles and increased effective range. If the OV-1 is to operate

in the Aggressor SAM environment, it appears axiomatic that it should be equipped with a major ECM package. If such material improvements are not cost-effective or feasible, the OV-1 will be limited to operations in a non-SAM environment.

c. Continue development of new long range systems. If organic Army capabilities are to be increased to 60 KM, a necessary requirement will be to continue development of cost-effective and survivable systems such as the Unattended Ground Sensor, Airborne radar systems, remotely piloted vehicles, etc.

2. Advantages. Advantages to increasing Army capabilities in the area from 20 KM to 60KM are primarily in the better responsiveness of organic systems to the needs of the ground force commander.

3. Disadvantages.

a. If the Army chooses to employ UGS, SF, and LRRP beyond the area of influence of the Corps, either the number of such agencies must be greatly fncreased to cover the area from 20KM to 60KM, or a reduced density from the FEBA to 20 KM must be tolerated. In consideration of the already marginal target acquisition capabilities beyond 5 KM of the FEBA, a further dilution in density is not appropriate.

b. Order of battle intelligence is the primary requirement beyond the area of influence. This information is most cost-effectively acquired by large area surveillance systems. The relatively short range of most ground systems require massive emplacement to cover the entire battlefield area, and as such appear to represent a sizeable investment. Improvement of

the SLAR and other feasible long range systems is also a major disadvantage from the standpoint of developmental costs.

C. MODIFY USA/USAF DOCTRINAL PROCEDURES.

1. Requirements. This alternative assumes that the US Army will primarily concentrate its efforts in the area from the FEBA to 20 KM and the USAF will be responsible for the area from 20 KM to 60 KM and beyond. To maximize the responsiveness of existing USAF capabilities, certain doctrinal and procedural changes are recommended:

a. Direction.

(1) Continuous Surveillance SOP. Existing procedures for tasking USAF are predicated on specific reconnaissance requests when missions are beyond the capabilities of organic Army assets. It is recommended that continuous surveillance of the battlefield from 20 KM to 60KM forward of the FEBA be directed to be performed by USAF Tactical Reconnaissance forces in any operation with a normal enemy air defense posture.

(2) Searches vice Covers. Visual searches of enemy avenues of approach should be used wherever possible in lieu of area and route covers. These searches may be accompanied by imagery of targets detected by the aircrew. Although searches do not provide imagery of large areas for detection of targets, they are immediately responsive, are capable of continuing surveillance without the necessity to return for film, and do not require time-consuming processing of imagery.

(3) Request appropriate Scale or Ground Resolution. If Area or Route Covers are required, it is recommended that the scale requirement be only that necessary to accomplish the interpretation task of the specific tactical situation. Target Interpretation tasks are specified as Detection, General Identification, Precise Identification, Description, and Analysis. Generally the ground resolution requirement for simple detection of a target is from 50 -1000 % greater than that required for various tasks of identification and description.[49] Simply speaking, this means that in any given area with any given sensor, from 50-1000% more flight lines must be flown, and from 50-1000% more film must be processed and interpreted to provide additional information about a target beyond simple detection. For instance, the ground resolution requirement for detection of vehicles is 5 FT, for general identification (tracked versus wheeled), 2 FT; precise identification (APC versus Tank), 1 FT. If the commander is interested in detecting changes in the disposition of a known enemy unit, "detection" of the number of vehicles moving on the roads near the unit may be sufficient, since identification of the unit may be implied. Unless very close scrutiny is applied to the reconnaissance request to insure that the direction of USAF reaources does not mandate"precise identification", the RF4C aircrew will have to spend five times as long in the target area, the film will require five times as long to process, and the report will be substantially delayed.

---

[48] Reconnaissance Reference Manual op. cit., p. 107

b. Processing/Dissemination. As described in Chapter IV, there are two separate "channels" for dissemination of tactical information collected by USAF Tactical Reconnaissance. The first consists of communications elements of the TACS and/or the Tactical Air Request net. The second consists of the Military Intelligence Battalion for Air Reconnaissance Support (MIBARS), located on the USAF airbase.

(1) Dedicate special UHF and HF channels for Visual Reconnaissance Reporting.

Presently voice reports made by the USAF aircrews are relayed through elements of the TACS in USAF channels. It is recommended that special frequencies be allocated for Tactical Reconnaissance reporting directly to the DASC at the Corps level. It further recommended that these be secure links and that the Army allocate sufficient intelligence personnel to monitor and record the information upon receipt. This procedure was done on occasion by the 45th Tactical Reconnaissance Squadron and others during the SEA conflict; however, it is not doctrinally clear in either USAF or Army publications.

(2) Colocate MIBARS interpreters in the USAF Photo Processing and Interpretation Facility (PPIF).

Although doctrine states that the MIBARS personnel will be located on the USAF base, it is unclear as to the actual working areas of the interpreters. In actual practice, a duplicate negative is made by the PPIF and delivered to the MIBARS. Although an initial report may be made by USAF interpreters, it may not be responsive to the Army commanders needs. Thus the duplicate negative is once again viewed by MIBARS interpreters. It is strongly recommended that Army interpreters of the MIBARS be located in the PPIF and view the film simultaneously with USAF interpreters.[49]

---

[49] There are additional benefits beyond timeliness for this recommendation. The duplicate negative delivered to the Army is of

(3) Insure communications directly from the PPIF. Communications from the MIBARS interpreter in the PPIF must be established directly to Army G-2 channels. In actual practice, this requirement is often overlooked even for the USAF interpreters, necessitating physical delivery of the interpretation report to a transmission facility.

2. Advantages. Advantages to increasing USAF responsiveness and employing USAF Tactical Reconnaissance for surveillance of the battlefield beyon 20 KM are:

a. Wide Area Surveillance. A single high-speed aircraft may be employed to cover the entire Corps area of interest from 20KM to 60KM across a typical front of 60 KM. Using primarily visual reconnaissance techniques and in-flight refueling, relatively few sorties are required to accomplish the mission on a continuing basis.

b. Responsiveness to Specific requests. The mobility of the high speed aircraft vice ground systems provides the commander the flexibility to request specific reconnaissance of likely target areas as they are generated from other intelligence sources.

3. Disadvantages. Disadvantages of using the existing USAF Tactical Reconnaissance capabilities are primarily due to dichotomy existing between information and timeliness. That is, it is possible to acquire timely order of battle information from visual searches; however, target acquisition to the accuracies required for unobserved fires is only possible from imagery covers which presently require upwards of 3 hours to process, and are substantially less survivable.

C. INTEGRATE THE QUICK STRIKE RECONNAISSANCE SYSTEM WITH THE CORPS BATTLEFIELD INFORMATION CONTROL CENTER.

1. Requirements. In order to integrate the capabilities of the developmental Quick Strike Reconnaissance system with the Army Battlefield Information Control Center, there are numerous problem areas which must be overcome by technology or procedures.

a. Echelon. . It is assumed that the integration can be made with the Corps BICC/BIC from either the Forward Reconnaissance Reporting Post (FRRP), the USAF Tactical Air Control Center (TACC), the USAF Control and Reporting Center (CRC), or the conceptual USAF All Sensor Reporting Post (ASRP) or a derivative thereof. See Figure 12 (TACS, Tactical Air Control System, includes both the TACC and the CRC. The ASRP will function in approximately same manner as the CRC for reporting of ground targets vice air targets.)

(1) Integration at the FRRP would require placing a MIBARS intelligence officer with the USAF interpreters in the unit itself. The actual location of the FRRP may vary from colocation with a Forward Air Control Post (FACP) in the Division rear area to colocation with other elements of the TACS back to the TACC. Line of sight range must be insured between the sensor aircraft or its relay. This range may vary from approximately 60 KM operating at low altitude without a rely to well over 300 KM operating with a relay. A MIBARS intelligence officer familiar with imagery interpretation is recommended because of the judgmental nature of the information which is to be passed to the BICC. Certain targets discovered by the QSR aircrew may be of little significance to the Army and would serve to clutter the system; whereas, others may be of significant value to the Army and not the USAF.

(2) Integration at the CRC is also technically feasible. In this concept, all targets would be passed to the CRC and then an appropriate decision would be required as to further dissemination to the Army G-2 according to the location or significance of the target within the Corps area of interest. Although initial receipt of the Tactical Digital Information Link (TADIL) targeting information is received, decoded and displayed at the USAF CRC in the present system, the CRC is primarily concerned with control of the air battle. Thus the integration of Army intelligence personnel in this facility would be antithetical to USAF doctrine.

(3) Integration at the TACC is also technically feasible. In this concept, all targets would be received by the CRC, processed and stored in the computers of the 407L. A repeater scope for display of only the alpha-numeric information concerning the target description, and precise location would be displayed in the TACC for viewing of the USAF and Army intelligence personnel.

(4) The All Sensor Reporting Post (ASRP) is a conceptual USAF facility which will process inputs from the FRRP as well as other organic USAF sensors and real time systems. The ASRP system will use 407L data processing equipment and TADIL, or a variation thereof. It will thus be capable of reformatting and/or retransmitting the TADIL messages to the Army BICC. It is recommended that the Army intelligence officer be integrated at the ASRP in the future system.

b. Communications.

(1) TADIL Integration. The TADIL message leaves the existing FRRP through the TRC 97 troposcatter transmission system. Installation of a TRC 97 system at the BICC will provide for the reception of the TADIL message. Installation of a standard USAF modulator/demodulator (MODEM) will provide for transformation into a format suitable for data processing, and purchase of a commercial programmable mini-computer and display will provide for processing and display of purely alphanumeric messages.. The 407L CRC also has the capability for positional display and targetting. This function cannot be included in the BICC without inclusion of additional ADP equipment. (See Figure)

(2) TACFIRE Integration. In this concept, an Army MIBARS intelligence officer is provided a TACFIRE entry device and stationed in the FRRP. The TACFIRE message is transmitted to the Corps Artillery BIC for target acquistion and thence to the Corps BICC/BIC for integration with other information into the enemy order of battle.

(3) Verbal or Teletype Integration. In this concept, the MIBARS intelligence officer is provided a secure link from either the FRRP, CRC, TACC, or the ASRP. Although this is perhaps the cheapest alternative, a certain amount of degradation in the system must be tolerated because of the time and accuracy required in transformation of the existing message.

c. Compatible Targetting/Plotting. The TADIL message emanating from the FRRP is in two parts. The first message which drives the displays of the CRC 407L will not be used by the BICC. The second message contains a limited description of the target and its position in Latitude/Longitude. Modifications to the program of the mini-computer could be expected to provide the same information in LORAN, GEOREF, or ohter grid systems. Targets are numbered from the FRRP in sequential order. Coordination is required between Army G-2 and USAF intelligence personnel to provide a commnon grid and target numbering system.

2. Advantages/Disadvantages. The foremost advantage of the alternative concerned with integrating the QSR system with the BICC is that the targeting information flowing into the system has been greatly incresed by the detection devices on-board the QSR aircraft,i.e. MTI, ELINT, etc., and that the targets detected by the aircrew can be precisely plotted from transmitted imagery to an accuracy compatible with unobserved fires. The timeliness of the information can provide for rapid maneuver or fires. Additionally this alternative shares the advantages discussed in paragraph C 2; that is, it provides the capability of continuing surveillance without the requirement to return for film replenishment and processing, and it is responsive to specific requests. The disadvantage is the increased costs involved in equipping sufficient aircraft with the operational capability. There are presently four operational Compass Sight aircraft with an image transmission system. It is recommended that these aircraft be equipped with the additional detection capability required and employed as a QSR detachment in support of a Corps operation.

E. SUMMARY. From the standpoint of cost effectiveness and mission requirements, consideration of the alternatives yields the following final recommendations.

1. The Army retain primary responsibility for surveillance of the battlefield to 20 KM, and secondary responsibility to 60 KM.

2. The Army increase the density of Long Range Reconnaissance Patrols organic to the Corps and process their information through Corps Arty channels to the Corps BICC/BIC.

3. The Army attach Special Forces elements to Corps Arty for operations from 10 KM to 60 KM beyond the FEBA. These units would be used for target acquisition beyond the area of influence of the division and within the area of influence of Corps 175MM and Lance. Target Acquisition should flow to Corps Arty BIC and thence to Corps BICC/BIC.

4. The Army continue development on UGS and other long range survivable sensors with priority to their use within 20 KM and secondary emphasis to 60 KM.

5. The Army task USAF Tactical Reconnaissance for continuous surveillance of the battlefield from 20 KM to 60 KM.

6. The Army direct surveillance with priority to visual route and area <u>searches</u> whenever possible. Area and route <u>covers</u> should be used only when other sources have indicated probability of enemy activity in the area.

7. When Area or Route Covers are required, the Army request the minimum scale or ground resolution required for <u>detection</u> of typical tactical targets. (Vehicles 5 ft., Rockets and Artillery 3 ft.)

8. The Army and USAF dedicate special UHF and HF channels directly to USAF intelligence and Army G-2 facilities. These channels should be secure and reserved for reconnaissance/surveillance reporting.

9. The Army and USAF coordinate to insure that MIBARS interpreters are located in the PPIF, view and interpret film simultaneously with USAF interpreters.

10. The USAF equip the four Compass Sight aircraft with additional detection devices in accordance with the Quick Strike Reconnaissance configuration.

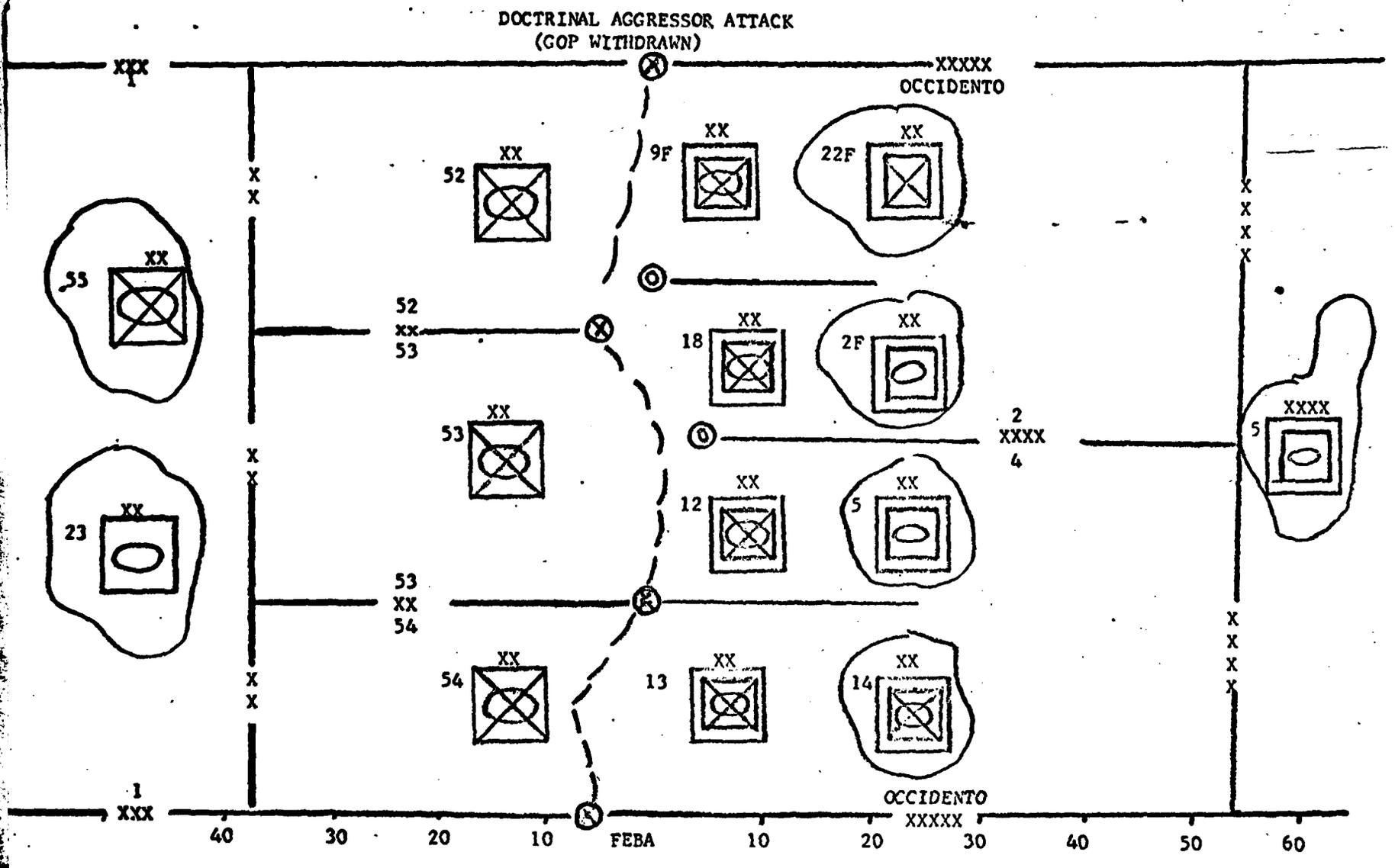
11. The USAF increase training in visual reconnaissance/surveillance procedures and techniques.

12. To provide continuous surveillance as required, the USAF conduct visual searches with conventional aircraft during daylight hours and use QSR equipped aircraft for night surveillance--both using air-refueling when available.

13. The Army and USAF coordinate to attach a MIBARS intelligence officer to the Forward Reconnaissance Reporting Post.

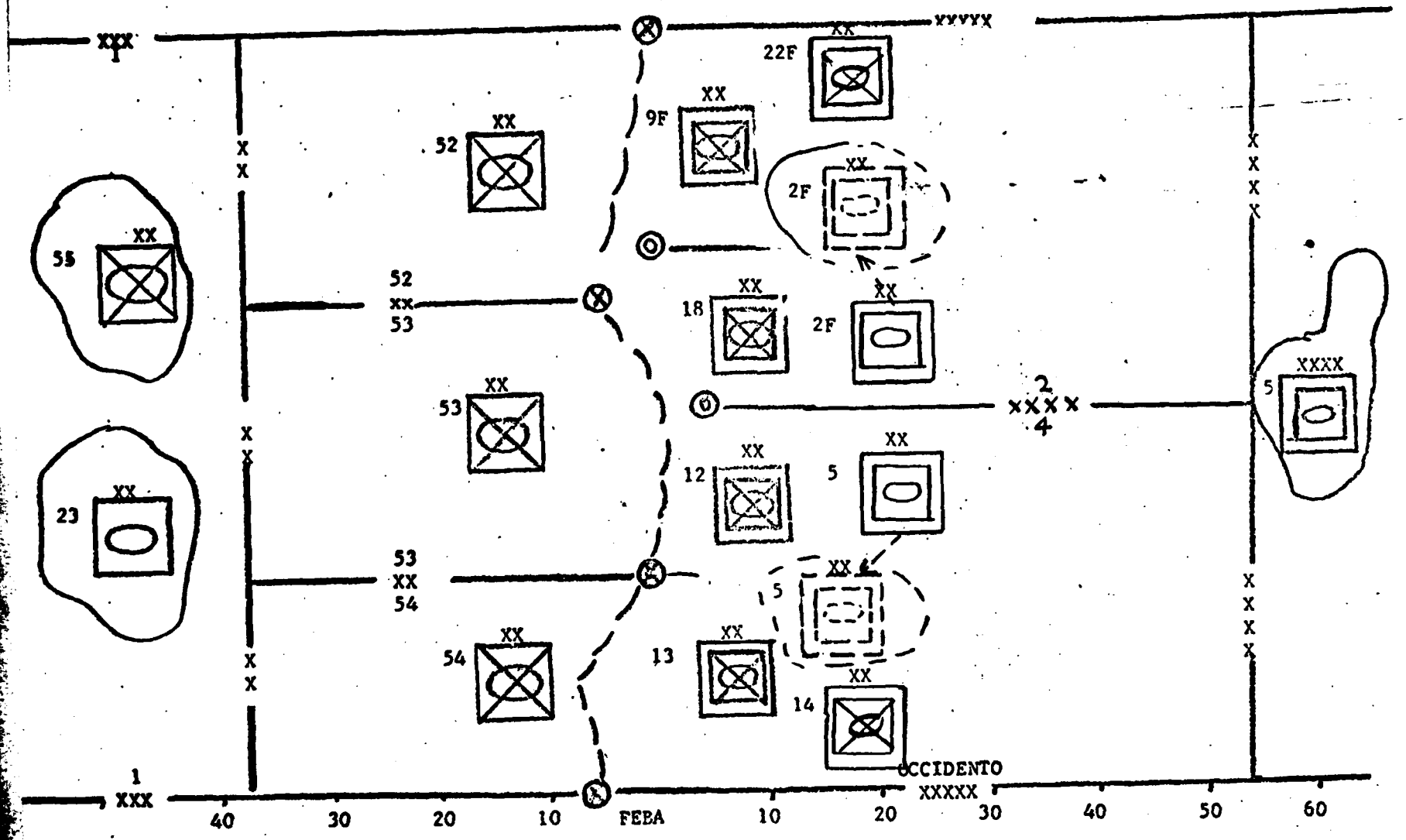
14. The Army obtain a TRC-97, MODEM, and commerical mini-computer/display with USAF software to integrate with TADIL into the existing Corps G-2 Air or future BICC intelligence channels. If this alternative is infeasible, the Army alllocate a TACFIRE digital message encoder to the MIBARS officer in the FRRP. Target acquisition should be transmitted to the Corps BIC and thence to the BICC.

15. The USAF and Army coordinate to exercise the concept of continuous surveillance of the battlefield utilizing all available capabilities of visual reconnaissance, processed imagery, and Quick Strike Reconnaissance.



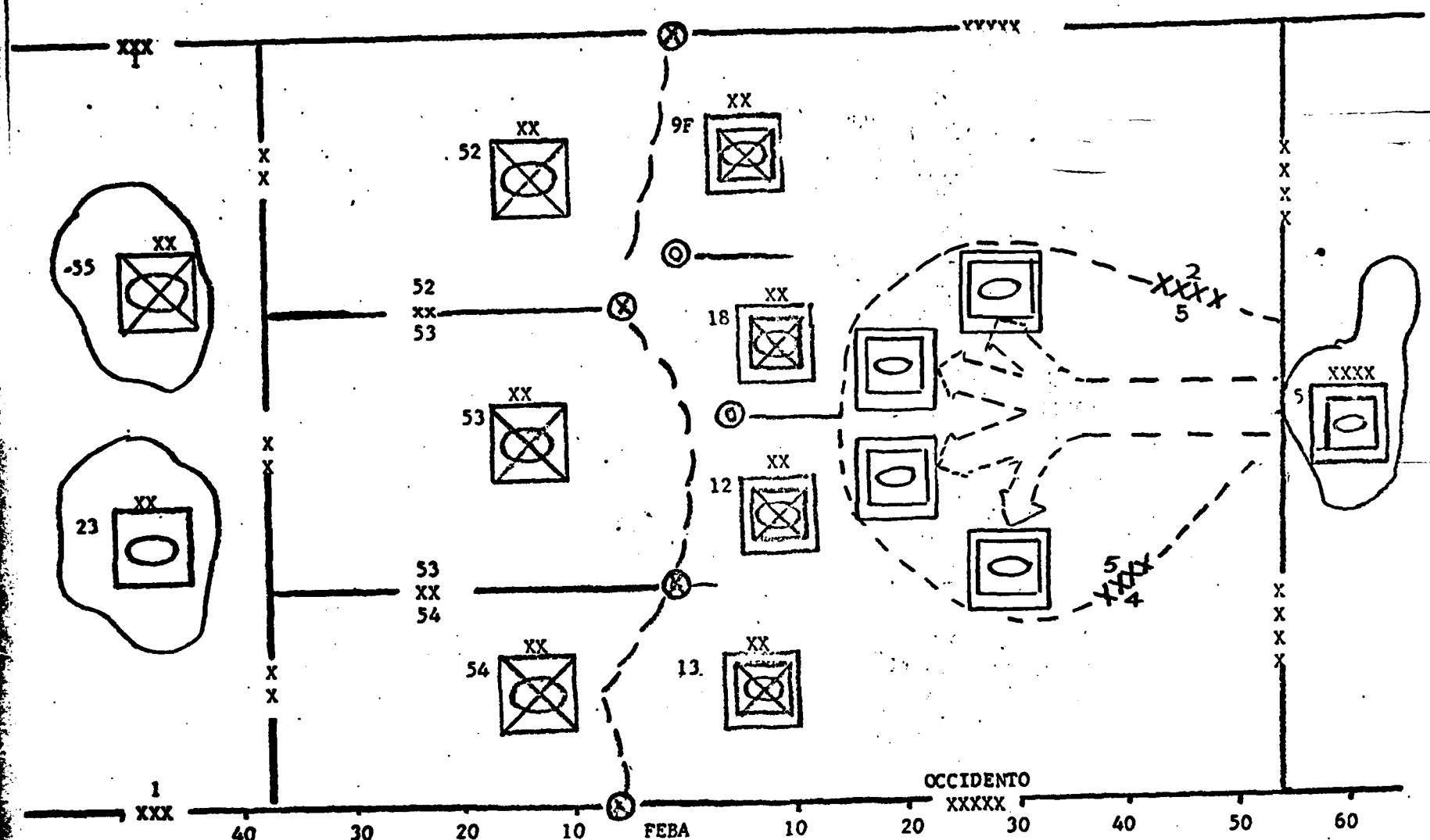
APPENDIX A TAB 1

CHANGE IN DISPOSITION IN TWO HOURS



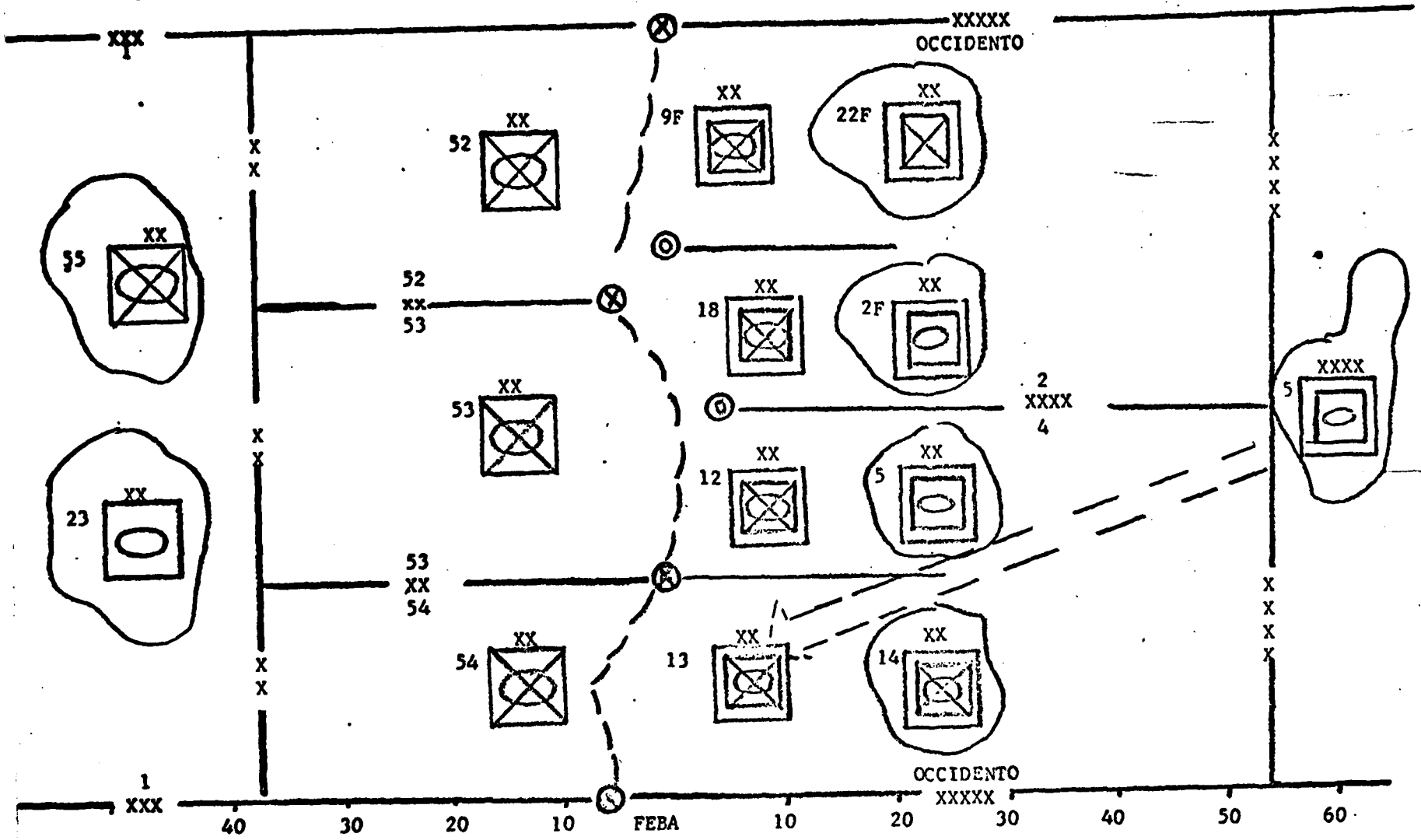
APPENDIX A - TAB 2

CHANGE IN COMPOSITION IN 5.5 HOURS



APPENDIX A-TAB 3

BATTALION SIZED REINFORCEMENT OF STRENGTH IN 1.9 HOURS



APPENDIX A --TAB 4

APPENDIX A -- TAB 5

CHANGE IN ORDER OF BATTLE IN 5.5 HOURS

APPENDIX A = 4 MTZ Div. in Contact ----------> 4 MTZ, 2 Tank in Contact
2 MTZ, 2 Tank in Reserve 2 MTZ, 4 Tank in Reserve