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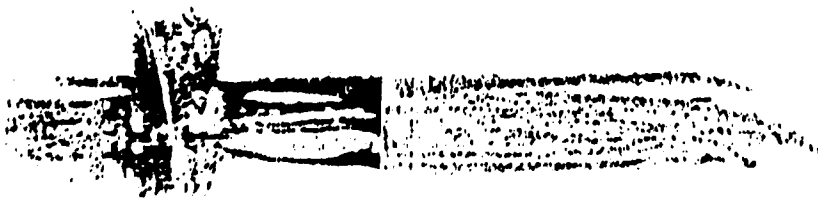
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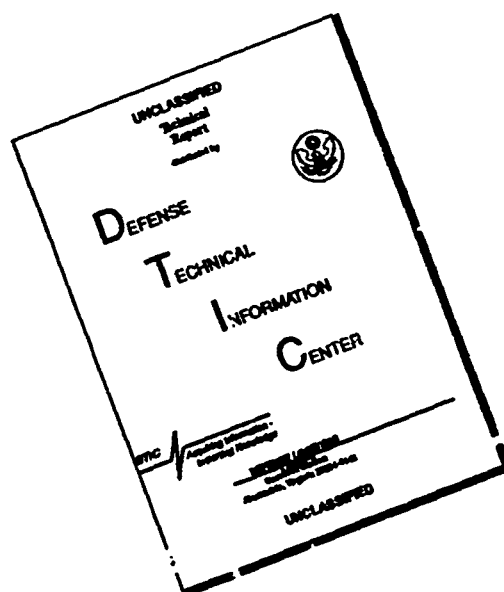
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ARMY CONCEPT TEAM IN VIETNAM
APO San Francisco 96243

ARMED HELICOPTER
RECONNAISSANCE AND
AREA SURVEILLANCE (U)

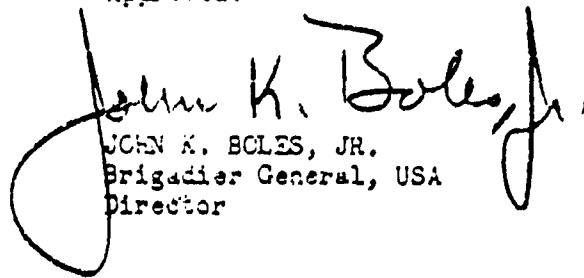
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JOINT RESEARCH AND TEST ACTIVITY
Office of the Director
APO 143
San Francisco, California

REPORT EVALUATION BY DIRECTOR,
JRATA

The conclusions and recommendations of the report are substantiated by the operational documentation and are concurred in by this headquarters. The report provides a valid assessment of the armed helicopter when performing aerial reconnaissance and area surveillance in the insurgent environment of Vietnam. The armed helicopter provided the Army of the Republic of Vietnam with an effective means of collecting and reporting combat information in time to permit appropriate combat action. Though this mission required considerable exposure to enemy ground fire, the armed helicopters received few hits. Late arrival of camera equipment precluded an evaluation of the capability of the armed helicopter to provide photographic intelligence. The excellent photography which was obtained on a limited number of missions, however, gives strong indication of a potential in this area. The concept of obtaining photographic reconnaissance by armed helicopters, including the photographic processing, developing and extracting of combat intelligence from the resulting photographs should be further evaluated.

Approved:


JOHN K. BOLES, JR.
Brigadier General, USA
Director

15 January 1963

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ARMY CONCEPT TEAM IN VIETNAM
APO San Francisco 96243

FINAL REPORT

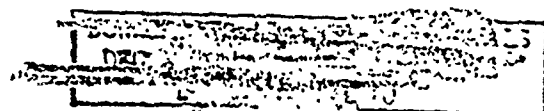
**ARMED HELICOPTER RECONNAISSANCE
AND AREA SURVEILLANCE (U)**

JEATA Project No. 1C-201.2

15 January 1965

Approved:

Paul L. Boggi
PAUL L. BOGGI
Colonel, Ar. or
Chief



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AUTHORITY

Letter, AGAM-P(M) (17 July 64) ACSFOR,
MA, 31 July 64, subject: Army Troop
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CINCPAC Msg 120 DTC 030426Z March 1964.

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the US Army Support Command, Vietnam,
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The Team is indebted to US advisors of the
Republic of Vietnam 5th and 7th Divisions
and to the officers and men of those
divisions.

Finally the team acknowledges the whole-
hearted assistance and cooperation of
personnel of the following US Army avia-
tion units, without whose unstinting
efforts the evaluation could not have
been completed:

Utility Tactical Transport Helicopter
Company (now the 68th Airmobile Company)

118th Airmobile Company (Light)

120th Airmobile Company (Light)

PROJECT OFFICER

Lt Col Roy V. Hunter, Artillery

EVALUATORS

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Major Robert D. Craig, Infantry

Major Robert O. Evins, Infantry

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I (C) PREFACE

A. ABSTRACT

From 10 April to 8 August 1964 the Army Concept Team in Vietnam (ACTIV) conducted an evaluation of the capability of an armed helicopter company and the armed platoons of airmobile companies (light) to provide effective aerial reconnaissance and area surveillance during counter-insurgency operations in the Republic of Vietnam (RVN).

Data upon which the evaluation is based were developed from operations by two Army of the Republic of Vietnam (ARVN) divisions and three US Army aviation units. The ARVN divisions were the 5th and 7th Divisions. The aviation units were the Utility Tactical Transport Helicopter Company (now the 68th Airmobile Company) with 20 assigned UH-1B armed helicopters, and the 118th and 120th Airmobile Companies (light). In the airmobile companies, only the armed platoon (eight armed UH-1B's in each company) flew reconnaissance and area surveillance missions. Armed helicopters of these units performed 45 combat reconnaissance and area surveillance missions in support of the two ARVN divisions. These missions involved 348 hours of flight time, of which 266 hours were flown in the objective area. The terrain within the areas of the selected ARVN divisions included mountain, plateau, jungle, and delta. No mission was conducted solely for the purpose of generating evaluation data. Only those missions in support of the two designated ARVN divisions were used as sources of data.

The evaluation revealed that the armed helicopter can be used as a vehicle to obtain and report intelligence information rapidly, and that survivability of armed helicopters is excellent when performing aerial reconnaissance and area surveillance in an insurgent environment such as Vietnam.

B. OBJECTIVES AND METHODS

1. Objective 1 - Support Provided to the Intelligence System of ARVN

Document the aerial reconnaissance and area surveillance support which the Utility Tactical Transport Helicopter Company (UTTHCO) and armed platoons of airmobile companies (light) (with expedient modifications) provided to a segment of the intelligence system of selected combat elements of ARVN.

The method for meeting objective 1 was that of recording the support provided on a request basis, and by whom and when the support was provided.

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Objective 2 - Timeliness Obtain and Provide Timely Information

Describe the capability of the armed helicopter with assigned crew to obtain and provide timely information to selected combat units of ARVN.

Methods for meeting objective 2 were:

- 1) Opinion poll of division G2 US advisors of timeliness of intelligence information on a mission basis
- 2) Recording of mission elapsed time and information provided on a mission basis

3. Objective 3 - Techniques of Maneuver and Detection Methods

Describe the techniques of maneuver and the detection methods used by the armed helicopter crews in the conduct of aerial reconnaissance and area surveillance missions in support of selected units of ARVN.

The method for meeting objective 3 was that of questioning aviators on techniques and methods used after each mission.

Evaluators accompanied helicopter crews on selected missions to observe techniques and methods employed by armed helicopter units.

4. Objective 4 - Survivability

Document the survivability of the armed helicopter in the aerial reconnaissance and area surveillance role in support of selected ARVN units.

The method used for meeting objective 4 was that of recording damage sustained, personnel killed in action (KIA), wounded in action (WIA), and aircraft forced down as a result of enemy fire.

C. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

In a counterinsurgency environment, the armed helicopter with compatible air-to-ground communications is a responsive and effective means for augmenting the capabilities of agencies engaged in collecting and reporting intelligence information.

In Vietnam, the capabilities of the armed helicopter in the reconnaissance and surveillance role should be further exploited.

When the airmobile company (light) is organized with an armed helicopter platoon the mission statement in TOE 1-77E should be expanded to include the following: "To provide aerial reconnaissance of the immediate battle area."

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II (C) INTRODUCTION

A. PURPOSE

Evaluate the capability of an armed helicopter company and the armed platoons of the airmobile companies (light) to provide effective reconnaissance and area surveillance under the counterinsurgency conditions in the Republic of Vietnam (RVN).

B. BACKGROUND

In July 1962, the Utility Tactical Transport Helicopter Company (UTTHCO) (an armed helicopter company) was activated in Okinawa and deployed to Thailand for 90 days. In September 1962, the UTTHCO was deployed to the RVN from Thailand. The UTTHCO mission in Thailand was to provide air transportation for movement of combat troops in forward areas of the combat zone. Upon its arrival in Vietnam it assumed a new role of providing close-in armed protection for unarmed troop transport helicopters. Combat damage to these unarmed helicopters had been increasing as more insurgent small arms fire was received in the landing zones. The armed helicopters were employed to seek out, engage, and neutralize the sources of enemy ground fire.

By early spring of 1963, combat experience had shown a need to increase aerial reconnaissance and area surveillance operations in support of the Army of the Republic of Vietnam (ARVN). Timely and accurate intelligence information concerning activities of insurgent forces is essential in order to restrict their movement and inhibit their ability to mass troops for attacks and ambushes.

The armed helicopter, with its excellent visibility, a 0 to 100 knots speed range, and vertical flight capability, appeared well-suited for meeting certain aerial reconnaissance and area surveillance requirements in the counterinsurgency environment of Vietnam.

A plan to evaluate the capability of an armed helicopter company (UTTHCO) to provide effective aerial reconnaissance and area surveillance under counterinsurgency conditions was submitted in July 1963. As finally approved by CINCPAC, the plan included the armed platoons of airmobile companies as well as the UTTHCO.

The aviation units selected for the evaluation were:

- 1) The UTTHCO, which was stationed at Tan Son Nhut Air Base, Saigon. The company operated throughout the II, III, and IV ARVN Corps

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areas, and was equipped with 20 armed UH-1B helicopters. It was redesignated the 68th Airmobile Company on 15 August 1964.

- 2) The 33d Transportation Company, which arrived in the RVN in September 1962. In October 1963, the unit was redesignated the 118th Airmobile Company (Light) and organized with one armed platoon and two transport platoons. The unit was stationed at Bien Hoa and operated primarily in the plateau, delta and mountain areas of III ARVN Corps.
- 3) The 57th Transportation Company, which arrived in the RVN in December 1961. In June 1963, the unit was redesignated the 120th Airmobile Company (Light), but was equipped with CH-21C helicopters until June 1964 when the CH-21C was replaced with UH-1B helicopters. The company was stationed at Tan Son Nhut Air Base, Saigon and operated primarily in the delta region south of Saigon in support of the 7th ARVN Division.

In view of the reorganization of units and the use of substitute aircraft it was not considered feasible to evaluate the aspects of personnel, equipment, and logistics. It is contemplated that these factors will be evaluated in ACTIV's project, "Evaluation of Army Aviation TCE's in Counterinsurgency Operations."

The evaluation was initiated 10 April 1964 and the field phase was terminated 7 August 1964.

C. SCOPE

1. Definition of Project

The evaluation concentrated on the following major areas:

- a) The capabilities of the UTTHCO and armed platoons of selected airmobile companies to support an aerial reconnaissance and area surveillance effort
- b) The capability of the armed helicopters with assigned crew to obtain and provide timely intelligence information
- c) The techniques of maneuver and the detection methods used in conducting aerial reconnaissance and area surveillance
- d) The survivability of armed helicopters in the aerial reconnaissance and area surveillance role

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2. Extent of Project

a. Physical Environment

(1) Area

The 5th and 7th ARVN Division tactical areas were selected because they contain most of the different types of terrain and cover found within the RVN. The two divisions occupy an area northwest and southwest of Saigon. Both division areas border Cambodia. See figure 1.

(2) Terrain

Except for a few isolated terrain features the northwest portion of the evaluation area consists of rolling terrain which varies as much as 1000 feet in height. Some of the ground cover in this area consists of original growth of evergreen forests with unbroken canopies. Other portions of the areas are covered by secondary broadleaf forests with broken canopies and abundant undergrowth. Much of the coastal area of the 7th Division area consists of mangrove swamp and saltwater marshland in which tall tropical grass usually grows. Southern Binh Duong Province and the land south and southwest of this area is delta land. The terrain is flat and averages ten feet above sea level. Heavy vegetation is found along the waterways and in and around the settlements. Parts of Kien Tuong Province and the Plain of Reeds area are covered by tropical grasses well above ten feet tall and in the rainy season are covered with water more than ten feet deep.

(3) Weather and Climate

The climate in the evaluation area is hot and humid with a yearly mean temperature of about 81 degrees Fahrenheit. The monsoons, blowing generally from the southwest in the summer and from the northeast in winter, profoundly influence the climate and rainfall. However, the velocity and direction of the wind, as well as the amount and timing of the rainfall, vary considerably from place to place because of the differences in latitude and altitude. The warm climate and heavy rainfall favor the rapid growth of vegetation in all parts of the area.

b. Human Environment

(1) Population

1st Corps (ARVN)

2nd Division (ARVN)

3rd Division (ARVN)

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- d) Utility Tactical Transport Helicopter Company (US)
(now the 68th Airmobile Company)
- e) 118th Airmobile Company (Lt) (US)
- f) 120th Airmobile Company (Lt) (US) The armed platoon
was organized on 21 June 1964.

(2) Equipment

The principle items of equipment involved in the evaluation were the UH-1B utility helicopters equipped with the M-6 armament subsystem (four 7.62mm guns) and the 2.75-inch rocket subsystem. Auxiliary items of equipment used were the Kenyon stabilizer and the P-2 sequence camera described in annexes D and E.

(3) Tactics

The tactics employed by the aviation companies conducting aerial reconnaissance and area surveillance were those selected by the platoon or fire team leader responsible for the mission. Techniques of maneuver are discussed in annex C.

(4) Troop Missions

(a) UTTHCO:¹

- 1) To provide armed helicopter escort of movement of troops and supplies.
- 2) To provide tactical air movement of combat troops in airmobile operations.
- 3) To provide aerial reconnaissance of the immediate battle area.
- 4) To provide helicopter lift for troops conducting raid operations and armed helicopter escort of those helicopters used to lift the troops engaged in these raid operations.
- 5) To provide tactical air movement of combat supplies and equipment within the combat zone.

¹ Table of Distribution Fr-8500-CO, Department of the Army, 15 April 1963, with change 5.

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(b) 118th and 120th Airmobile Companies (light):²

- 1) To provide tactical air movement of combat troops in airmobile operations
- 2) To provide tactical air movement of combat supplies and equipment within the division area.
- 3) To provide supplemental aerial fire support to maneuver elements of the division.

(5) Sociological Elements

The following is summarized from US Army handbooks.³

The Republic of Vietnam has a population of approximately 14.6 million people which are largely concentrated in the eastern coastal plain, the Mekong Delta plain, and the many cities, towns, and villages of these areas. The highland region which comprises more than half of the total of South Vietnam is very sparsely populated.

South Vietnam has an average population density of 236 per square mile. About 10 percent of the people reside in urban areas. The other 90 percent live on the 13 percent of the land that is best suited for rice cultivation: the delta and the small river basins in the central lowlands. Population density ranges from 2,000 per square mile in the province of Quang Nam (in the north) which includes the important city of Da Nang, to 13 persons per square mile in Quang Duc Province in the plateau area of the Chaine Annamitique. The Mekong Delta area, comprising approximately 26,200 square miles, has a population density of 522 per square mile. The delta is heavily populated along the rivers and canals which crisscross it, but in many areas where the soil is less fertile, it is sparsely settled.

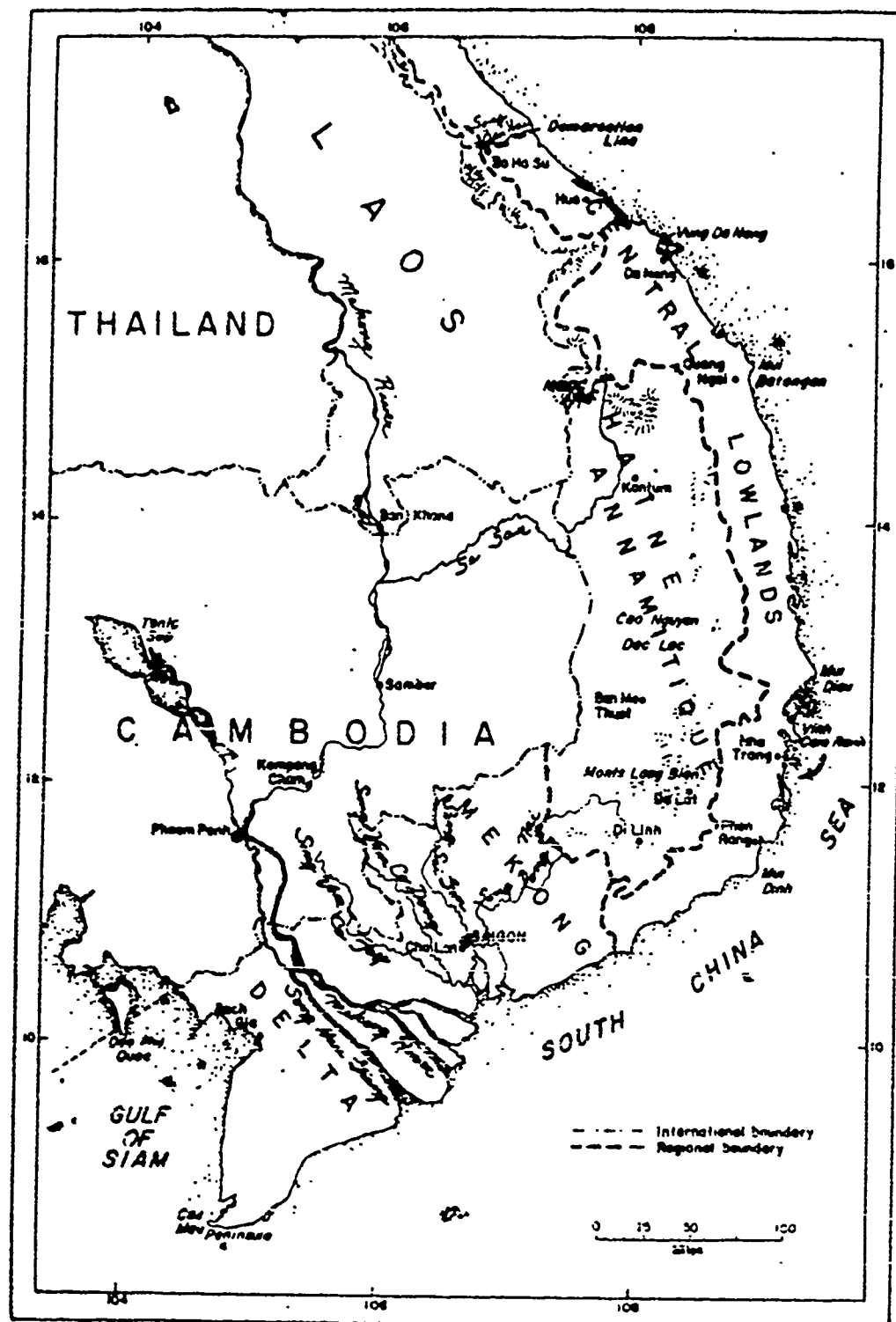
The portion of the Chaine Annamitique lying within South Vietnam has an area of 18,000 square miles and a population of only 584,000 people. These people are members of scattered mountain tribes that subsist on hunting, fishing, and slash-tree farming. The extensive forests and rich soils of the area could support a much larger population, but the high prevalence of malaria has curtailed settlement. See figure 2.

The Fifth Division area is comprised of Tay Ninh, Binh Duong and Hau Nghia provinces, with a combined population of 678,919

² Table of Equipment and Organization 1-77E, Department of the Army, 15 July 1963.

³ US Army Handbook for Vietnam, Department of the Army, September 1962, and MAAG-Vietnam Handbook, "Tactics and Techniques of Counterinsurgency Operations" (U), revised 1 July 1963.

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(U) FIGURE 2. Geographical regions, Republic of Vietnam.

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people. Kien Tuong, Dinh Tuong, Kien Hoa, Go Cong and Long An provinces comprise the Seventh Division area, with a total population of 1,616,979. In both areas, population densities vary from 0 to 1000 per square mile.

In the Fifth Division area, the population is found, predominantly, in the larger cities and along the main roads and canals, while in the Seventh Division area, the population is much more evenly distributed over the entire region because of the fertility of the soil.

Vietnamese are the predominant ethnic concentration in the two division areas, although there are large numbers of Cambodians in Tay Ninh province and along the Cambodian border.

D. METHODOLOGY

1. Procedures

The pertinent factors of the intelligence cycle, from original request until delivery of the intelligence information by the aircraft commander, were recorded for each mission request.

The support requested and the support provided in terms of number of helicopters, total response times, and breakdown of missions by time, were documented. Evaluators' observations and interview of helicopter crew provided descriptions of techniques of maneuver, types of information obtained, and adequacy of communications. In addition, the recipients of the information made a judgment of the timeliness of information on a mission basis.

a. Data Collection Methods

The collection of data was confined to an investigation of four primary objectives: the nature of the reconnaissance and aerial surveillance support provided the ARVN intelligence system, the capability to obtain and provide timely information, the techniques of maneuver and detection procedures, and the survivability of aircraft while on reconnaissance missions. Specifically, the data collection employed four research devices:

- 1) Evaluators' observing and reporting reconnaissance missions
- 2) Description of reconnaissance missions based on after-action reports
- 3) Two questionnaires, designed to record the significant events of a mission from the initial request to the final debriefing at the ARVN division

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- 4) A ground-fire damage report (US Army Support Command, Vietnam Form 46)

b. Analysis Methods

The analysis was, essentially, an intensive study of the intelligence data collection system, from the ARVN or US advisor-initiated request, through the reconnaissance operation to its completion and the filing of the mission report. Analysis was concentrated on such factors as helicopter reaction times, tactics employed by helicopters, intelligence communication procedures, and timeliness and validity of the information reported. Ancillary to the study of reports, the examination of records, and the evaluation of US G2 advisors' opinions, a study of photographic detection was also made. Quantitative data, in the forms of reaction and mission times, as well as damage and survivability records were tabulated and the results summarized.

2. Limitations and Variables

The insurgent situation in Vietnam placed limitations on the types of data available and the collection effort that could be implemented. Certain limitations were imposed by Commander, US Military Assistance Command, Vietnam (COMUSMACV) in his letter, Evaluation of Armed Helicopter Reconnaissance and Area Surveillance, serial 0297, dated 31 March 1964. Paragraph 6 of inclosure 1, referenced letter, is quoted in part as follows:

- a. The UTTHCO and the airmobile companies will be placed in support of an ARVN division(s) as directed by corps senior advisor.
- b. Reconnaissance and surveillance missions will be flown as requested by the ARVN division commander with the concurrence of the division US senior advisor and in accordance with the existing rules of engagement.
- c. Helicopters will be employed in consonance with appropriate directives. The following rules of engagement will apply:
 - 1) All helicopters will display US markings.
 - 2) Helicopter armament subsystems are to be employed only defensively, to suppress insurgent fire directed against the helicopters.
 - 3) Each armed helicopter will carry an ARVN observer at all times when on an operational mission.

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- d. Test data will be collected during conduct of required operational missions. Missions will not be scheduled solely for the purpose of gathering test data.

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III (C) DISCUSSION

A. OBJECTIVE 1 - SUPPORT PROVIDED TO THE INTELLIGENCE SYSTEMS OF ARVN

Documentation of aerial reconnaissance and area surveillance missions performed by the armed helicopter company and airmobile companies was limited to those missions requested through formal ARVN and US advisory staff channels.

Requests for missions exclusively devoted to reconnaissance and area surveillance were relatively few in number. However, reconnaissance was performed as a part of many other missions. Reconnaissance operations performed by armed helicopters, but not covered in this report, included the following:

- a) Reconnaissance and area surveillance performed by a fire team while escorting the ARVN commander and US senior advisor control ship on airmobile operations
- b) Aerial reconnaissance performed by a reconnaissance element of two to four armed helicopters that preceded the transport elements by one to five minutes into a designated landing zone on airmobile assault operations
- c) Reconnaissance conducted by crews enroute to and from areas of operation

In addition to aerial reconnaissance and area surveillance missions, the airmobile companies performed combat assault, troop and passenger lift, aerial resupply, medical evacuation, captured Viet Cong evacuation, and command and control missions.

1. Request Procedures

The routes of flow for reconnaissance and area surveillance requests, from the initial request to the completed mission, are described below. Reconnaissance and surveillance planning was generally based on the essential elements of information and on ground commander's mission and concept of operation. The intelligence officer was responsible for aerial reconnaissance and considered the information requirements of subordinate elements as well as his own.

a. 5th ARVN Division

Requirements for reconnaissance and surveillance were normally generated by a command need for information at division, sector,

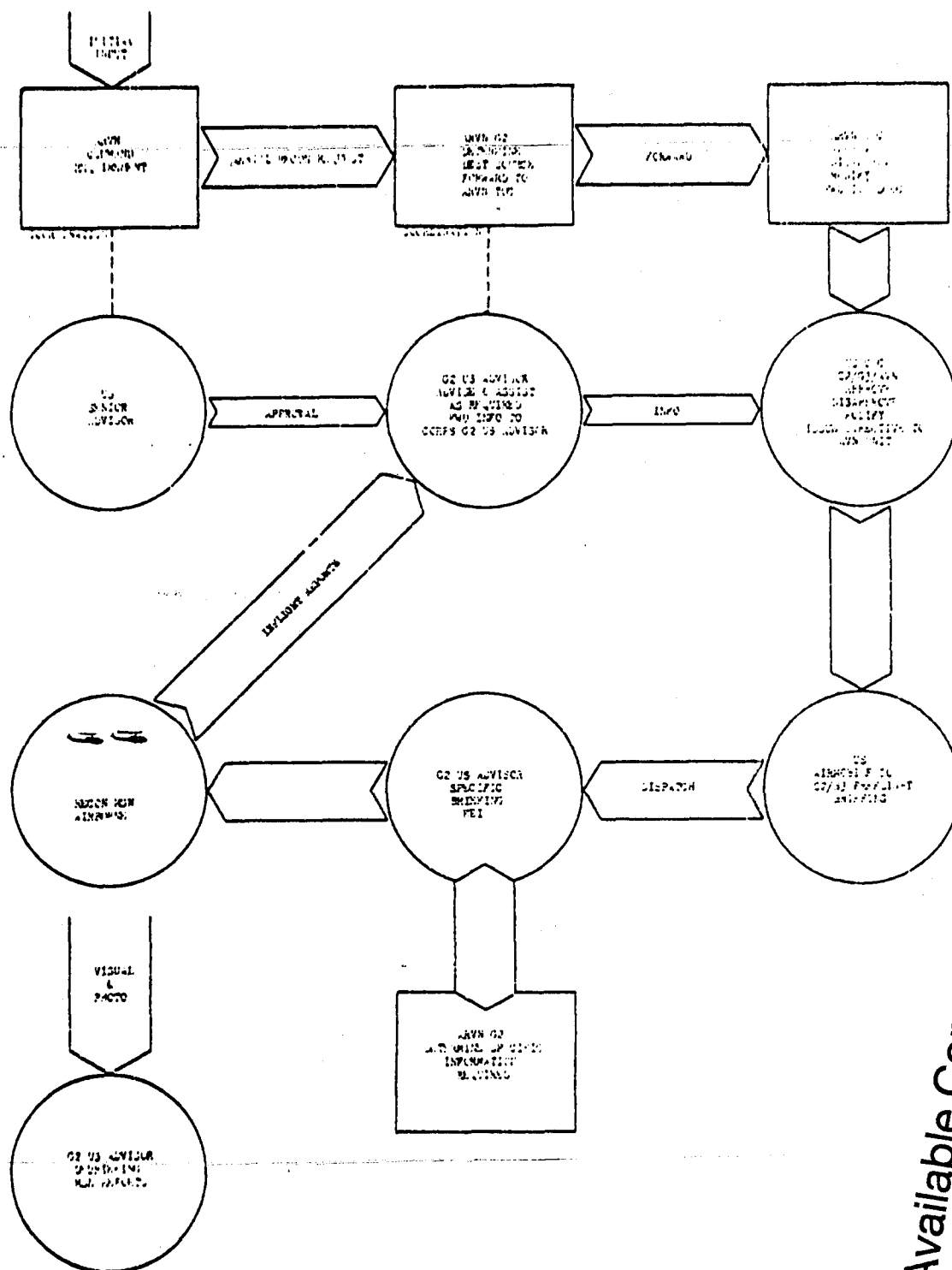
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brigade, or battalion level. The requirement was normally developed by the ARVN staff and coordinated with their US counterparts. When approved, the requirement passed to the next higher echelon of command as a mission request for aerial reconnaissance or area surveillance to be performed by armed helicopters. Upon receipt of a mission request from a subordinate unit (i.e., sector, battalion), the ARVN division intelligence officer processed the request within the division, obtaining command approval prior to assigning it a request number. The request was then coordinated with the division US senior advisor and forwarded to III ARVN Corps tactical operation center (TOC) for further approval.

Concurrently, similar staff action would be taking place in the parallel US advisory communication channels originating at the lowest level of assigned US advisors. The ARVN corps TOC coordinated the request with the corps US senior advisor's combat operation center (COC). The ARVN corps commander does not have any US Army aircraft under his operational control; he receives armed helicopter support from Army aviation units under the operational control of the corps US senior advisor. When aircraft were available and other missions did not take precedence, the request was approved by COC and assigned to one of the aviation units as a directed mission. Upon receipt of the mission, the aviation unit coordinated the mission with the supported ARVN unit. A preflight briefing was given to the armed helicopter crews, and they were dispatched to the supported unit for a specific briefing of the mission by the US advisor to the intelligence officer. The appointed aircraft mission commander took charge of the armed helicopters and performed the aerial reconnaissance or area surveillance mission. He made inflight reports on predetermined radio frequencies as required. At the end of the mission, the mission commander was debriefed either while airborne or upon his return to the supported unit. In either case, the mission was not considered complete until the originator of the initial request for aerial reconnaissance had received the information he requested. (See figure 3.) Of the 16 approved reconnaissance missions in support of the 5th Division during the evaluation period, three produced information that resulted in action by ground elements. In 13 cases no action was taken or considered necessary.

b. 7th ARVN Division

The 7th ARVN Division operated independently and was not under control of an ARVN corps during the period of the evaluation. This command arrangement permitted the US senior advisor to have direct approving authority for aerial reconnaissance or area surveillance missions flown in support of the 7th Division. Similar mission requests in support of the 5th ARVN Division had to be forwarded to the III Corps US senior advisor for approval. The request channel for aerial reconnaissance and area surveillance support was more direct for the 7th Division. This was for the 5th Division by virtue of having one less approval step. Therefore, the 7th ARVN Division request channel was generally



(U) FIGURE 3. 5th ARVN Division request channel.

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responsive to the ARVN command requirement than the 5th ARVN Division request channel. Further, an airmobile company was placed under operational control of the 7th ARVN Division US senior advisor. This provided the division with more flexibility and quicker response to initial information obtained from other intelligence gathering sources. The UTTHCO was in general support of the 7th ARVN Division.

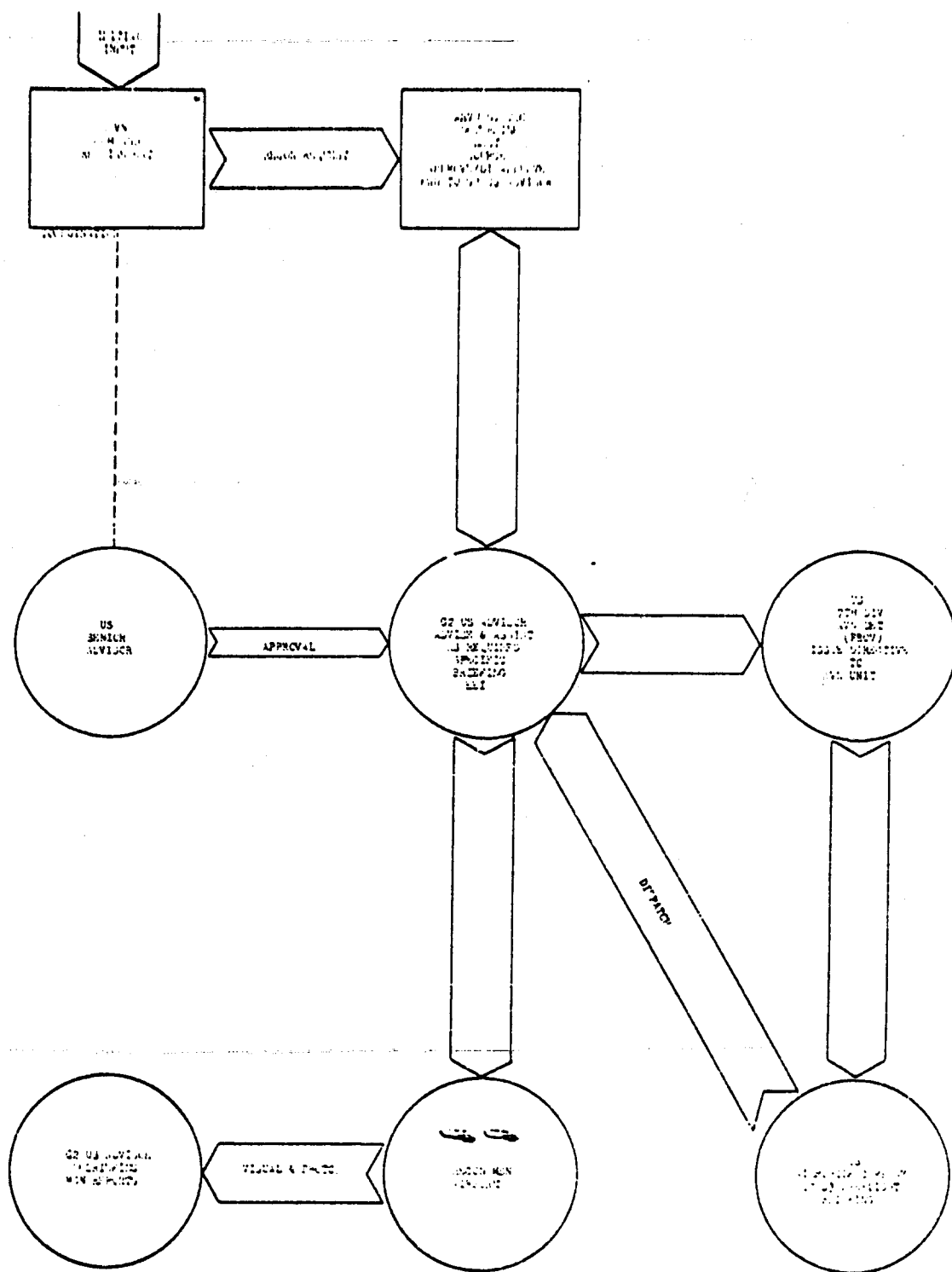
Regimental sector advisors submitted a weekly surveillance plan to the division G2 US advisor listing desired photography or observation/reconnaissance missions to be performed during the ensuing week. This plan was directed toward obtaining information of a relatively static nature, i.e., Viet Cong installations, safe areas, supply bases, terrain analysis, etc. In addition to the weekly surveillance plan, daily preplanned missions were submitted to the US G2 advisor. Missions were designed to obtain information of a transient nature such as location of newly occupied positions, troop movements, areas of contemplated operations, and to make damage assessments. Requests that were limited to missions that could not be preplanned and required immediate execution for desired results were submitted to the division TOC duty officer as required. When aircraft were available and other missions did not take precedence, the request was approved by the 7th Division Aviation Detachment and assigned to the 120th Airmobile Company or the UTTHCO as a directed mission. The appointed aircraft mission commander took charge of the armed helicopters and performed the aerial reconnaissance or area surveillance mission. In-flight reports were made on predetermined radio frequencies as required. At the end of the mission, the aircraft mission commander was debriefed either while airborne or when he returned to the supported unit. In either case the mission was not considered complete until the originator of the initial request had received the information he requested. (See figure 4.) As a result of 29 reconnaissance missions flown, the 7th Division initiated 3 eagle flights, 2 airmobile assaults, and 7 ground actions. One eagle flight and one ground action resulted from one aerial reconnaissance flight. From another flight, there resulted one airmobile assault and one ground action. In 19 cases no action was taken or considered necessary.

2. Mission Analysis

A total of 65 mission requests for aerial reconnaissance or area surveillance originated from the following sources:

	<u>Requests</u>	<u>Percent</u>
Division	31	48
Sector	17	26
Regiment	7	11
	14	

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(U) FIGURE 4. 7th ARVN Division request channel.

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	<u>Requests</u>	<u>Percent</u>
Battalion	<u>10</u>	<u>15</u>
Total	65	100

Over half of these mission requests were preplanned:

	<u>Requests</u>	<u>Percent</u>
Preplanned	35	54
Immediate	<u>30</u>	<u>46</u>
Total	65	100

Support was not provided for 20 (31 percent) of the requests for aerial reconnaissance missions for the following reasons:

- 1) Armed helicopters were not available for aerial reconnaissance and area surveillance (nine requests).
- 2) Mission request failed to reach III Corps COC through ARVN channels (two requests).
- 3) Mission request withdrawn prior to reaching III Corps COC (one request).
- 4) Armed helicopters were diverted to higher priority missions prior to takeoff (three requests).
- 5) Disapproved by III Corps with no reason given (five requests).

Forty-five requests (sixty-nine percent) were approved and assigned to the aviation units indicated below. Of these, 23 were preplanned and 27 were immediate missions:

	<u>Missions Assigned</u>
UTTHCJ	31
118th Airmobile Company	12
120th Airmobile Company	<u>2</u>
Total	45

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The types of reconnaissance missions that could be performed by armed helicopter are described in annex C. Missions actually performed during the evaluation were as follows:

	<u>Number</u>	<u>Percent</u>
Point	5	11
Area	37	82
Route	<u>3</u>	<u>7</u>
Total	45	100

3. Conclusions

a. Most of the requests for aerial reconnaissance and area surveillance missions originate at division level.

b. Sixty-nine percent of the aerial reconnaissance and area surveillance missions requested by division G2's were approved and assigned to the aviation companies.

c. Twelve (eighteen percent) of the sixty-five mission requests received were not supported either because armed helicopters were not available or because they were subsequently diverted to higher priority missions.

B. OBJECTIVE 2 - CAPABILITY TO OBTAIN AND PROVIDE TIMELY INFORMATION

During the evaluation, judgment of timeliness was based on the US G2 advisor's opinion as to whether or not the information obtained by the armed helicopter crews was received by ARVN in time to serve as a basis for appropriate action. In some instances, completeness and accuracy of information was sacrificed because the situation did not permit postponing a decision by ARVN until a complete report could be rendered. Based on the after-action reports, the ACTIV evaluator determined whether or not the aviation unit was responsive to ARVN's request. The evaluator also determined the elapsed time from receipt of the mission request to completion of the mission by the aviation mission commander. See G2 US advisor's comments, annex A.

The capability of the UH-15 helicopter to land and take off in confined areas enhances its value as a reconnaissance vehicle. This capability allows the aviation crew to be briefed by the ground commander on the latest situation that confronts the friendly forces prior to a reconnaissance mission. In addition, the sector advisor or regimental S2 can more easily reconnoiter Viet Cong activity in his local area. Commanders and staff can personally observe the action taking place and make quicker, more accurate estimates of the situation.

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This evaluation did not endeavor to determine the effectiveness of action taken by the ARVN units after receipt of the information reported by the armed helicopters.

1. Mission Analysis

The 45 mission requests that were approved by higher headquarters and assigned to the aviation companies were completed as follows:

	<u>Assigned</u>	<u>Supported</u>	<u>Completed</u>
UTTHCO	31	31	28
118th Airmobile Co	12	12	12
120th Airmobile Co	<u>2</u>	<u>2</u>	<u>2</u>
Total	45	45	42

Three of the assigned missions were terminated before completion because:

- 1) One was diverted to a higher priority mission in IV Corps area by MACV prior to completion of reconnaissance mission.
- 2) A Vietnamese intelligence agent became disoriented in the air and could not identify area.
- 3) One armed helicopter was damaged by Viet Cong small arms fire on second pass over the area. Reconnaissance mission was terminated prior to completion.

The armed helicopters were able to complete 93 percent of the reconnaissance missions assigned.

Of the 45 aerial reconnaissance requests flown by the armed helicopter units, 30 (67 percent) were requested by the supported unit to corroborate other sources of information indicated as follows (see comments, annex A.):

<u>Other Source</u>	<u>Number of Missions</u>
Civilian	3
Self Defense Corps (now Popular Force)	3
ARVN troops	14

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<u>Other Source</u>	<u>Number of Missions</u>
Vietnamese agents	4
Captured documents	1
US observers	2
Vietnamese Air Force	1
Unknown	<u>2</u>
Total	30

The remaining requests sought to obtain initial information.

In most cases, the armed helicopter crews were requested to locate and identify Viet Cong activity, including personnel, reported by other sources. (See annex B.) The type of activity observed and the number of times reported to the supported unit by the helicopter crews follow:

<u>Activity</u>	<u>Number of Times</u>
Personnel in the open	13
Personnel with weapons	7
Personnel in sampans	3
Personnel in prepared positions	<u>8</u>
Total	31

In 14 instances no activity was observed.

Positive identification of Viet Cong personnel was made in 22 cases when the helicopter was fired upon. In one instance the helicopter landed and recovered part of a Viet Cong uniform lost by fleeing personnel, and in another instance armed personnel were observed approaching a Self Defense Corps (SDC) post that had requested an armed helicopter reconnaissance mission.

Identifying hostile personnel from the air is difficult. In a counterinsurgency environment with the enemy, SDC personnel, and civilians wearing similar dress, it becomes even more difficult. Many times the Viet Cong would identify themselves by firing at the helicopter. This accounted for 22 of the 28 times that personnel were identified as Viet Cong. At other times, personnel were identified as Viet Cong by

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being observed in prepared positions with weapons, preparing roadblocks on highways, or by their standard items of Viet Cong uniform. In some cases personnel observed could be reported only as suspicious.

After each of the 45 reconnaissance and surveillance missions, US G2 advisors evaluated the information received for its timeliness and usefulness. Information from 43 (96 percent) of the missions was judged to be timely and useful.

The response times recorded below are those of the armed helicopter crews after the aviation unit had been directed to perform immediate aerial reconnaissance or area surveillance missions.

<u>Response Time</u>	<u>Number</u>
Immediate	12
Up to 45 minutes delay	6
More than one hour delay	<u>4</u>
Total	22

Response times for immediate mission requests averaged approximately 23 minutes. In twelve cases, the response was immediate as the armed helicopters were already airborne in the area at the time of the request.

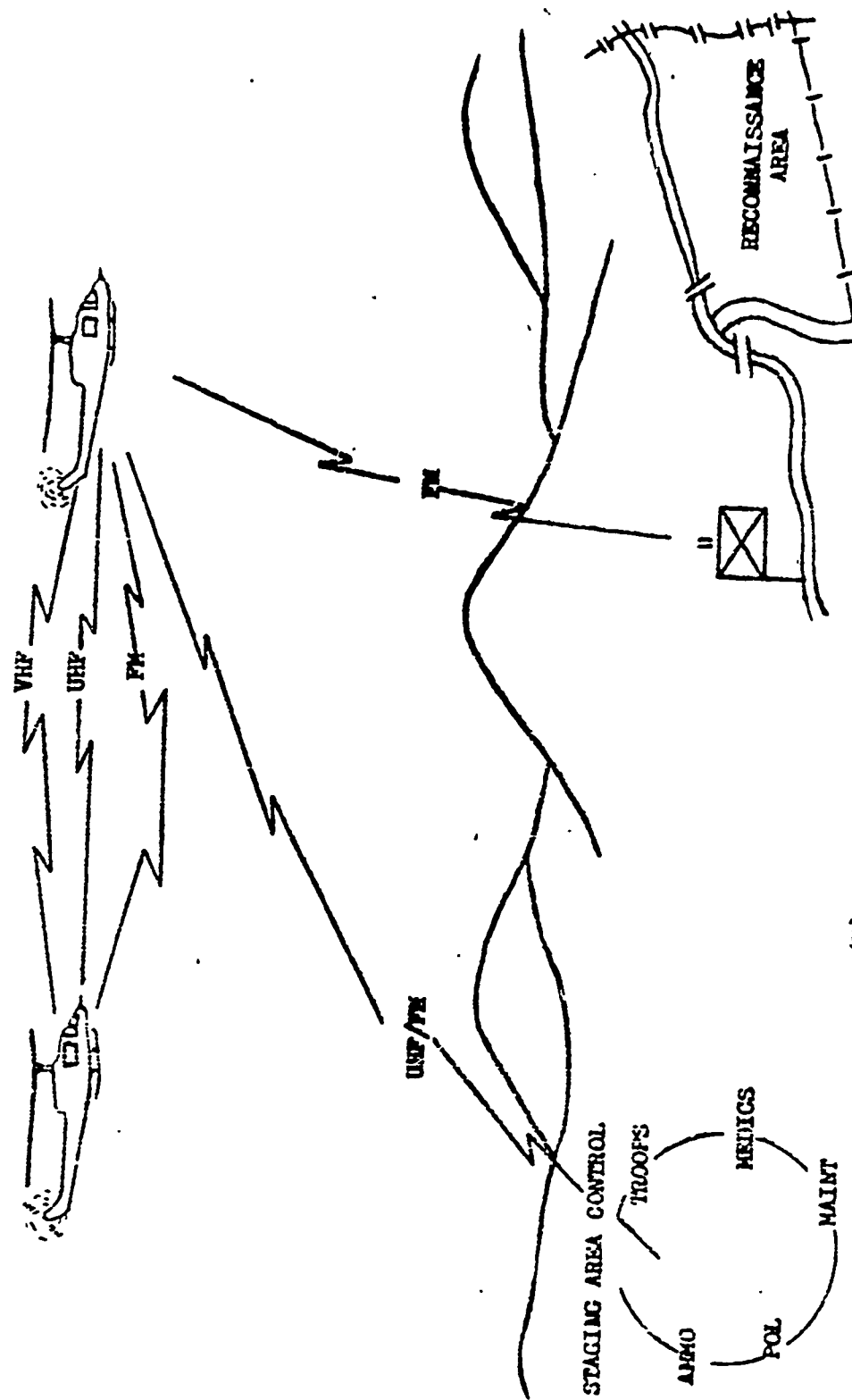
Nineteen (eighty-three percent) of the preplanned missions that were supported were flown as scheduled. The remaining four averaged delays of approximately 1-3/4 hours.

No attempt was made to determine the reasons why certain missions requests were delayed in ARVN or US advisory channels.

Reports from the supported units and the armed helicopter companies indicate that air-to-ground communications (figure 5) were excellent 39 percent of the time. See annex B.

<u>Condition</u>	<u>Times</u>
Excellent	40
Crowded	1
Fair	<u>1</u>
Total	42

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(U) FIGURE 5. Communication net.

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Three of the assigned missions were terminated before completion. See page 18.

2. Conclusions

a. Armed helicopter crews completed 93 percent of the aerial reconnaissance missions assigned.

b. The reporting of information via air-to-ground communications during the mission provided information that was considered timely and useful by the US G2 advisors. (See annex A.)

c. Armed helicopter crews were asked to corroborate information from other sources on 30 (67 percent) of their missions. Of the 30 missions flown, the armed helicopter crews were able to corroborate information from other sources 63 percent of the time.

d. Armed helicopters performing aerial reconnaissance and area surveillance were responsive to the requirements of the ground commander.

e. Air-to-ground communications were adequate.

f. On 80 percent of the missions flown, positive identification of Viet Cong was made.

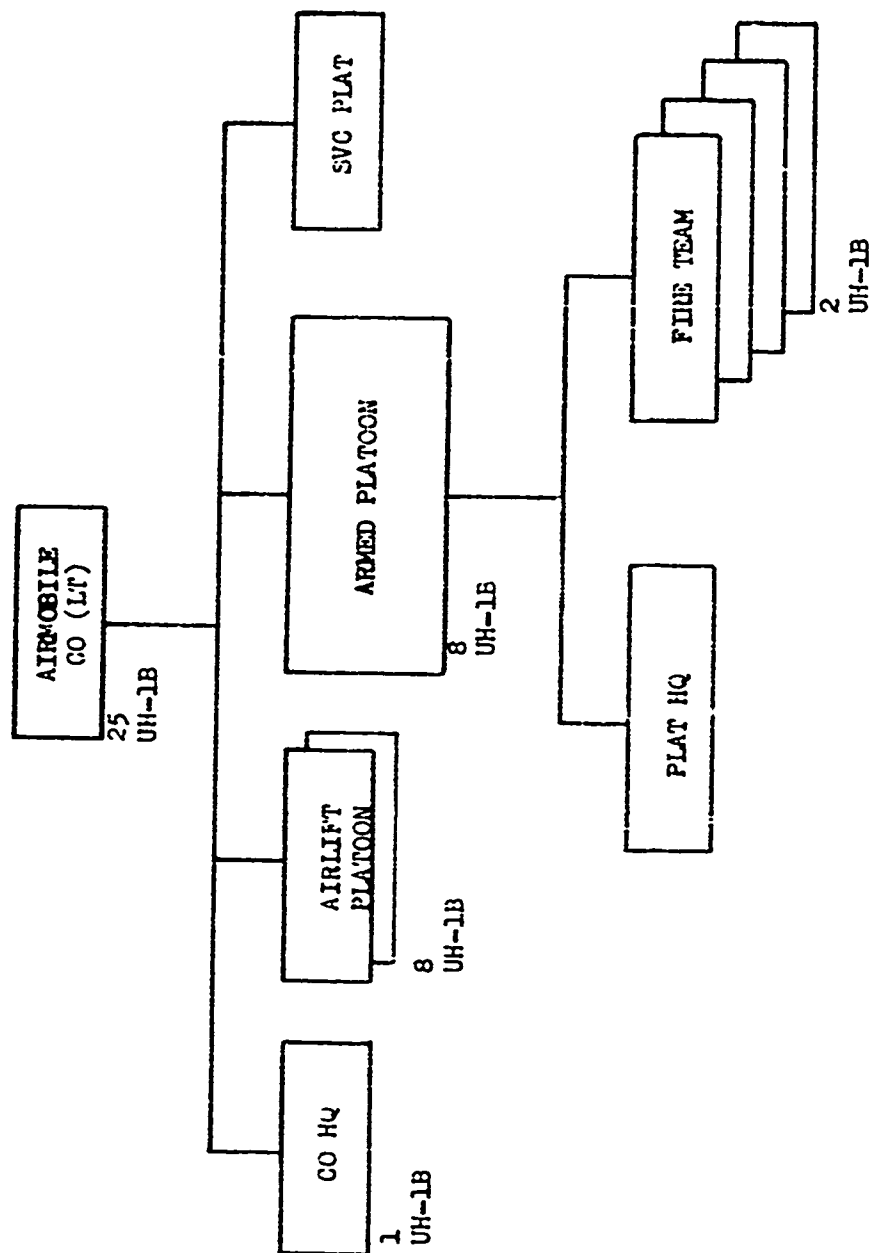
C. OBJECTIVE 3 - TECHNIQUES OF MANEUVER AND DETECTION METHODS

As a result of the war in Vietnam a variety of new techniques in airmobile warfare have been developed and tested. The techniques presented herein are the result of experience gained over a period of more than a year under counterinsurgency conditions. The flight formations used are a result of this experience and were designed to:

- a) Afford optimum tactical employment
- b) Reduce effects of enemy small arms fire
- c) Expedite movement to and from target areas
- d) Provide flexibility to the commander
- e) Provide maximum command and control.

1. Recognition of the Armed Platoon

The armed platoon is one of the basic combat elements of the armed helicopter company and the airmobile companies (figure 6).



(U) FIGURE 6. Organizational chart, airmobile company (lt), TOE 1-77E

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The principle element of an armed platoon is the fire team. This team consists of two or three armed helicopters. It is the basic maneuver element of the platoon. Two to four fire teams can be formed depending on helicopter availability. The armed platoon may be augmented by additional fire teams from other units on missions requiring more than a platoon-size force.

2. Description of the Armament System

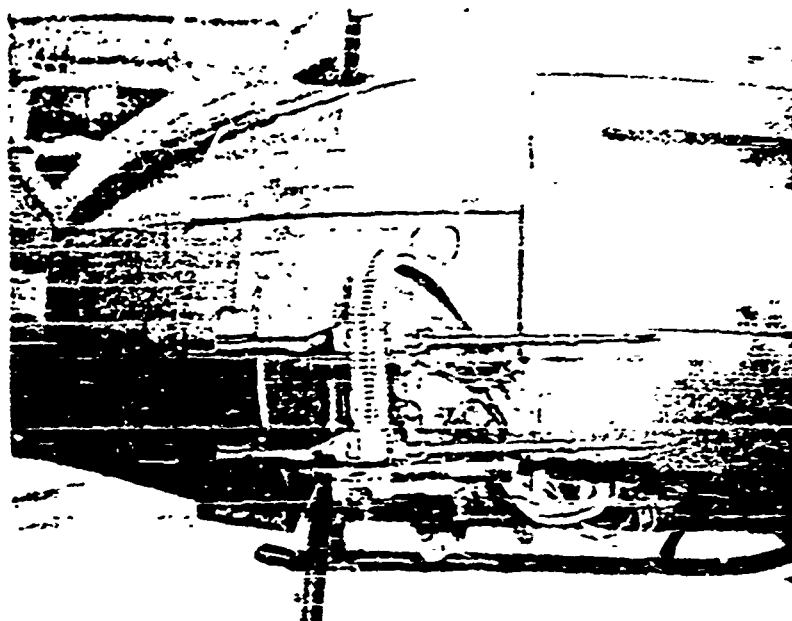
Normal armament for each helicopter of the armed platoon is the XM6-E3 armament kit consisting of the M-6 machinegun subsystem and the LAU-32A rocket pods or the larger LAU-3A/A rocket pods. The M-6 subsystem in combination with the LAU-32A is the basic helicopter weapon system employed within the platoon.

The M-6 subsystem presently being used in Vietnam was designed primarily to provide helicopters with a counter-fire capability to suppress enemy ground-to-air small arms fire. It is a flexible, power-operated, quad machinegun kit. The weapons may be stowed in a predetermined forward firing position and fired as a fixed installation by either the pilot or the copilot/gunner. Each of the two armament mounts supports two M-60C machineguns, which makes a total of four weapons with a combined rate of fire from 2,000 to 3,000 rounds per minute. With the system fully loaded, a total of 6,000 rounds is available. The copilot/gunner can aim the guns independently of the attitude of the helicopter through the use of a sight control unit. The weapons may be elevated 12 degrees, depressed 60 degrees, and traversed 12 degrees inboard and 70 degrees outboard. (See figure 7.)

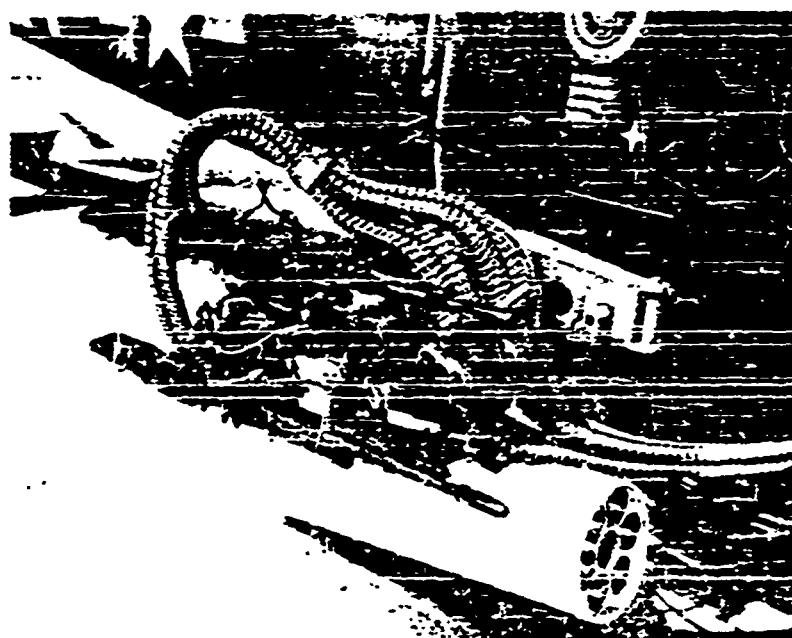
The LAU-32A subsystem is a 6-round, 2.75-inch, folding fin aerial rocket (FFAR) pod. One pod is suspended on each side of the helicopter from the Aero 15C bombrack mechanism, which is an integral part of the adapter housing on each side of the helicopter. The pods may be jettisoned electrically from within the helicopter in flight or manually released on the ground. The current LAU-32A pods are disposable, but plans are underway to explore the possibility of reusable pods. (See figure 8.)

The LAU-3A/A subsystem is an 18-round, 2.75-inch, FFAR pod. This larger pod is often carried as reinforcement for the fire teams of less than platoon size. One pod is suspended from each of the Aero 15C bombrack mechanisms. The pods may be jettisoned electrically during flight or manually released on the ground. The current LAU-3A/A pods are disposable, but plans are underway to explore the possibility of reusable pods. (See figure 9.)

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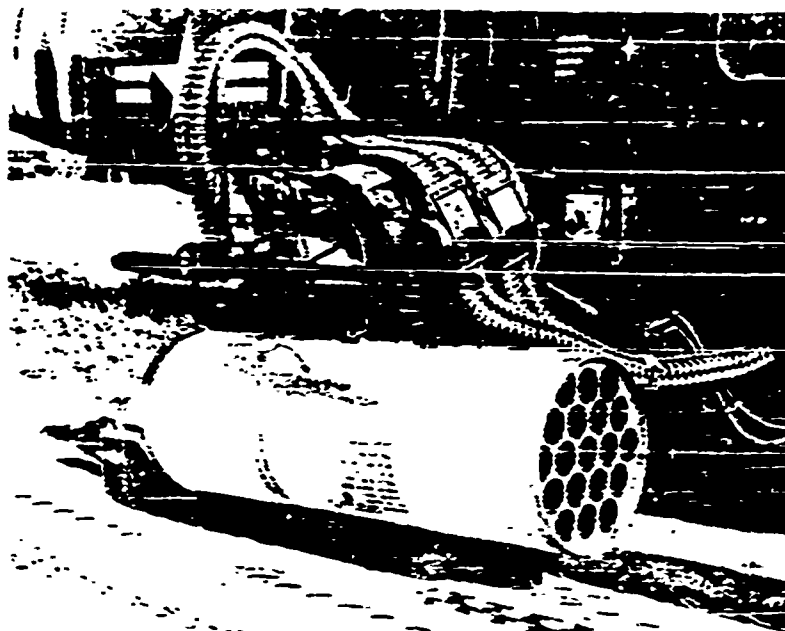


(U) FIGURE 7. 7.62mm machineguns mounted on UH-1B.



(U) FIGURE 8. LAU-32A mounted on UH-1B.

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(U) FIGURE 9. LAU-3A/A mounted on UH-1B.

3. Techniques of Maneuver

A summary of the techniques of maneuver used throughout the evaluation is given below. A detailed discussion of these techniques is contained in annex C.

a. Area reconnaissance

Most area reconnaissance missions were performed by a fire team using an S-turn search and observe pattern. Well-defined terrain features were used as limiting points. In the absence of terrain features, time and compass headings were used to ensure complete area coverage.

b. Point Reconnaissance

A fire team was normally dispatched to reconnoiter a point on the ground. The altitude of the helicopters was usually determined by the nature of the information desired, presence of the enemy, and his ability to deliver antiaircraft fire. The reconnaissance started at approximately 1500 feet above the ground and gradually was lowered as necessary to obtain the requested information. A trail formation was normally used.

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c. Route reconnaissance

Reconnaissance of a linear area, i.e., road, stream, or canal, was usually conducted by a fire team employing one helicopter on each side of the route. When the route was bordered on either side by trees or dense foliage, aircraft stayed approximately fifty meters in from the tree line where possible. Flight altitude varied from contour (in close proximity to tree tops in heavily forested areas) to 100 feet above the ground in sparsely wooded terrain. In extreme turbulence resulting from thermal conditions in mountainous terrain, flight altitudes were raised to 300 feet above the tree tops. Usually, an extended echelon was used on all low-level reconnaissance.

d. Zone reconnaissance

No requests were made for zone reconnaissance during the period of this evaluation. Techniques that call for a fire team to cover a battalion-size area have, nevertheless, been developed by the UTHCO. Basically, the same techniques for area reconnaissance apply to zone reconnaissance as conducted from the air.

4. Detection Methods

The primary detection method used during the evaluation was visual, with no optical aids. Altitudes above ground level varied from 100 to 1500 feet during the aerial reconnaissance, depending on the enemy situation. Air speeds ranged from zero at a hover in relatively safe areas to 80 knots forward speed in areas heavily infested with Viet Cong.

The armament with which the armed UH-1B was equipped provided sufficient firepower to permit the armed helicopter to perform the low-level reconnaissance that was necessary to locate and identify targets. The heavy volume of fire available on the armed UH-1B was used to provide suppressive fire not only to enhance the capability of the armed helicopter to accomplish aerial reconnaissance and area surveillance missions but also to increase survivability.

On at least seven missions, standard field binoculars, attached to a gyroscopic device known as the Kenyon stabilizer, were used by helicopter crews to increase their visual detection range in the objective area. (See annex D for a description of the Kenyon stabilizer.) In the opinion of the users, the Kenyon Stabilizer was effective in increasing detection at altitudes between 1000 feet and 2000 feet. However, the weight of the stabilized binoculars is such that both of the observer's hands must be used, thus preventing him from performing other necessary functions.

A secondary detection method programmed for use during the evaluation was photography. An Air Force P-2 sequence camera was mounted on

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the left front skid of selected helicopters in the UTTHCO and the 118th Airmobile Company. No request for photographic reconnaissance was made by either of the ARVN divisions supported during this evaluation. Therefore, no attempt was made to determine the photographic processing and development times or procedures. However, the supporting helicopter units did some photographic work while performing other missions. The photographs shown in annex E were taken on one such mission in the delta land southwest of Saigon.

Because of the late arrival of the camera equipment in RVN (7 July 1964), it was not possible to explore all the possibilities of its use. See annex E for description of the camera.

5. Conclusions

a. Armament enhanced the ability of the helicopter to perform reconnaissance and surveillance.

b. The fire team was the basic element employed in reconnaissance and surveillance missions.

c. The primary method of detection was visual at altitudes from 100 to 1500 feet.

d. The Kenyon stabilizer significantly improved the visual discrimination of observers at altitudes between 1000 and 2000 feet.

e. The Air Force P-2 sequence camera can probably be used effectively on armed helicopters.

D. (C) OBJECTIVE 4 - SURVIVABILITY

Survivability is treated here as the ability of the armed helicopter to continue to operate in a hostile environment while performing aerial reconnaissance and area surveillance.

Factors which contribute to survivability are:

- 1) Vulnerability of the helicopter
- 2) Amount and effectiveness of enemy fire
- 3) Caliber of weapons employed against the helicopter
- 4) Ground cover and fields of fire
- 5) Terrain
- 6) Camouflage used by the enemy

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- 7) Tactics and techniques used by the crew
- 8) Speed and altitude of the helicopter
- 9) Length of exposure time to an armed enemy.

1. Exposure

A total of 45 aerial reconnaissance and area surveillance missions were flown during the period of this evaluation. A cumulative total of 148 armed helicopters were used during these missions. The number of armed helicopters flown on a mission varied from two to ten helicopters.

These 45 missions required 348 flight hours, of which 266 hours were spent in objective areas. The remaining 82 hours were used flying to and from target areas.

Enemy ground fire was directed at the armed helicopters on 22 (49 percent) of the reconnaissance and surveillance missions flown, while the remaining 23 (51 percent) encountered no enemy fire.

Ground fire directed at the armed helicopters was estimated to come from as few as one weapon to as many as 100. See mission 5RS27, annex B. Even though the Viet Cong have some heavier weapons, such as the caliber .50 machinegun, during this evaluation no weapon larger than a caliber .30 machinegun was reported to have been fired at reconnaissance helicopters.

2. Damage Sustained

Four armed helicopters were hit by enemy ground fire while performing aerial reconnaissance and area surveillance missions during the period of the evaluation. Each hit consisted of a single round, of which only one resulted in a personnel injury. The crew chief of one armed helicopter received a minor laceration on the left leg from a round which came through the cabin floor. In all cases the armed helicopters continued to fly after being hit. See table 1. Hit ratio resulting from data collected was one hit for every 75 to 100 hours. See table 2.

The disciplined manner in which Viet Cong refrain from firing at armed helicopters on aerial reconnaissance indicates that when they position themselves preparatory to an operation, they are forbidden to open fire until they have been detected. No helicopters were hit on the first pass over an objective area.

3. Conclusions

- a. Of the 148 armed helicopters used during the evaluation, 94

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(U) TABLE 1. HIT DATA FOR ARRED HELICOPTER R&S SUPPORT OF 5TH AND 7TH ARVN DIVISIONS 10 APRIL 1964 TO 8 AUGUST 1964

ALTITUDE ABOVE GROUND LEVEL	AIR-SPEED KNOTS	TYPE FORMATION	POSITION NUMBER	PASS NUMBER	NUMBER OF HITS	ESTIMATED RANGE	TYPE WEAPON	PERSON- NEL MIA	STRUCTURAL* DAMAGE
500 Feet	80	Trail	2	2	1	300 Meters	Rifle	None	One hole in skin of tail boom
300 Feet	75	Trail	1	2	1	100 Meters	Rifle	Crew Chief minor laceration left leg	One round through com- partment floor
500 Feet	80	Trail	2	3	1	200 Meters	Rifle		One round ruptured fuel cell and hydraulic servo con- trol damaged
500 Feet	80	Trail	2	4	1		Rifles and .30 Caliber MGs		One hole through overhead cir- cuit breaker panel

* In each case the helicopter continued to fly

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(U) TABLE 2. HITS RECEIVED DURING ARMED HELICOPTER R&S SUPPORT OF 5TH AND 7TH ARVN DIVISION 10 APRIL TO 8 AUGUST 64

UNIT	NUMBER OF MISSIONS	NUMBER OF AIRCRAFT	HOURS FLOWN	TIME OVER OBJECTIVE	HITS
68th Air-mobile Co.	31	99	267.9	214.4	3
118th Air-mobile Co.	12	43	72.9	47.8	1
120th Air-mobile Co.	2	6	7.5	3.5	0
TOTALS	45	148	348.3	265.7	4

(64 percent) were subjected to small arms fire by the Viet Cong. Four helicopters sustained slight damage from enemy fire.

b. One armed helicopter was hit by small arms ground fire for every 75 to 100 hours of aerial reconnaissance and area surveillance missions flown by armed helicopters during the evaluation.

c. During the period of the evaluation the armed helicopter in the reconnaissance and area surveillance role maintained a survivability rate of 100 percent.

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IV (C) CONCLUSIONS AND RECOMMENDATIONS.

A. GENERAL CONCLUSIONS

The armed helicopter in the aerial reconnaissance and area surveillance role in the counterinsurgency environment of Vietnam provided ARVN with an effective means of collecting and reporting combat information in time to serve as a basis for appropriate action. Helicopter crews were able to obtain information that was sought by ARVN during the evaluation with no loss of personnel or materiel. The present communication equipment mounted in the armed helicopters is adequate for providing air-to-ground communications with tactical units..

B. SPECIFIC CONCLUSIONS

1. Armed helicopter crews were capable of obtaining and reporting combat information to ARVN units on a timely basis.
2. In the counterinsurgency environment of Vietnam, the armed helicopter augments and complements other means of collecting and reporting information to the ARVN.
3. During the period of the evaluation, the armed helicopter received few hits in comparison to the number of hours of exposure in objective areas.
4. TOE 1-77E, the Airmobile Company (1st) does not provide for an armed helicopter platoon.
5. In Vietnam sufficient numbers of helicopters are not always available to meet all of the valid requirements for armed helicopter aerial reconnaissance and area surveillance in support of ARVN.
6. The visual discrimination of a qualified observer in an armed helicopter is significantly improved at altitudes between 1000 and 2000 feet when a Kenyon stabilizer is used with binoculars.
7. High and low oblique photographs were obtained with the US Air Force P-2 sequence camera mounted on US Army helicopters. Evaluation of the photographic reconnaissance capability of armed helicopters is warranted.

C. GENERAL RECOMMENDATIONS

The full capabilities of the armed helicopter should be exploited to augment and complement other information gathering means available to ARVN.

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D. SPECIFIC RECOMMENDATIONS

1. Aerial reconnaissance and area surveillance missions should be accorded a high priority by the corps senior advisors in Vietnam for the allocation of armed helicopters consistent with other operational requirements.

2. When the airmobile company (1) is organized with an armed helicopter platoon, the mission statement in TOE 1-77E should be amended to include: "To provide aerial reconnaissance of the immediate battle area."

3. The concept of photographic reconnaissance by armed helicopters should be evaluated by ACTIV, including the processing and developing support required.

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(C) ANNEX A

US ADVISOR G2 COMMENTS

This annex contains comments of G2 US advisors relative to the timeliness of the support provided by the armed helicopter crews and the airmobile companies in aerial reconnaissance and area surveillance missions.

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ANNEX A

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21 August 1964

COMMENTS, G2 US ADVISOR, 5TH ARVN DIVISION, ON ARMED HELICOPTER RECONNAISSANCE AND AREA SURVEILLANCE

1. The 5th ARVN Division had approximately 50 percent of its requests for reconnaissance and area surveillance missions approved by III Corps.
2. Of the missions approved by III Corps, all except one, or possibly two, were dispatched in sufficient time to accomplish the assigned mission.
3. The armed helicopter is an excellent vehicle for reconnaissance and area surveillance missions because of its controlled speed, ability to land at remote headquarters for pre-mission briefings, and sufficient firepower on board to defend itself.

ANNEX A

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ACTIV S2 US ADVISOR, 7TH ARVN DIVISION, ON ARMED HELICOPTER RECONNAISSANCE AND AREA SURVEILLANCE

1 The 7th ARVN Division Tactical Zone used armed helicopters for a total of 34 recorded missions during the period of the evaluation. Many additional reconnaissance and surveillance missions were performed on an immediate basis while armed helicopters were supporting sectors of the division tactical zone. These missions were generally not reported to this headquarters and were not recorded by the ACTIV evaluator.

2 Specific missions requested were usually confirming in nature, i.e., information is received that an enemy unit is located in a certain area. This initial information generally comes from agents or informants and in many cases has not been evaluated for reliability and accuracy. The 7th Division normally used the armed helicopters to confirm the reported enemy locations in those areas.

3. Information received from armed helicopters is considered better than that received from light fixed-wing observation aircraft (OV-1) and about equal with information received from OV-1 (Mohawk) surveillance aircraft.

4. Generally speaking, the 7th ARVN Division used armed helicopters to confirm original information obtained from various other sources.

5. Even though the division has first priority on OV-1 support, we believe that the armed helicopter has a definite role to play in our aerial reconnaissance plans. Our concept is that the OV-1 is used on a tactical zone level, i.e., controlled and directed by division tactical zone headquarters, using information received from both higher and lower headquarters. We try to provide our sectors with adequate OV-1 coverage for photography purposes and believe that each sector, regiment and even battalion should have a capability to reconnoiter their own area with aircraft under their control and with their own observers. The armed helicopter gives the division this capability. Qualified ARVN observers are used to observe in their own local area. Sometimes the sector or regimental S2 will act as observer on a reconnaissance mission.

6 It is believed that armed helicopters could be used more often on all types of reconnaissance and surveillance if we had enough to assign a fire team to each sector. With only one team available for a division tactical zone, refueling becomes a problem and reduces the amount of time that can be spent on area and route reconnaissance. The refueling problem is being solved by placing fuel in province towns. Refueling is becoming less of a limiting factor in performing necessary aerial reconnaissance.

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7. While the armed helicopter is possibly a slower and therefore an easier target for the enemy than other reconnaissance and surveillance aircraft, it also is capable of delivering a heavy concentration of return fire, a factor of which I am sure the Viet Cong are aware.

8. As with all forms of aerial reconnaissance and surveillance, the main difficulty in obtaining information is getting the aircraft down where the enemy can be identified. I don't know of a single instance in which Viet Cong were located while aircraft were orbiting at 2000 feet. The armed helicopter has an extensive capability to get down low. The ability to return fire enhances their capability to do the low-level reconnaissance that is necessary. I believe the armed helicopter plays an effective role in confirming intelligence information rather than being an originator of information.

9. Responsiveness was excellent during the evaluation period and continues to be so. This is primarily because we used armed helicopters already allocated to us for our reconnaissance and surveillance missions. In most cases they are in the area and it is simply a matter of diverting them to the objective area via radio communication. The timeliness of information obtained is also good since our sector S2's monitor the air-to-ground frequency over which the reports are transmitted. When division dispatches an armed helicopter fire team on a reconnaissance mission, the sector provides observers, briefings and call signs. Reports of this nature are monitored at division level. Action is generated at sector level in response to information received.

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(C) ANNEX B

MISSION NARRATIVES

This annex contains narrative description of representative reconnaissance missions flown by armed helicopters.

<u>Mission Number</u>	<u>Page</u>
5RS5	B-2
7RS15	B-3
5RS18	B-4
5RS19	B-6
5RS20	B-7
7RS27	B-8
7RS30	B-9
5RS27	B-10

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ANNEX B

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ARMED HELICOPTER RECONNAISSANCE MISSION NUMBER 5RS5 IN
SUPPORT OF THE 5TH ARVN DIVISION, UNDER CONTROL OF THE
118TH AIRMOBILE COMPANY.

At approximately 1230 hours on 15 April 1964, a road convoy failed to cross a control point on a tactical road march from vicinity of Soui Da in Tay Ninh Province. Radio contact could not be established with the convoy leader. In order to discover the reason for the delay, the 5th Division Operations Officer requested the use of armed helicopters to conduct a route reconnaissance.

Approval to conduct the aerial reconnaissance was obtained. The mission was assigned to the 118th Airmobile Company at Bien Hoa. The mission was further assigned to the armed platoon. A fire team was dispatched to the 5th Division for briefing. The G2 US advisor briefed the officer in charge of the two armed helicopters as to the last known location of the convoy.

The fire team lifted off the command post helipad at 1300 and returned one hour later. The fire team spent approximately 40 minutes in the objective area.

Upon locating the stalled convoy, the location was reported immediately to the 5th Division Command Post. The fire team descended to 500 feet in trail formation. The crews were able to observe that the lead vehicle was damaged by a mine. No other enemy action was evident. This information was reported by radio to the command post.

During the return trip to the command post, the lead helicopter was fired upon by a small group of Viet Cong. The fire was not returned. No damage was sustained by the helicopters.

During the debriefing of the reconnaissance fire team by the division G2 US advisor, it was concluded that the information obtained by the armed helicopters was timely and that air-to-ground communications were excellent.

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ARMED HELICOPTER RECONNAISSANCE MISSION NUMBER 7RS15 IN
SUPPORT OF THE 7TH ARVN DIVISION, UNDER CONTROL OF THE
7TH DIVISION AVIATION DETACHMENT (PROVISIONAL)

A Self Defense Corps post, approximately 10 kilometers east of My Tho, was attacked during the night of 6 May 1964. The attack was reported to Headquarters, 7th Division at My Tho by telephone. Prior to notification of the attack, 7th Division had planned an "Eagle Flight" operation in the vicinity of the SDC post. As a result of the report, it was decided to conduct an aerial reconnaissance to determine the size and exact location of the Viet Cong force.

An armed helicopter reconnaissance mission was requested and the Senior Advisor of the 7th Division approved the use of armed helicopters to fly the mission at 0815 hours on 7 May 1964. The request channel was direct to the armed helicopter mission commander at the division tactical command post at Tan Hiep Airfield, 7 kilometers north of My Tho. The tactical command post and the helicopters had already been positioned at the airfield to support the "Eagle" operation. The aircraft in this case had been provided by the Utility Tactical Transport Helicopter Company. A map briefing of the mission was given to the mission commander prior to take-off. A heavy fire team (a flight of three armed helicopters) was used to perform the aerial reconnaissance.

The flight departed from Tan Hiep Airfield for the SDC post at 0830 and returned at 0910. The helicopters spent approximately fifteen minutes in the target area. The flight was able to detect and identify a Viet Cong squad in the open. A unit estimated to platoon size was detected in a tree line. Identification was positive as the flight crew could see weapons being carried, and the helicopters were fired upon by about two automatic weapons. Suppressive fire was returned by the helicopters. None of the helicopters were hit. Identification and exact location of the Viet Cong force was reported by radio to the division tactical command post.

The technique of maneuver for the armed helicopters was a left echelon formation with the two lead aircraft at an altitude of 200 to 300 feet above the ground and the trailing aircraft 100 to 200 feet higher. Flight speed in the area varied from 80 to 85 knots.

A debriefing of the helicopter crews was held at 0920, ten minutes after the return of the flight to Tan Hiep.

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ARMED HELICOPTER RECONNAISSANCE MISSION NUMBER 00018 IN
SUPPORT OF THE 5TH ARVN DIVISION UNDER CONTROL OF THE
118TH AIRMOBILE COMPANY

On the morning of 18 May 1964 a Self Defense Corps (SDC) post reported to Han Nhia sector headquarters that it was receiving harassing fire from the north, east and south from an estimated company of Viet Cong. At 1000 hours the sector headquarters reported the attack to division headquarters and requested four armed helicopters to conduct immediate aerial reconnaissance in the vicinity of the SDC post under attack. The request was processed by the division and passed to III Corps TOC at approximately 1130 hours. The request was disapproved by III Corps. After intervention by the division G2 US advisor, the request was finally approved by corps and passed to the 118th Airmobile Company at 1500 hours. An armed platoon (5 helicopters) was dispatched at 1530 hours to Boa Tran where the sector G2 US Advisor briefed the platoon commander at 1545 hours. Essentially, the briefing stated the SDC post was still receiving fire from the north, east and south sides of the perimeter. One Vietnamese soldier was wounded in one of the observation towers. It was believed by the intelligence officers that the purpose of the attack was to allow the Viet Cong to ambush a potential rescue unit along the road to Duc Hoa. The armed platoon was given the mission to: 1) locate the positions of the Viet Cong firing on the SDC post, 2) reconnoiter the road between the SDC post and a rescue unit that was on the way to reinforce the SDC post, 3) locate a possible ambush site believed to be set near the road between the SDC post and the village of Duc Hoa. The armed platoon commander was informed by the sector G2 US advisor that all personnel not inside the SDC post or in the village of Duc Hoa were considered Viet Cong.

The armed helicopters performed reconnaissance in the area for an hour. During this time the platoon reported many personnel in sampans on the small waterways lead into Duc Hoa. The platoon received sporadic fire from two different areas but was unable to locate the exact firing positions occupied by the enemy. Suppressive fires were implemented by the platoon commander after the ARVN observer on board his helicopter had pointed out suspect enemy locations. No damage was sustained by the helicopters. No sign of an ambush were detected along the road leading to the SDC post. This information was reported immediately to the sector US advisor by radio.

The technique of maneuver was two fire teams, two helicopters each in trail, orbiting areas assigned by the platoon leader. The fifth helicopter was armed with rockets, flown by the platoon leader. He operated between the two fire teams where he could direct the two fire teams and reinforce either fire team as necessary. The fire teams flew at altitudes of 100 to 500 feet with the rocket helicopter at 700 feet. Airspeeds used were 60 to 80 knots.

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A debriefing was conducted at sector headquarters at 1645 hours. After completing the reconnaissance mission, the armed platoon returned to home station at Bien Hoa at 1705 hours.

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ARMED HELICOPTER RECONNAISSANCE MISSION NUMBER 5RS19
IN SUPPORT OF THE 5TH ARVN DIVISION, UNDER CONTROL OF
THE 118TH AIRMOBILE COMPANY.

In the early morning of 22 May 1964 an ARVN patrol discovered a dead VC soldier. Papers found with the body indicated the position of a VC battalion. After studying these papers the Binh Duong Sector S2 requested an immediate armed helicopter reconnaissance to verify the information contained therein. The request was forwarded to 5th Division Headquarters by telephone at 0913 hours. Division approved the request and forwarded it to III Corps at 0925 hours. III Corps approved the request and at 0940 hours assigned the mission to the 118th Airmobile Company.

At 0955 hours four armed helicopters departed from Bien Hoa for the Binh Duong sector headquarters helipad where they landed at 1010 hours.

The mission commander was briefed by the Sector S-2 advisor at the helipad. The advisor requested that the flight check for company size VC units in the vicinity of coordinates XT770190, 770215, 740230, 785-260, and 810220. He also requested a check for possible VC ambush positions along Highway 13.

The helicopters took off and flew over the target areas for approximately 50 minutes. Technique of maneuver used was two fire teams, two helicopters each, flying in trail at approximately 500 feet altitude, lowering to tree top level on successive passes over the areas. Coordination between helicopters was effected by VHF radio.

Large groups of people were seen in the rice paddies and along the river banks. No positive identification was made but since the helicopters were not fired upon the people were presumed to be friendly.

The armed helicopters returned to Binh Duong where the crews were debriefed by the sector S-2 advisor. Although there had been no enemy contact, this completed the mission and the armed helicopters returned to home station at 1115 hours.

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ARMED HELICOPTER RECONNAISSANCE MISSION NUMBER 5RS20
IN SUPPORT OF THE 5TH ARVN DIVISION, UNDER CONTROL OF
THE 118TH AIRMOBILE COMPANY

At approximately 1320 hours the Hau Nghia sector advisor forwarded a request for armed helicopters to perform a reconnaissance mission in his area of responsibility to 5th Division G2. Division G2 processed the request and forwarded it to III Corps TOC. Corps disapproved the mission request based on nonavailability of armed helicopters at that time. Later in the afternoon Corps called back to the 5th Division and stated armed helicopters were available if the requirement still existed. Corps was informed by the division G2 that the requirement was still valid.

At 1600 hours the 118th Airmobile Company was directed by III Corps to provide 5th Division with a reinforced fire team. Four armed UH-1B helicopters departed Bien Hoa at 1610 hours and arrived at Boa Tran, sector headquarters at 1625 hours. The sector US advisor was waiting and immediately briefed the aircraft mission commander. Instructions were to reconnoiter the Oriental River in the vicinity of coordinates XT47C010 for an estimated 200 Viet Cong soldiers in sampans and along the river banks. He was instructed to report locations and direction of movement of the enemy force when sighted.

The fire team departed at 1630 hours, spent approximately thirty minutes in the target area, and returned to Sector Headquarters at 1710 hours. During the mission, many sampans, some covered with leaves, were observed along the river banks. The boats were apparently empty, no people were seen in the area, and no ground fire was received. It was not possible to determine whether or not these boats belonged to the VC. The technique of maneuver used two light fire teams (2 UH-1B each), one on each side of the river. The aircraft of each fire team flew in a trail formation at an airspeed of 80 knots. The lead helicopter flew at an altitude of approximately 200 feet above the terrain and the trail helicopter followed at 100 to 500 feet above the lead ship. Information was transmitted immediately to sector headquarters by radio during the flight and was confirmed at 1710 hours when the crews were debriefed at Boa Tran by the Sector G-2 advisor.

Following the debriefing the fire teams were released and returned to home base at Bien Hoa at 1730.

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ARMED HELICOPTER RECONNAISSANCE MISSION NUMBER 7RS27
IN SUPPORT OF THE 7TH ARVN DIVISION, UNDER CONTROL OF
THE 7TH DIVISION AVIATION DETACHMENT (PROVISIONAL)

Five armed helicopters were assigned to take part in a continuing operation in the vicinity of Can Duoc, Long An sector on 16 June 1964. The helicopters were requested to perform aerial surveillance on a flank of one infantry unit and one mechanized unit. The flank under surveillance was about 13 to 14 kilometers long and the boundary was marked by a canal.

The aviation element of the 7th Division briefed the helicopter crews. Included in the map briefing were instructions not to fire at any other than positive pinpoint enemy targets and then only after receiving specific permission from the ARVN commander in each instance. These instructions also pertained to returning fire received from the ground.

The main purpose of the helicopters in this operation was to locate and report any suspected enemy, who were then to be reduced by ground units. This rule against aerial fire on this mission was an attempt to preserve the friendship of civilians in the contained areas who might be injured if area fire was delivered. Additional briefing instructions were to watch for and report any large movement out of the contained area.

The flight commander used two flight fire teams of two helicopters each. He alternated these fire teams on station so that continuous coverage of the area could be provided. The first fire team took off from My Tho at 0705 hours and the other team made final departure from the objective area at 1300 hours. At this time the helicopters were relieved by fixed wing aircraft.

The fire teams with aircraft in trail about 1000 meters apart flew up and down the canal at 400 feet altitude until 0820 hours. At this time an estimated four rounds of enemy fire were directed at the helicopters. One helicopter sustained a hit which came up through the cabin floor and resulted in minor lacerations on the left leg of the crew chief. The fire teams flew the rest of the mission at an altitude of 1500 feet because of the restriction against defensive fire. No further damage was sustained. This incident and the suspected location of the source of this fire was reported to the Senior Advisor, 7th Division by radio as soon as it occurred.

This suspected location was investigated by RVN naval units operating in the canal. No further suspicious activity was noted or reported. No formal debriefing was held. During conduct of the mission air-to-ground radio communications were intermittently effective.

A total of 10 hours flight time were used on this mission, of which 8 hours were flown in the objective area.

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ARMED HELICOPTER RECONNAISSANCE MISSION NUMBER 7RS30
IN SUPPORT OF THE 8TH AIRBORNE BRIGADE, UNDER CONTROL
OF THE 7TH DIVISION AVIATION DETACHMENT (PROVISIONAL)

On 21 June 1964 elements of the 8th Airborne Brigade, having been landed in a heliborne assault, requested armed helicopter reconnaissance and area surveillance support. The plan of ground movement was for an attack to be made south, astride a canal leading from the landing zone located in the vicinity of Han My in the Dinh Tuong province (XS 1060). The commander of the lead ground unit requested that the armed helicopters search the canal forward of his line of advance to locate enemy personnel. This request was transmitted by radio to the UTTHCO at 1100 hours, with further instructions that ground targets were not to be taken under fire unless they were carrying weapons or fired upon the helicopters. No formal briefing was conducted as the fire team leader had operated in this operation earlier in the day and was completely current on the ground situation. Response to the request was immediate. A light fire team (2 helicopters) flew up and down the canal, one on either side of it, for a distance of $1\frac{1}{2}$ kilometers ahead of the lead ground element. Flight altitude was from 200 to 400 feet above the terrain. At 1105 hours the fire team members observed enemy personnel in foxholes, and at 1110 hours eight VC ran for cover when the helicopters appeared. This information was passed on by radio to "Red Hat", the ground unit advisor, as it was obtained. The running persons were identified as definite VC when they fired some 8 to 12 rounds at the helicopters. As the enemy reached cover of a banana grove, the helicopter made three firing passes at the enemy position in the grove. On the third pass the number two ship in the trail formation was hit by a round of small arms fire which ruptured the fuel cell and damaged the hydraulic-servo control. This necessitated return of that aircraft to the staging area at Vinh Long for repair. The mission was cancelled at this point at 1130 hours. The mission to this point had taken 30 minutes all in the objective area. Mission reporting was timely although communication difficulties were experienced because of too many individuals operating on one VHF air-to-air frequency. These were the airmobile company commanders, the control ship, the armed aerial fire support aircraft, and the armed reconnaissance helicopter. Only one FM radio frequency was used by the ground commander and this radio frequency was also inadequate for the amount of traffic. Despite the problems noted, the mission was successful in that it pinpointed enemy positions for the advancing ground troops. This report was written by an ACTIV evaluator who participated in the mission as a crew member.

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ARMED HELICOPTER RECONNAISSANCE MISSION NUMBER
5RS27 IN SUPPORT OF THE 5TH AAVN DIVISION,
UNDER CONTROL OF THE 118TH AIRMOBILE COMPANY

On 14 July 1964 intelligence reports indicated a VC buildup in the area between Ben Cat and Thu Dau Mot. At 1500 hours that date, Phu Loi Brigade Headquarters requested a route reconnaissance to check Highway 13 from Thu Dau Mot to Ben Cat and north.

A light fire team of two armed helicopters was dispatched from the 118th Airmobile Company at Bien Hoa at 1500 for Phu Loi where they landed and were briefed on the above at 1540 hours by the Brigade S-3 advisor. At the time this fire team was dispatched a call was sent to Tan Son Nhut for a third crew on an administrative mission there. This crew departed immediately for Bien Hoa to pick up an armed aircraft which had been readied for the reconnaissance mission. The fire team of two helicopters departed from Phu Loi at 1545 hours and proceeded north at from 600 to 800 feet altitude in an echelon right. The third helicopter departed from Bien Hoa at the same time and joined the fire team at 1600 hours, at which time the team went into a wide V formation still at 600 to 800 feet. Suspicious areas were scanned closely from a trail formation down to below 300 feet. The helicopters maintained communication with one another on VHF radio.

Highway 13 from coordinates XT750310 to XT810110 contained 18 roadblocks of various degrees of effectiveness. Some were no more than small mounds of earth over which vehicles could pass easily. Others were deep holes or ditches that vehicles would have to by-pass. This information was passed to 5th Division G2 advisor by radio. First enemy contact was at 1615 hours when an estimated platoon at XT765445 took the flight under fire. The fire team went into trail and proceeded to hit this target with 2 75-inch rockets and 7.62mm machineguns from an orbit to the right. After three orbits no further ground fire was observed and the fire team broke contact and reported the information to 5th Division by radio. The team landed at Ben Cat at 1645 hours and refueled. The US advisor at Ben Cat was briefed on the results of the reconnaissance up to that point.

After refueling, the fire team departed from Ben Cat for the vicinity of XT690170 where VC had been reported. An estimated company of VC took the helicopters under fire at this point with about 50 to 100 weapons. This fire was returned from a trail orbit to the right from 600 to 800 feet altitude. The approach to the target was changed with each pass. Each helicopter would be positioned to commence firing as soon as the helicopter ahead of it had pulled up and out of the line of aircraft fire. As the helicopter pulled up and away the door runners attempted to protect the rear by rapid continuous fire with their carbines. On the fourth pass the number 2 helicopter in the flight was hit by a caliber 30 round which

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entered through the left door and went up through the circuit breaker panel damaging the essential bus bar. Contact with the VC was broken at this time.

The pilot of the damaged aircraft elected to head directly to Bien Hoa airfield rather than make a precautionary landing at Phu Loi, the nearest secure area. Contact was made by VHF radio with two more armed helicopters which had been dispatched by the 118th Airmobile Company as a light fire team to augment the first team. The second fire team watched the damaged aircraft until safely home, while the remainder of the first fire team landed at Phu Loi to check for damage before continuing with the mission. No damage from hits to either ship was discovered. The helicopter crews were debriefed by brigade S-3 at this time.

The second fire team proceeded into the search area and was taken under fire by snipers in the vicinity of XT870300 at approximately 1800 hours. This was reported to 5th Division by radio. The first fire team departed from Phu Loi at 1815 hours with a minimum load of ordnance remaining, having expended all their rockets and all but about 400 rounds of 7.62mm ammo per helicopter. Searching the area around Thu Dau Mot the team surprised five VC digging a deep ditch roadblock across a dirt road at XT890141. When the actions of these VC indicated fight, the remaining helicopter ordnance was unloaded on them, and they were effectively neutralized. This action was reported to 5th Division by radio so that the VC weapons and bodies could be recovered. The first fire team then returned to Bien Hoa landing at 1845 hours. The second fire team continued to search the area around Thu Dau Mot and noted a roadblock flying a VC flag at XT762140. This was reported to 5th Division by radio and the flag knocked down by gun fire for whatever psychological effect that might have. This fire team returned to Bien Hoa at 1900 hours. No debriefing was held at the completion of this mission as all information had been passed on by radio as obtained. The 5 aircraft that took part in this mission spent a total of 12.5 hours flying time with 10 hours time over target. Mission reporting was timely and the information obtained presented a clear valuable picture of the situation to ground control. This narrative report was written by an ACTIV evaluator who participated in this mission as a member.

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(U) ANNEX C

TECHNIQUES OF MANEUVER

The following was summarized from the UTTHCO SOP, "Tactical Employment of the Armed Helicopter Company", US Army Utility Tactical Transport Helicopter Company, 11 February 1964.

1. GENERAL

The procedures described herein are intended to be used as guides and should not be considered as inflexible. Each new situation in a counterinsurgency environment must be solved by an intelligent interpretation and application of the concepts set forth in established literature. Blind adherence to any one set of rules will not carry the effort.

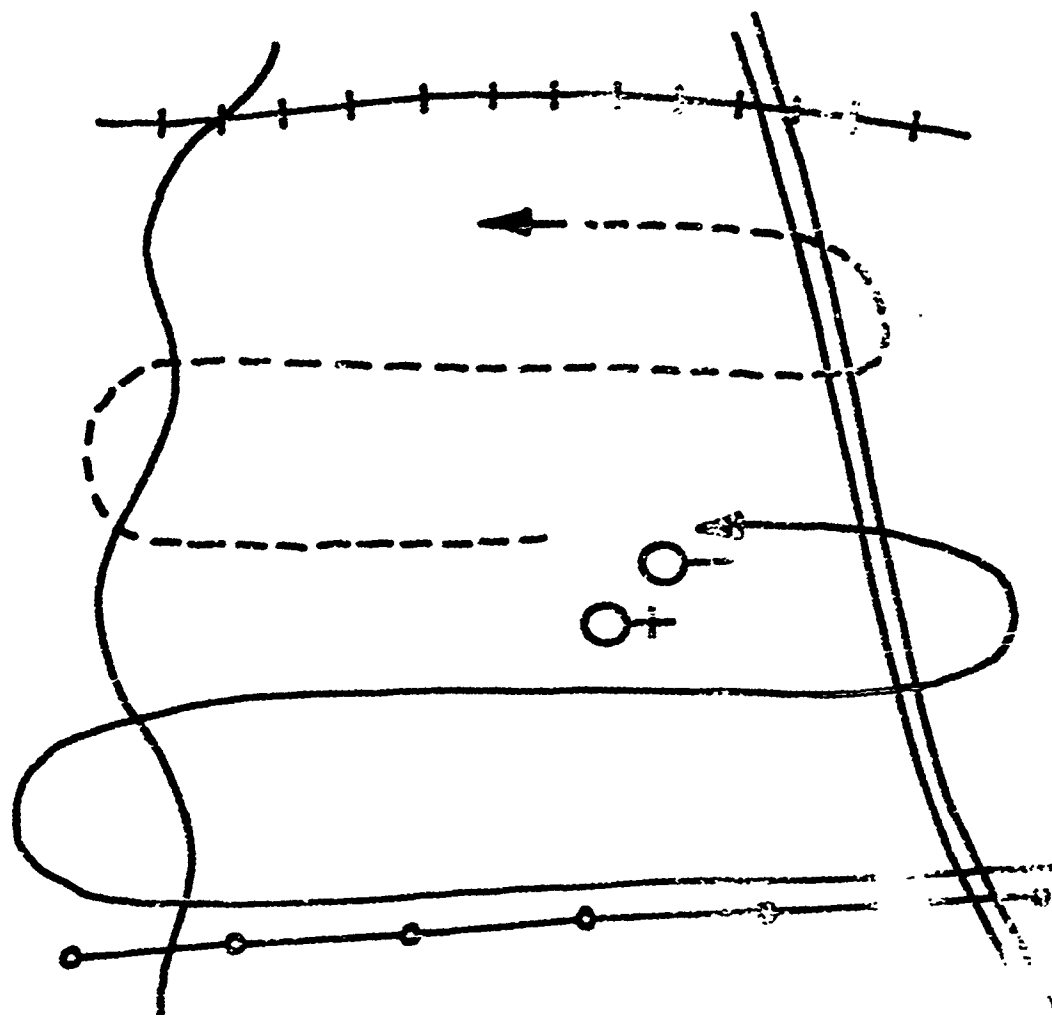
2. AERIAL RECONNAISSANCE AND AREA SURVEILLANCE

Aerial reconnaissance and area surveillance are essential ingredients of a successful operation in counterinsurgency warfare. Without reconnaissance, the ground combat commander cannot properly assess the insurgent's capabilities and limitations. In obtaining information, helicopter fire teams performing aerial reconnaissance and area surveillance avoid combat with enemy forces if at all possible. They use their weapons only when combat is essential to the mission. The reconnaissance mission must not be jeopardized by combat with the enemy, particularly when fighting is not essential in obtaining the information desired. Installation of the XM-6E3 and LAU 32/A armament subsystems, as brought out in the discussion, provide the aerial reconnaissance vehicle with the inflight capability of returning or, in effect, suppressing the insurgent's small arms fire. The armed aerial vehicle provides the commander with quick-reacting mobility, defensive firepower, and communication required of a reconnaissance vehicle. It is especially suited to execute area, point, route, and zone reconnaissance.

a Area Reconnaissance

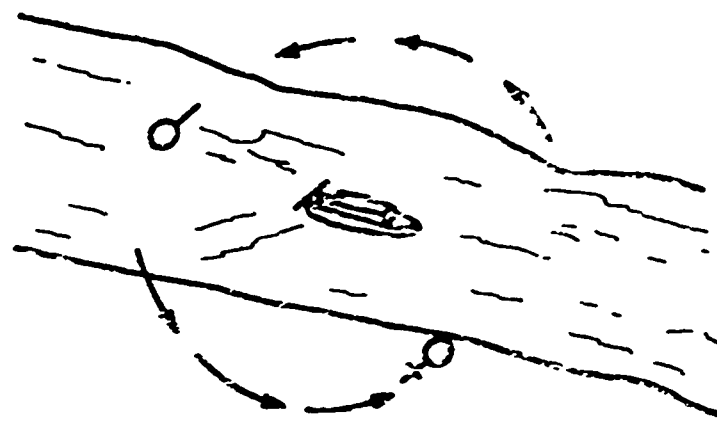
(1) Definition

Area reconnaissance is the directed effort to obtain detailed information of all routes, terrain, and enemy forces within a clearly defined area. Area reconnaissance is performed to gain information of a definite locality such as towns, woods, or crossing sites on a river. The area may be reconnoitered for possibly enemy or to determine its suitability as an assembly area or for other uses by friendly forces. The area to be reconnoitered must be clearly delineated.



○ WINGMAN
 ○+ FIRE TEAM LEADER

(U) FIGURE C-1. Pattern flow in area restricted.



○ WINGMAN

⊕ FIRE TEAM LEADER

(U) FIGURE C-2. Pattern flow in point reconnaissance.

and the terrain adjacent to the route, which if occupied by the enemy, could affect movement along the route. The requirements of a route reconnaissance are less time consuming and can normally be performed more rapidly than area or zone reconnaissance.

(2) Techniques

Reconnaissance of a road, stream, tree line, etc., is usually conducted by a fire team employing one armed helicopter on each side of the route. The fire team may be supported by a second fire team. If the route is bordered on either side by trees, the aircraft should stay 50 meters in from the tree line for best observation. The flight altitude in forested areas should be at treetop level to provide for best observation of personnel and equipment under the dense forest canopy. In sparsely wooded terrain, the flight altitude may be as high as 100 feet above the terrain. This will provide good detail of ground patterns, i.e., trails, patches, ravines, tree lines, and still leave good fields of vision on a horizontal plane to the front and side. In mountainous terrain, the flight altitude should be at least 300 feet horizontally and vertically from tree tops to provide a margin of safety for down drafts and turning voids of armed helicopter and still provide room for detailed observation under the trees. High ground should be reconnoitered first. The enemy will generally choose high ground for observation posts, outposts, and bivouac areas. An example of formation

should be used on low-level reconnaissance. The fire team leader's wingman should position himself 200 to 300 meters behind, to the left or right of the lead helicopter, as shown in figure C-3.

d. Zone Reconnaissance

(1) Definition

Zone reconnaissance is the directed effort to obtain detailed information of all routes, terrain, and enemy forces in a zone defined by boundaries. Zone reconnaissance is more thorough and time consuming than other reconnaissance missions. When the enemy's location is in doubt, or when it is desired to locate suitable routes or determine cross-country trafficability in a zone, a zone reconnaissance may be directed. The width of the zone assigned to subordinate units is determined by the pattern of the road net, terrain features, type of information desired, anticipated enemy action, troops available, weather, visibility, and time available to accomplish the mission.

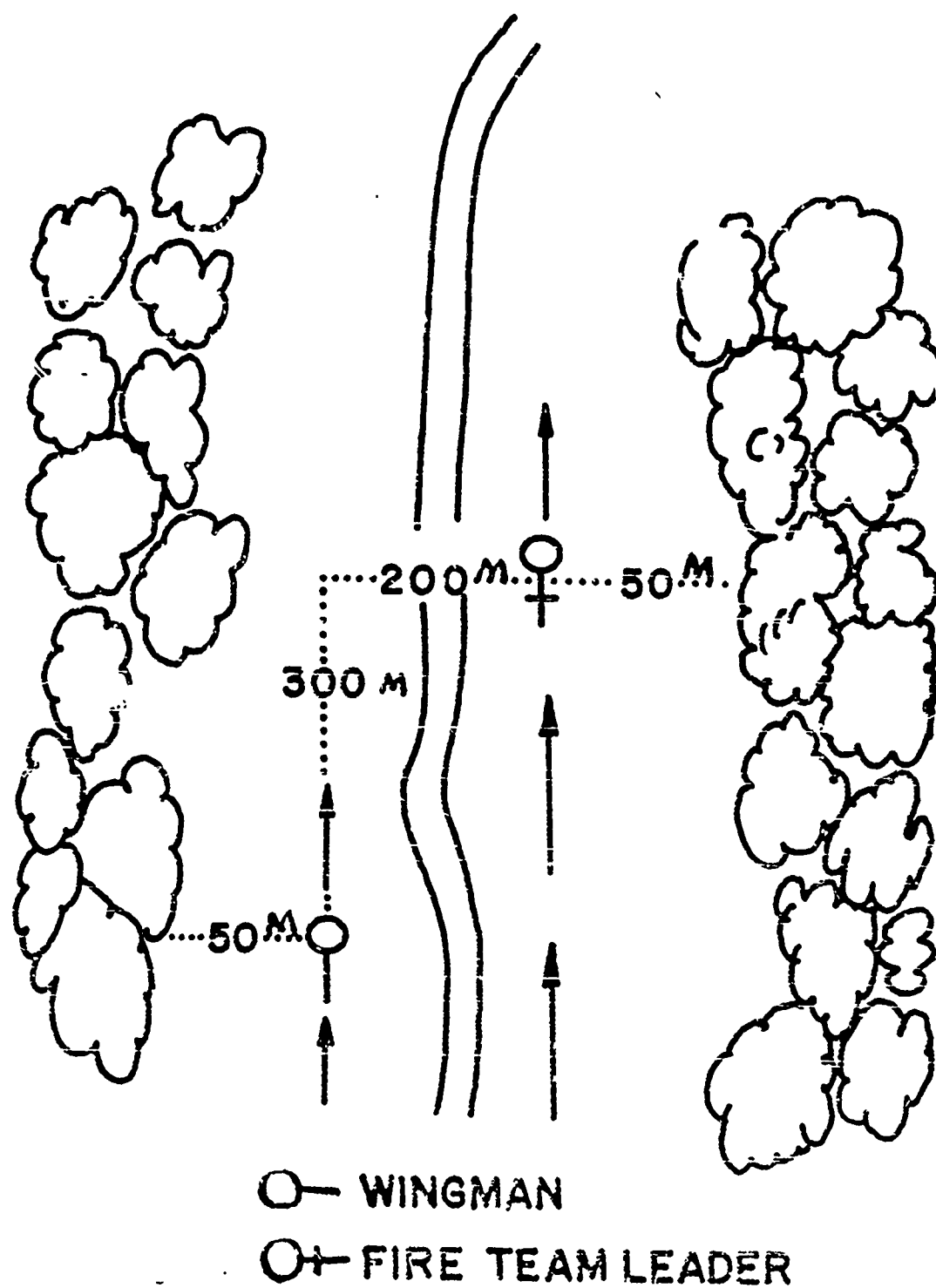
(2) Techniques

A fire team is capable of covering a zone adequate for a battalion size operation by using basically the same techniques used for area reconnaissance.

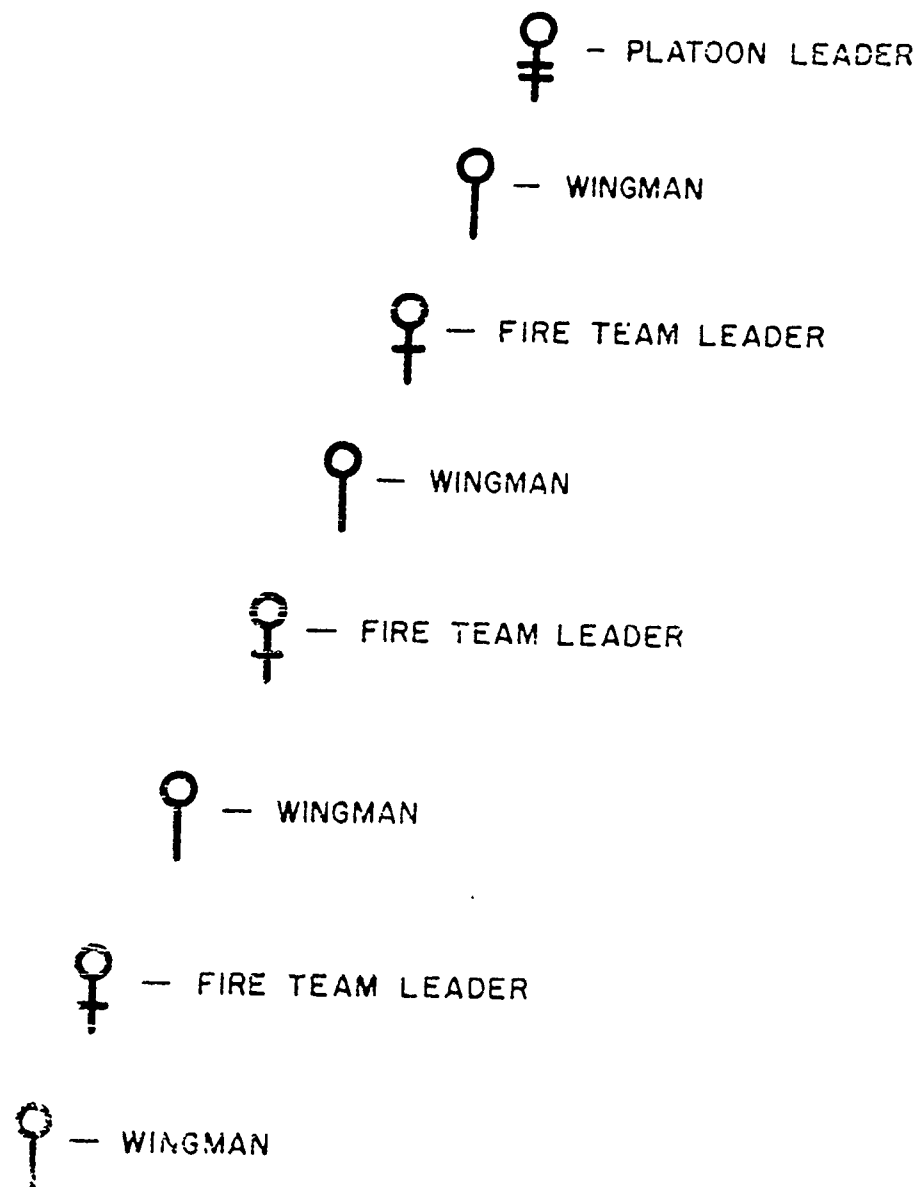
3. FORMATIONS

The principles and techniques shown in figures C-4 to C-13 are the results of experience gained over a period of more than one year under counterinsurgency warfare conditions. They were designed to:

- a) Afford maximum tactical employment
- b) Reduce effects of ground fire
- c) Expedite movement to and from target areas
- d) Provide the commander maximum command and control of his aerial element.



(U) FIGURE C-3. Route Reconnaissance.



(U) FIGURE C-4. Echelon left (platoon).

♀ — PLATOON LEADER

♀ — WINGMAN

♀ — FIRE TEAM LEADER

♀ — WINGMAN

♀ — FIRE TEAM LEADER

♀ — WINGMAN

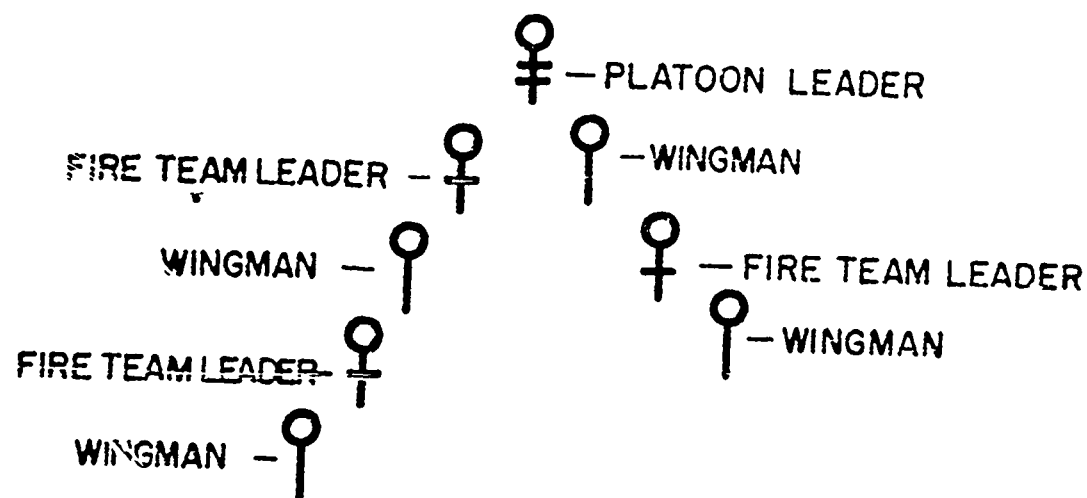
♀ — FIRE TEAM LEADER

♀ — WINGMAN

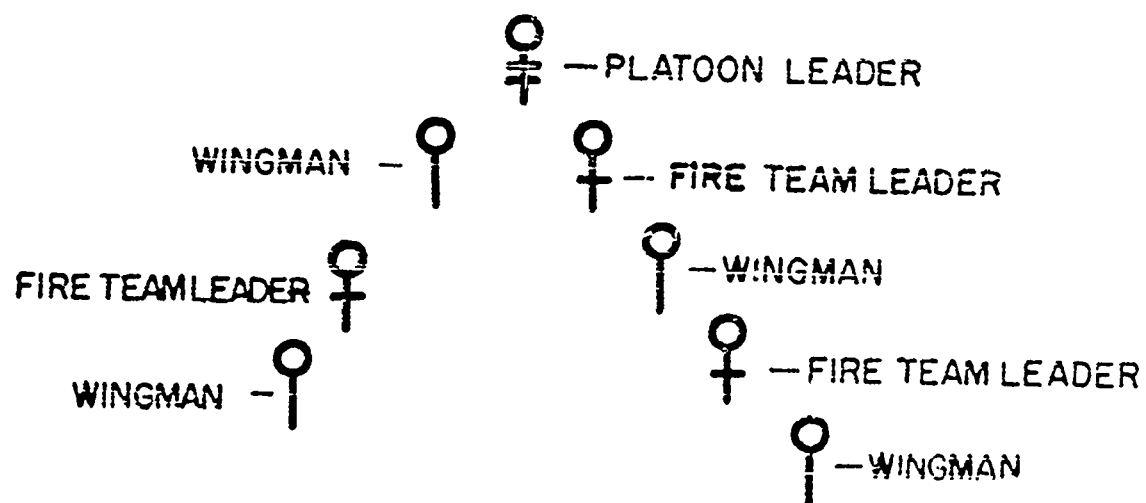
(U) FIGURE C-5. Echelon right (platoon)

ANNEX C

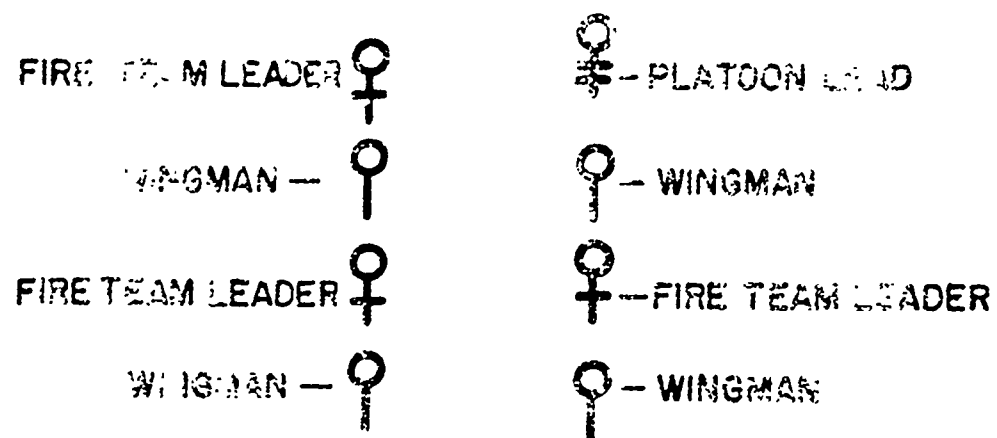
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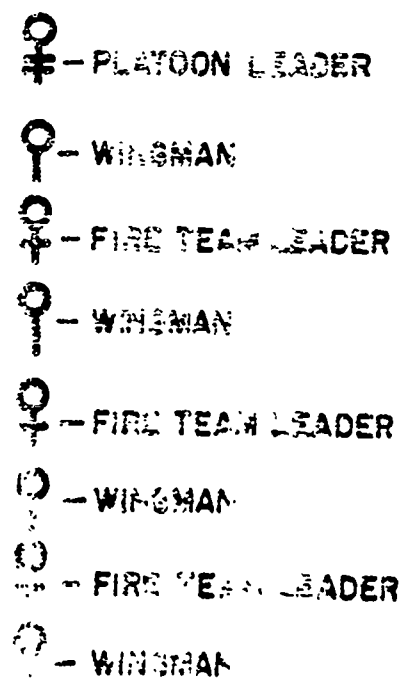
(U) FIGURE C-6. Heavy left.



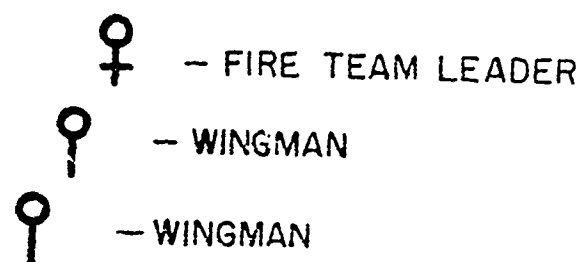
(U) FIGURE C-7. Heavy right.



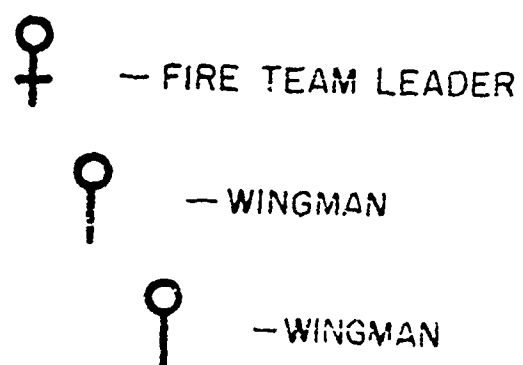
(U) FIGURE C-8. Fire teams abreast.



(U) FIGURE C-9. Column.



(U) FIGURE C-10. Echelon left (fire team).



(U) FIGURE C-11. Echelon right (fire team).

♀ — FIRE TEAM LEADER
 WINGMAN — ♀ ♀ — WINGMAN

(U) FIGURE C-12. Wedge.

♀ — FIRE TEAM LEADER
 ♀ — WINGMAN
 ♀ — WINGMAN

(U) FIGURE C-13. Trail.

(U) ANNEX D

KENYON STABILIZER

During the evaluation, an operational test was conducted as a part of objective 3 to determine the effectiveness of the Kenyon stabilizer in improving the visual discrimination of armed helicopter crews using binoculars. It was determined by the user that the stabilizer is an effective instrument that improves visual discrimination of objects on the ground at altitudes between 1000 and 2000 feet above ground level.

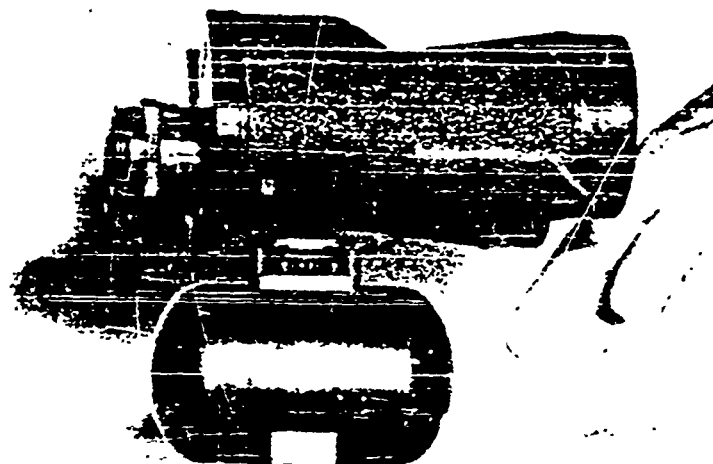
The following is summarized from "Operational Evaluation of the Kenyon stabilizer", Office, Secretary of Defense, Advance Research Project Agency, Research and Development Field Unit in Vietnam (ARPA-RDFU-V), 25 April 1964.

1. DESCRIPTION

The Kenyon stabilizer (KS-4) is a gyroscopic device housed in a metal cylinder measuring approximately 2.75 inches in diameter and 4.5 inches in length. See figure D-1. The weight of the stabilizer is 34 ounces. A batter pack, weighing 3 pounds 14 ounces provides power for the stabilizer. An adapter attaches the stabilizer to the hinge pin of standard field binoculars (M-17). The stabilizer consists of a case containing two single-degree-of-freedom gyros. The free axes are spring-restrained to the case and are oriented approximately 70 degrees from each other. The gyros operate in opposite directions at approximately 20,000 revolutions per minute, and are mounted in gimbal axes which are approximately 2.25 inches apart. The inertial rigidity of the system opposes torque applied perpendicular to the spin axis. No restraint is offered to rotation about the axis parallel to the line of sight through the binocular lens.

2. DISCUSSION

An evaluation was conducted by ARPA-RDFU-V to determine the effectiveness of the Kenyon stabilizer in improving the visual discrimination range of observers using binoculars. It was concluded that stabilized binoculars significantly increase the visual discrimination range of observers in the UH-1B helicopter. It was recommended that model KS-4 Kenyon stabilizer be considered for adoption as standard equipment by US Army airmobile companies.



(U) FIGURE D-1. Kenyon stabilizer attached to binoculars.

3. USER STATEMENTS

a. Captain John D. Talley, 68th Airmobile Company

A thorough test has been conducted by the UTTHCO (68th Airmobile Company) using the Kenyon stabilizer in conjunction with the M-17 binoculars for target acquisition and clarification. The following is the combined opinion of those involved in the test:

- 1) The Kenyon stabilizer was found to be very effective at altitudes between 1000 feet and 2000 feet. Above 2000 feet the target became very hard to identify.
- 2) At altitudes below 1000 feet it becomes increasingly difficult to maintain targets in the glasses as altitude is decreased, and at altitudes of 300 feet and below it is nearly impossible to stay on target with the glasses.

As a conclusion it is felt that the Kenyon stabilizer is of considerable value when used on high reconnaissance and area surveillance but of very little value for low reconnaissance.

b. 1st Lt R. Daws, 118th Aviation Company

In the two times I used binoculars with the Kenyon stabilizer I found that I could see people on the ground, along roads or in fields, whom I would not have spotted with the naked eye. It was possible to see and identify the tools people had in their hands, such as hoes, brooms, etc. It would have been possible to identify weapons had these people been holding them rather than tools. The weight of the stabilized binocular was such that it required both my hands to use them. This prevented my operating the flexible gun sight when using the binoculars. The power pack for the stabilizer is too bulky and takes too long to make the stabilizer effective after being turned on. The two missions on which I used the binoculars consisted of one reconnaissance mission and one escort mission. I believe the binoculars would prove very useful in the hands of a qualified observer in the back of the helicopter, but they are too cumbersome for use by the pilot or copilot.

c. Captain J. Kilgore, 118th Aviation Company

I have used the Kenyon stabilizer on five separate missions, of which three were reconnaissance and surveillance missions and two were escort missions. The stabilized binoculars were very effective in observing people and structures on the ground, but the advantages offered do not justify the inconvenience of use by either pilot or copilot. The weight and bulk of the stabilizer binoculars is such that two-handed operation is necessary. I would be very happy to have a set of stabilized binoculars for each of my armed helicopters to be used from the rear of the aircraft, preferably by a qualified observer.

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ANNEX D

D-14

(U) ANNEX E

SEQUENCE CAMERA

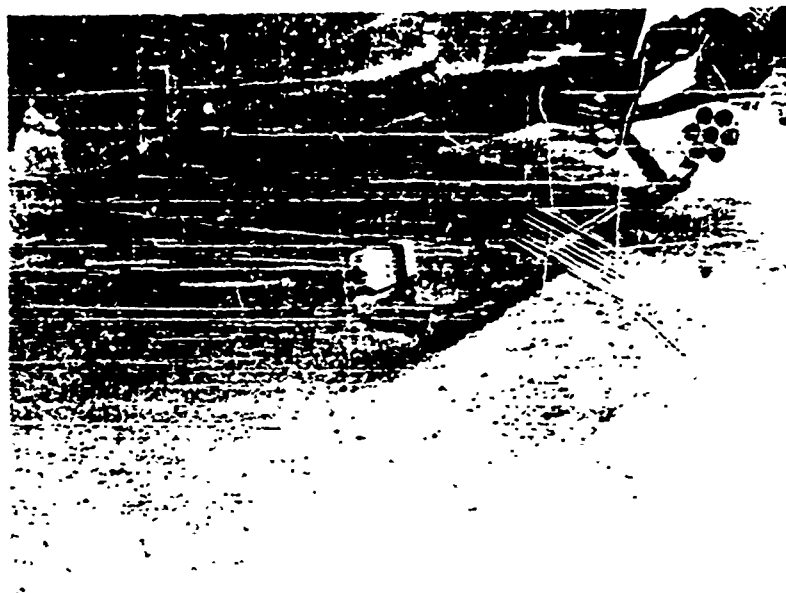
During the evaluation one of the detection methods explored by ACTIV in objective 2 was photographic reconnaissance from a low-flying helicopter.

An operational feasibility evaluation was conducted by two of the US Army aviation units to explore the possibility of getting good photographic information on Viet Cong installations. This included taking pictures of village buildings, roads, trails, foot paths, and waterways; possible cover and concealment points along tree lines and groves; possible sites for weapons, open foxholes, waterholes, and camouflaged positions.

Equipment used was the P-2 sequence camera developed by the US Air Force as an impact and strike camera. It uses 70mm perforated film upon which frames $2\frac{1}{4} \times 2\frac{1}{4}$ inches in size are exposed. It has a 3-inch focal length, an f2.8 lens, and a stainless steel focal plane shutter with speeds of 1/500, 1/1000, and 1/2000 of a second. The cycling rate is five to six frames per second. It can be loaded with a 15- or 50-foot magazine assembly. An accessory is available that permits manual or remote control. Its military specification is MIL-C-6662A. It was selected as an off-the-shelf item that had known capabilities. There is the possibility that it is not the best camera for helicopter reconnaissance in a counterinsurgency environment, however, and an evaluation should be made to determine its suitability in comparison with other available cameras.

Cameras were mounted on the left front skids of four UH-1B helicopters and aligned with the 7.62mm machineguns in the stowed position (figure E-1). The camera operating mechanism was electrically actuated by the cargo release switch on the cyclic control stick. This allowed either the pilot or copilot to operate the camera. All camera settings were manually adjusted on the ground prior to takeoff. Fifty-foot rolls of film were precoded into magazines that were easily removed at the completion of a reconnaissance mission.

Photographs shown in figures E-2 through E-4 were taken in the delta region of the RVN. Figure E-2 was taken on a second pass through an area from which the helicopters had received heavy small arms fire. The figure shows at "A" a possible foxhole, at "B" the position from which the fire was received, at "C" a windbreak or shelter, and at "D" a church.



(U) FIGURE E-1. P-2 sequence camera on UH-1B

Figure E-3 was taken by the wingman of the fire team at an altitude of about 250 feet on the same pass as in figure E-2. It shows at "A" possible foxholes, at "B" a waterhole, at "C" the area from which the fire was received, at "D" a possible gun position, and at "E" the church.

Figure E-4 was taken about 150 feet above the ground on the last pass through the area. At "A" personnel are hiding in a ditch, "B" is a possible gun position, "C" is the possible location of foxholes, and point "D" is the area from which fire was received.

It was found that:

- a) It is possible to get excellent photography with P-2 sequence camera.
- b) The camera aligned with the machinegun in the stowed position has a limited field of view.



(U) FIGURE E-3. Photo by helicopter-mounted P-2 camera.



(U) FIGURE E-2. Photo by helicopter. - 400 ft. - 1000 ft. - 1000 ft.



(U) FIGURE E-4. Photo by helicopter-mounted P-2 Camera

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(U) (S) (C) (E) (X) (Y)

DATA COLLECTION FORMS

The data collection forms listed below were used during the period of the evaluation.

<u>Description</u>	<u>Page</u>
ACTIV Form 7, Evaluator Mission Report	F-2
ACTIV Form 8, Aviation Mission Report	F-5
ASCV Form 46, Ground Fire Damage Report	F-6

Best Available Copy

EVALUATOR MISSION RECORD
ARMED HELICOPTER IN RECONNAISSANCE AND AREA SURVEILLANCE

ACTIV Evaluator:

Mission Number:

Date:

1. Mission Data:

Originator of Mission Request: _____

Type Request: (Preplanned, Immediate)

Type Recon Mission: (Area, Route, Zone, Point)

DTG Mission Requested: (In addition to Division, include time of subordinate unit request) _____

Mission Request Channel: _____

Number of UH-1B requested: _____

Other type aerial reconnaissance requested: _____

Mission Request Content _____

DTG UH-1B requested for: _____

DTG request received by Aviation unit: _____

Number of UH-1B provided: _____

Aviation unit and mission commander: _____

DTG UH-1B provided: _____

Explain discrepancy (time, number): _____

ACTIV Form 7 (2 April 64)

ANNEX F

F-2

2. Briefing:

DTG mission briefing: _____

How briefed (at division, by telephone, radio, other): _____

Briefing Instructions: _____

3. Execution:

DTG actual Take-Off: _____

DTG actual Return: _____

Delays:

Weather _____

Maintenance _____

Weapons _____

Communications _____

Change in Orders _____

Other _____

4. Target Data:

What types of targets were the armed helicopter with assigned crew able to detect?

Could the target be identified as friend, foe, or suspicious?
Yes/No. If yes, how?

Photographic: Photos taken Yes/No.

LTC prints provided G2: _____

Results: _____

Was helicopter fired at? Yes/No. If yes, estimate number of times _____

5. Helicopter hit by ground fire Yes/No.

(if yes, survivability information will be obtained from GROUND FIRE DAMAGE REPORT, ASCV Form 46).

6. Debriefing:

DTG mission debriefing: _____

How debriefed (at division, by telephone, radio, other) _____

Percent of mission completed: 0, 1/3, 2/3, 3/3.

Why was mission not completed? _____

Mission reporting timely. Yes/No.

Stablized binoculars used Yes/No. If yes, state results _____

Adequacy of Air-to-Ground Communications: _____

Techniques of Maneuver: _____

7. Post mission comments:

Was information obtained intended to confirm information from other sources? Yes/No. Was information obtained initial information? Yes/No

What were the other sources of information? _____

What command action was taken as a result of information obtained on this mission?

Eagle Flight _____

Airmobile Assault _____

Ground Action _____

None _____

9. Evaluator Remarks: _____

Mission No. _____ DTG _____ Unit Supporting _____

Pilot _____ Organization _____

Type Mission _____

Iter No.	Target Identification (Include *Type Terrain and ** Ground Cover)	Coord	Time of Observa- tion	Alt	To Whom, When, How Information Reported

*Terrain: Flat = F, Rolling Hills = H, Mountain = M, Delta = D, Mangrove = G,
Coastal = C, Rice Paddy = R

**Ground Cover: None = 1, Scrub = 2, Grass = 3 (Indicate Height), Up to 1/3 Trees =
4, 1/3 To 2/3 Trees = 5, Over 2/3 Trees = 6, Structures = 7 (Indicate
How many).

ACTIV Form 8, 2 Apr 64

C-L-A-S-S-I-F-I-C-A-T-I-O-N
"CONFIDENTIAL WHEN COMPLETED"

GROUND FIRE DAMAGE REPORT (AGS-ASGV-CA-1-(C))

TO: Commanding General
US Army Support Group, Vietnam
ATTN: ASGV-CA
APO San Francisco 96243, US Forces

FROM: Commanding Officer

I. General:

a. Date: _____ d. Mission Number: _____
b. Type of Aircraft: _____ e. Type of Mission: _____
c. Aircraft Ser. No.: _____ f. Pilot's Name and Rank: _____

II. Description of Conditions at Time Ground Fire was received.

a. Absolute Altitude: _____ b. Airspeed in Knots _____
c. Aircraft Activity at Time it was hit:
(1) On ground at _____
(2) Taking off from _____
(3) Enroute from _____ to _____
(4) Landing at _____
(5) Other. _____
d. Approximate Reading in Degrees: _____
e. Visibility Conditions: _____
f. Type of Formation: _____
(Trail, Echelon, Vee, Right or Left, Other)
g. Position Number _____ in formation of _____ aircraft.
h. This was _____ pass through area during this mission.
i. Was armed helicopter escort present? Yes (); No ().

ASGV Form 45 (15 Sep 63)

ANNEX F

8.1

III. Enemy Data.

a. Was source of ground fire observed? Yes (); No ().

b. If source of ground fire was observed (or could be estimated) complete the following:

- (1) Coordinates of source: _____
- (2) Direction of source: From _____ o'clock. (Direction of flight is 12 o'clock).
- (3) General description of terrain and ground cover at source:

- (4) Range to source in meters _____
- (5) Number and type of weapons fired: _____
(Rifle, MG, Unknown)
- (6) Number of rounds fired: _____
- (7) Was tracer fired? Yes (); No ().

IV. Counter-Fire Data: If fire was returned, complete the following:

- a. Target Description: _____
- b. Range: _____; Direction _____; Altitude _____;
Speed _____.
- c. Rounds fired: MG _____; Small Arms _____; Rocket _____
- d. Results: _____

V. Summary of Damage Data:

KIA _____ KIA _____

a. Number of Hits: _____ b. Casualties: US _____ VN _____

WIA _____ WIA _____

c. Was aircraft hit in protected area (ie fuselage; tank armor plate, etc)? Yes (); No (). If answer is yes, describe effectiveness of the protective device or kit: _____

d. Aircraft Reaction to Enemy Fire (check one).

(1) () Crashed.

(2) () Forced to land, later destroyed.

(3) () Forced to land, later recovered.

(4) () Continued to fly.

e. Describe Structural Damage: _____

VI. Remarks: _____

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(U) ANNEX G

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Commanding General, Seventh US Army, ATTN: G-3	5
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Commanding General, US Army Test & Evaluation Command	1
Commanding General, US Army Ordnance Center & School	1
Commanding General, US Army Mobility Command	1
Commanding General, US Army Special Forces Fort Bragg, North Carolina	4
President, US Army Armor Board	1
President, US Army Infantry Board	1
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Commanding Officer, US Army Combat Developments Command Armor Agency	2

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Hq, US Air Force, ATTN: AFRDC Washington, D. C., 20310	1
Hq, US Air Force, ATTN: AFRST Washington, D. C., 20310	1
Hq, US Air Force, ATTN: AFRDD Washington, D. C., 20310	1
Hq, US Air Force, ATTN: AFPIFDA Washington, D. C., 20310	1
Hq, US Air Force, ATTN: AFORQT Washington, D. C., 20310	1
Hq, US Air Force, ATTN: AFSPD Washington, D. C., 20310	1
Hq, Air Force Systems Command, ATTN: SCS-6 Andrews Air Force Base, Washington, D. C., 20310	3
Commander, Air Proving Ground Center, ATTN: PGBAP-1 Eglin Air Force Base, Florida	1
Hq, Air Force Systems Command, ATTN: AFSSC Wright-Patterson Air Force Base, Ohio, 45433	1
Air Force Avionics Laboratory, ATTN: AVP Wright-Patterson Air Force Base, Ohio, 45433	1
Hq, Aeronautical Systems Division, ATTN: ASJ Wright-Patterson Air Force Base, Ohio, 45433	1
Hq, Aeronautical Systems Division, ATTN: ASZ Wright-Patterson Air Force Base, Ohio, 45433	1

Hq, Aeronautical Systems Division, ATTN: ASR Wright-Patterson Air Force Base, Ohio, 45433	1
Hq, Research and Technology Division, ATTN: RTTN Bolling Air Force Base, Washington, D. C., 20310	3
Air Force Aero Propulsion Laboratory, ATTN: AFS-Maj D L Sumner Wright-Patterson Air Force Base, Ohio, 45433	1
Air Force Flight Dynamics Laboratory, ATTN: FDG Wright-Patterson Air Force Base, Ohio, 45433	1
Systems Engineering Group, ATTN: SESJ, Directorate of Limited War Wright-Patterson Air Force Base, Ohio, 45433	1
Hq, Tactical Air Command, ATTN: DORQ Langley Air Force Base, Virginia	1
Hq, Tactical Air Command, ATTN: DMEM-AC Langley Air Force Base, Virginia	1
Hq, Tactical Air Command, ATTN: DORF-SW Langley Air Force Base, Virginia	1
Commander, 1st Air Commando Wing Hurlburt Field, Florida	1
Commander, Special Air Warfare Center Eglin Air Force Base, Florida, 32542	1
Commander, 1st Combat Application Group Eglin Air Force Base, Florida, 32542	1
Commander, Tactical Air Warfare Center Eglin Air Force Base, Florida, 32542	1
Hq, Pacific Air Force, ATTN: PFORQ Hickam Air Force Base, Hawaii	1
Hq, Pacific Air Force, ATTN: PFLPL Hickam Air Force Base, Hawaii	1
Hq, Pacific Air Force, ATTN: PFMSS Hickam Air Force Base, Hawaii	4
Commander, 13th Air Force APO US Forces 96274	2