SUBJECT: JOEG-V's Operational Evaluation of Armed Helicopters -(C);
Short Title: OPENAH -(U)

Commanding General, U.S. Military Assistance Command,
Vietnam, APO 143, San Francisco, California

Chief of Staff
Department of the Army
The Pentagon
Washington 25, D.C.

1. Reference a establishes the Joint Operations Evaluation Group­
Vietnam and directs that the JOEG-V will monitor test operations in
order to evaluate the results having joint implications. Operational
evaluation reports prepared by the JOEG-V and associated test reports
will be forwarded to the initiating agency via normal military channels
with simultaneous information copies being forwarded to JCS, Service
departments, and DDR&E/ARPA.

2. Reference b directs that evaluations include the views of the
Director, OSD/ARPA R&D Field Unit, Vietnam/JOEG-V.

3. Reference c directs deployment of a U.S. Army Utility Tactical
Transportation Company (UTTHCo) (Provisional) to South Vietnam
for the purpose of evaluating a concept of employing armed helicopters
and tactics and techniques in escort of transport helicopters and indig­
ous ground troops involved in Air Mobile Operations.

4. Reference d directs that the Director, OSD/ARPA R&D Field
Unit/JOEG-V, will place primary emphasis on the improvement of
combat capability for the forces actually involved, leaving longer term
impact on U.S. Forces and doctrine to be derived from essentially
U.S. based analysis of successful and unsuccessful field experiment.
Since this evaluation is based entirely on operations that took place
in RVN, the discussion and findings apply primarily to this theater.

DOWNGRADED AT 3 YEAR INTERVALS,
DECLASSIFIED AFTER 12 YEARS

CONFIDENTIAL
5. The Director's (JOEG-V) evaluation of those portions of the final Armed Helicopter test report that have joint implications are attached as Inclosure 1.

6. Attached as Inclosure 3 are ten (10) copies of the final test report of the Army Concept Team in Vietnam (ACTIV) on the Armed Helicopter. (Five (5) copies for CINCPAC and five (5) for CofS USA).

7. The Distribution List is attached as Inclosure 2.

3 Incl:
1. Evaluation
2. Distribution List
3. Final Report

ROBERT H. YORK
Brigadier General, U. S. Army
Director
| ANNEX 1 | Evaluation of Final Report by Assistant Director, JOEG-V |
| ANNEX 2 | Comments on Final Report by 2nd Air Division |
| ANNEX 3 | Comments of Commanding Officer, U.S. Army Support Group, Vietnam |
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INTRODUCTION

The ACTIV Final Test Report, "Operational Evaluation of Armed Helicopters, Short Title: OPENAH," was evaluated by the Deputy Director, JOEG-V, Annex 1. Separate comments were submitted by the Commanding General, 2d Air Division on this test report (Annex 2). These two annexes point out what are considered to be the "joint interest" aspects of the test. The Commanding General, US Army Support Group and the senior advisors who employed the armed helicopter elements of the Utility Tactical Transport Helicopter Company (UTTHCO) were asked to submit comments on Annex 1, or their general comments, in order to get the views of all concerned. These comments are at Annexes 3 thru 7. This paper will be an overall evaluation of the divergent views expressed in the annexes indicated above. The views of the Commanding Officer, Marine Medium Helicopter Squadron 261, are at Annex 11.

It is pointed out that this discussion is confined to operations in the RVN and is based to a great extent on actual observations of the armed helicopters and fixed-wing aircraft in operations in the escort role. Longer term aspects of these tests or their utilization in other environments or levels of hostility are left to evaluations to be conducted in CONUS.

It is recognized that the evaluator can be accused of bias and the evaluation discounted to a great extent for this reason. Although an honest attempt was made to be objective as possible it is difficult, if not impossible to discard twenty-six years of military experience. If it is considered that bias is reflected in this evaluation, it is pointed out that it results from an honest attempt to answer what are considered to be honest criticisms that stem from sincere convictions by those with opposite views. Except for those criticisms this evaluation would have been very brief indeed. No claim is made, for example, as Air Force evaluators have made for the fixed-wing aircraft, that the armed helicopter can perform all the aviation support mission requirements of the counterinsurgency ground forces. The reader is therefore invited to weigh
the relative bias of the two opposing schools of thought. For this purpose all pertinent views are included in the annexes.

JOINT INTEREST

The most pertinent test objective, from the joint interest viewpoint, is test objective #2; "assessment of the effect on insurgents of suppressive fire delivered by armed escort helicopters in the landing zone".

Test results proved to ACTIV's satisfaction that the armed helicopter has both a role to play in the escort of transport helicopters and a capability to perform that role. In-country critics of the armed helicopter question the relative effectiveness of this aircraft vis-a-vis the available fixed-wing aircraft. Such critics contend that because of the relatively limited firepower of the armed helicopter, its vulnerability, and its high cost (when compared to in-country fixed-wing aircraft), it is unsuitable for the role in which it was tested. This mission, they say, can be more effectively and economically performed by fixed-wing aircraft. Viewpoints of both groups, pro and con, germane to this evaluation, are covered in Annexes 1 thru 12.

EVALUATION

A. General

There is no "pure", statistical proof in the ACTIV report of the effectiveness of the armed helicopter suppressive fire in the landing zone (LZ) against insurgents. The difficulty of gathering "pure" data under actual operations must, of course, be recognized. Test objectives were subordinated to actual operations and since there were so many uncontrollable factors involved, the acquisition of conclusive statistical data was impossible to obtain during the test period. The fact that the number of hits on transport helicopters declined from a pre-test rate of .011 per combat support hour to .007 during the test period may not be statistically conclusive but it is, at least, noteworthy. These figures are strikingly significant because it is known that during the last three months of the test (at least), the enemy's anti-aircraft fire effectiveness throughout the RVN increased threefold (See Annex 2).
Mr Mark J. Eisner, Research Analysis Corporation (RAC) analyst with CDTC-V, was asked to make a statistical analysis of ACTIV's final test report. This analysis is at Annex 2. Mr Eisner's conclusion was as follows:

That there are inadequacies in the statistical measure of effectiveness and controls used in the OPENAH program does not reflect on the actual effectiveness of armed helicopters in the escort role. The findings and conclusions of the study may be valid — suppressive fire may be as effective as claimed — but it seems clear that many of them have not as yet been established on the basis of sound statistical reasoning, so that the validity of the findings must rest on other bases. It may well be that seasoned military judgment and the opinions of the "users" are more appropriate to an evaluation of this nature. But if statistical arguments are used, they must be used properly, despite limitations imposed by testing in an active theater.

Viet Cong (VC) casualty figures estimated by ACTIV may not be impressive. The UTTHCO was testing a concept. Their mission was to protect the transport helicopters. Enroute to the LZ the transports endeavor to avoid the Viet Cong since it is considered that this tactic provides the best protection for these aircraft. That mission is considered most successful on which no enemy resistance is encountered yet the troops debark and accomplish the mission. It is not feasible to compare the relative effectiveness of the armed escort helicopter with that of the fighter by using Viet Cong kills as a measure.

The mission of the fighter-bomber is to kill, the mission of the armed helicopter escort is to protect. While either "suppressive" or "destructive" fire (the terms should be used interchangeably) contributes to such a mission, the number of transport helicopters saved by such fire cannot be measured. A parallel would be the role of fighter aircraft in escorting B-17's in WWII. Also, there is no claim in the ACTIV report that the current UH-1's are the ideal armed helicopter. In fact, a significant portion of the test was conducted with UH-1A's carrying locally fabricated weapons systems consisting of two (2) .30 caliber machine guns and sixteen (16) 2.75 inch rockets. The machine guns were not flexible as were those on the later UH-1B models which came equipped with a production-type flexible machine gun system. But UH-1B helicopters were never equipped with the latest and more effective casualty producing weapons; i.e., the XM 5 40mm grenade launcher.

In any case, dependence on statistics alone would be dangerous. For
example, if statistics on the numbers of enemy killed by the M-1 rifle in the RVN were computed, the chances are that a conclusion could be made that the M-1 rifle is not an effective weapon and that it should therefore be abandoned. The fallacy of such a conclusion is apparent.

Since statistics are in this case not conclusive, the evaluator, as Mr. Eisner suggests, must rely heavily on professional opinion - and professional opinion is divided between the Air Force and the Army. An examination, therefore, of both views is required.

B. Opposing Views

On the one hand, those who flew the armed helicopters are most enthusiastic about its capabilities. Similarly, the personnel of the escorted helicopters, as well as the US Army advisors and the ARVN division commanders, are strong supporters of the armed helicopter. In other words, the users and customers are satisfied.

On the other hand, those who question the wisdom of using the armed helicopter in this role do so with challengeable statistics and base their arguments primarily on cost-effectiveness. It must be pointed out that the arguments presented by this latter group are very plausible indeed. To those who have not observed operations they will certainly appear most sound. In deference to the sincerity of the critics, none of them have as yet taken the opportunity to observe the operations of the UTHHCO. Without first hand knowledge they have had to rely, unfortunately, on theoretical analysis as a basis for their arguments.

Since professional opinion differs, a close look at some of the factors are in order. First, an understanding is required of the characteristics of the armed helicopter and the nature of heliborne operations, as well as the enemy and the environment.

C. The Armed Helicopter, the Enemy, and the Environment

1. Characteristics of the interim-armed helicopter

a. Advantages

In the role in which they were used, the most favorable characteristics of the armed helicopter were:
(1) Its ability to fly in close proximity to and at the same speed range of the transport helicopter. This gave the aircraft a very quick response capability that could not be duplicated by any other aircraft.

(2) Its great visibility. This resulted not only from its ability to fly low and slow, but because of the design of the helicopter and the fact that five pairs of eyes (pilot, co-pilot/gunner, crew chief/gunner, and ARVN observer) were always available to look. This not only increased the chances of detecting the Viet Cong but also allowed for discrimination between combatants and non-combatants.

(3) Its ability to perform its mission in marginal weather conditions when other aircraft could not fly - a most important point in the RVN. The armed helicopter—being a helicopter—does not require weather minimums in excess of those required by the escorted transport helicopters in order to accomplish their mission. Weather must be recognized as a limitation of fixed-wing, fighter-bomber aircraft. It can preclude the execution of heliborne missions if fixed-wing aircraft are depended upon exclusively for air support. Furthermore, recognizing the marginal weather limitations of fixed-wing aircraft, the VC can be depended upon to capitalize upon this fact whenever possible. Of the 78 missions conducted during the test period, only 4 were delayed due to adverse weather conditions and none were aborted.

(4) Its ability to concentrate a relatively high volume of concentrated firepower in a short period of time from a very stable platform.

(5) Flexibility of armament. The M-60C 7.62mm machine guns on the XM-6E3 UH-1B are flexible in azimuth to $70^\circ$ to each side of the longitudinal axis and in elevation to $60^\circ$ degrees above and $60^\circ$ degrees below the datum plane. The co-pilot/gunner trains and fires this subsystem from his sighting station. The pilot has an emergency forward firing capability.

(6) Its ability to operate in confined spaces where fixed-wing aircraft could not, particularly in certain LZ's in the mountains.

(7) Its good communication with the transport helicopters as well as with the ground commanders. More important than the radio equipment itself is the fact that the armed helicopter's base of operation was invariably
at the division field command post where the pilots could stay abreast of the operation, be immediately responsive, and could get face-to-face instruction when it was required.

(8) Its great flexibility, which enabled it not only to perform its primary mission but also to evacuate wounded and prisoners, deliver supplies, relay radio messages, or transport the ground commander and observers to the battlefield - all of which it performed many times.

b. Disadvantages

The unfavorable characteristics of the interim-armed helicopter when compared to in-country fixed-wing aircraft are:

(1) Its limited time on station. To partially offset this disadvantage, operations from forward bases were conducted but this required pre-positioning aviation fuel which was often cumbersome and ran the risk of disclosing planned operations (although no more so than moving the division headquarters and troops to these sites).

(2) Its vulnerability. (This will be discussed later).

2. The Environment.

In the delta where the bulk of escorted heliborne operations occurred during the test, the target area usually consisted of a village or villages located in a patch of palm trees, often along a canal. The surrounding areas are open rice paddies. The landing zones (LZ's) for the transport helicopters were selected on the basis of the latest intelligence information. Normally there were two options: (1) To select LZ's far enough away from the target area for the transport helicopters to be safe from fire from that area, or (2) To select an LZ as close to the target area as possible. The selection was made, after reconnaissance, by mutual agreement between the transport commander and the ARVN senior advisor after taking many factors into consideration. The ARVN Commander and advisor generally preferred to get as close to the objective as possible. This desire was based on experience that, except perhaps for sentries, the VC normally do not occupy positions until an attack approaches. With the surprise that the helicopter can achieve, ARVN commanders hope to
occupy the area before the VC can occupy these positions, which can be done if
the helicopter is landed close enough.

Analysis of these two viewpoints leads to the following con-
cclusions:

In the first case, by landing at a distance from the objective,
surprise has been sacrificed and the enemy, if present, is given an opportunity
to man his foxholes. If the enemy does so, friendly troops are exposed for long
periods of time to enemy fire before reaching the objective. If such fire is
received, it would be prudent, obviously, to employ fighter aircraft. The
question next arises, does the escort helicopter have any role to play under
such circumstances? The answer is "no", in view of the escort helicopters'
mission of providing protection to the transport helicopter into the initial LZ.
(The insurance, morale and deterrence factors, however, are considerations.)

On the other hand, if the decision is made to land the transport
helicopters on or close to the objective area in order to achieve surprise, the
role of the armed helicopter in protecting the transport helicopter is more
apparent. The critical phase of such a heliborne movement is the approach, land-
ing, and lift-off in the LZ. During this time the success of the entire operation
is at stake and a number of lives and expensive equipment are in jeopardy. Such
a situation calls for instantly responsive fire support if enemy fire is received.
It is under such circumstances that the armed helicopter is particularly suit-
able for defense of the transports. It is flying immediately adjacent to the
transports. Its ground-oriented pilot and crew can see details of the ground
situation and can therefore often locate the enemy even before he opens fire. If
this does not happen, direct communications between the transports and escorts
provide immediate notification to the armed helicopters of the direction of
hostile fire as soon as it is received. This information is received simultane-
ously by all the armed helicopters, at least one of which, using the tactics
described in section II of the Final Test Report, should be in a position to
return fire immediately or in a matter of seconds. From that moment on, using
the daisy chain maneuver, continuous fire can be maintained on the enemy position
until the transport helicopters have discharged their troops and lifted off.

It would be impossible for fixed-wing aircraft to provide such instantaneous support during this critical period or to maintain it for the period of time required. The speed of the fixed-wing aircraft does not permit it to stay close to the slow-landing helicopters, hence the likelihood is extremely remote that the fighter will be at the exact required spot at the precise moment, and identify the target in time to fire. Even should it be able to accomplish this, its turn-around time would not allow it to maintain the continuous fire required for the short period of time the transport helicopters are so vulnerable. If multiple targets should appear, the fixed-wing aircraft’s problem would be even more difficult.

The foregoing description of the circumstances which prevail in the landing zone, observed, a number of times by the evaluator, indicates that both the armed helicopter and the fixed-wing aircraft have appropriate roles to play in heliborne landing operations. The armed helicopters are needed to give instantaneous, concentrated, and continuous fire during the approach, landing, and lift-off; and the fighter aircraft are needed to provide heavier firepower after the targets have been identified and the transport helicopters have withdrawn.

3. The Enemy

Experience in the RVN, and in counterinsurgency generally, demonstrates that intelligence is seldom accurate enough to predict with certainty the exact strength and location of the enemy. It will seldom if ever be known whether a position is occupied or not. If the position is occupied and surprise has not been achieved, the transport helicopters are obviously in a critical situation if the decision has been made to land close to the objective. As pointed out in the Final Test Report, Section III, TAB 3A, the enemy is fully aware that the transport helicopter is most vulnerable during the landing period. The well-trained insurgent will withhold his fire until this time, which is generally too late for the helicopter to abort and go to an alternate landing zone. Defensive VC tactics against helicopters are described again in Annex 8. This
annex also shows that the VC have been instructed to lay quietly and avoid disclosure during preparatory air strikes. After opening fire they are to "advance toward the enemy (ARVN) to avoid air strikes".

a. Weak vs Strong Enemy Positions

The point is often made by those who would negate the efficiency, effectiveness, and practicality of the armed helicopter that it may be able to perform its escort mission against light opposition but it could not perform this mission against heavy opposition, therefore its value is questionable. The Ap Bac battle is cited as conclusive proof of this argument. This point needs analysis.

If an enemy position is occupied and the defenders withhold their fire until the transport helicopters are touching down the helicopters are in trouble. The armed helicopter, less vulnerable because it is still moving at 60/90 knots, provides the transport helicopter with its best opportunity to extricate itself without undue losses at this time. This is true whether there is one or one hundred enemy firing. Any counter-fire at this point tends to reduce the effectiveness of enemy fire, and is worthwhile regardless of its source. To say that the armed helicopter is only effective against light opposition is unrealistic. It would be just as logical to say that only an atomic bomb is worthwhile if enough artillery is not available to completely wipe out the opposition. Firepower is firepower regardless of its source. Its effectiveness can only be measured by its volume, accuracy, and timeliness. The effectiveness of the firepower of the armed helicopter should be no more questionable than firepower from any other source.

b. Ap Bac

It would be doing the entire defense establishment a disservice if the armed helicopter were placed in disrepute because of false impressions that have been drawn from the battle at Ap Bac. There no longer needs to be any doubt about what occurred at Ap Bac. The circumstances have been well investigated and documented. Additionally, the VC "after action report" on that battle has been captured. Facts pertinent to that battle are:
(1) No armed helicopters were lost in that operation while performing their escort mission. One armed helicopter was disabled while it was attempting to rescue the crews of downed transport helicopters. This attempt was made without proper fire cover, and in front of a known strong enemy position. Only one transport helicopter was unable to exit the landing zone after depositing its troops. Another was hit in the forward transmission while leaving the LZ and made an emergency landing outside the LZ where the crew was evacuated safely. Two H-21's and the UH-1 mentioned above were disabled while attempting to rescue the crew of the single H-21 downed in the LZ. These rescue attempts were in conformance with a unit SOP which called for such action at that time. This standard procedure has since been discontinued in favor of command decision at the scene of action.

(2) The effect of the suppressive fire of the armed helicopter at Ap Bac is, of course, unknown. No one can say how many transport helicopters or how many lives would have been lost had the armed helicopter not been present. However, it can definitely be pointed out that the enemy held his position until dusk and withdrew at a time of his own choosing despite the fire from the armed helicopters; the fire from six battalions of landed ground troops; several attacks by a company of M113 armored personnel carriers; and the bombing and strafing (after the enemy position had been located) by 6 AD-6's and 6 T-28's using 50 caliber, 20mm, 2.75 rockets, bombs and napalm. According to their own after action report the VC lost 18 KIA and 39 WIA.

It is apparent that the armed helicopter should be condemned no more than any other weapons system engaged in that operation.

D. Vulnerability of the armed helicopter

It cannot be denied that the helicopter is vulnerable. It would be foolish to argue otherwise. Nothing is more vulnerable, however, than a foot soldier trying to advance across an open muddy rice field against a determined enemy. In either case the risk invariably has to be measured against the possible gain. Tactics have to be varied to fit the situation. In the case of the armed helicopter, the test conclusively shows that in operations to date the armed
helicopter has shown its ability to survive at the current level of insurgency operations while utilizing daring tactics and techniques. Despite these daring tactics not one armed helicopter was unable to return to base under its own power while performing its escort mission during the test period. As pointed out earlier one UH-1 was disabled while attempting a rescue. During the armed helicopter test period two A-1H's, three T-28's, two B-26's, and two OV-1's were lost while on operations.

While no claim is made that the helicopter is not vulnerable, it should be pointed out that because of its autorotation capability, it is normally able to descend sufficiently slowly after being hit to avoid destruction and is therefore repairable. This is not a characteristic of fixed-wing aircraft.

E. Cost-Effectiveness

Another point of joint interest that has been raised by the critics of the armed helicopter is that of cost-effectiveness. JOEG-V does not have the capability to make a cost-effectiveness appraisal. This can better be accomplished in CONUS. Since Air Force elements in-country have expressed concern on this point, however (See Annexes 1 and 2), the following considerations should be of interest to those who may make such a study.

The cost of the armed helicopter is high when compared to that of in-country fixed-wing aircraft. (Although the "fly-away" cost of the A-1H was $259,836 in FY 53.) Neither is high when compared with more sophisticated aircraft. What applies to the armed helicopter, of course, applies to the transport helicopter from the cost standpoint. No one questions the value of the transport helicopter in counterinsurgency although compared to the truck it is very expensive. Its value, however, lies in its ability to do what the truck cannot do. Similarly, the value of the armed helicopter, as pointed out above, lies in its ability to do what other aircraft cannot do (or, if other aircraft can do what the helicopter does, they cannot do it in as timely a manner or as well).
If a comparison is to be made between the fixed-wing aircraft and the armed helicopter, the purchase price and maintenance cost are not the only factors that should be compared. Expensive runways and base facilities required for the fixed-wing but not for the helicopter, would be a consideration. A parallel might also be the modern aircraft carrier. The cost of each plane utilized from the carrier is astronomically high. In the case of the aircraft carrier and runway and base facilities, however, both are needed in modern war. Cost is therefore a secondary consideration in any decision to use them. It should also be a secondary consideration in the use of the armed helicopter.

Again, vulnerability is a consideration in cost-effectiveness, particularly as it pertains to possible escalation. It would be impossible, of course, to measure the relative vulnerability of fixed-wing aircraft and their required runways and fixed base facilities, or the missile vulnerability of the aircraft carrier in a war of higher scale, against the relative invulnerability of the dispersed helicopter.

The cost of a transport helicopter destroyed because of inadequate protection and the cost of the lives of the personnel it carries, though impossible to measure, are still factors to be considered.

Finally, the cost of ordnance expended on targets where results are unobserved is a factor. Ordnance expended by the armed helicopter during the test period is given at Tab XI of the Final Test Report. For comparison purposes the ordnance expended by the VNAF/USAF fighter aircraft for the period 1-31 May (a period of peak VNAF/USAF activities) as reported in the 2d Air Division's APEX OPSACT reports, was computed. See Table 1, next page.
# Table 1

<table>
<thead>
<tr>
<th>Type of Ammo</th>
<th>Total Expended</th>
<th>Cost</th>
<th>Units of Ammo Expended on Structures and Sampans; No VC Casualties</th>
<th>Cost</th>
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<tbody>
<tr>
<td>500 lb G.P. Bomb</td>
<td>167</td>
<td>37,241.00</td>
<td>127(76%)</td>
<td>28,321.00</td>
</tr>
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<td>250 lb G.P. Bomb</td>
<td>99</td>
<td>19,800.00</td>
<td>52(53%)</td>
<td>10,400.00</td>
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<tr>
<td>120 lb Frag. Bomb</td>
<td>1,848</td>
<td>114,576.00</td>
<td>937(51%)</td>
<td>58,094.00</td>
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<tr>
<td>100 lb G.P. Bomb</td>
<td>1,356</td>
<td>94,920.00</td>
<td>628(46%)</td>
<td>43,960.00</td>
</tr>
<tr>
<td>Napalm</td>
<td>769</td>
<td>106,891.00</td>
<td>400(52%)</td>
<td>55,600.00</td>
</tr>
<tr>
<td>2.75 inch Rocket</td>
<td>14,850</td>
<td>1,262,250.00</td>
<td>6,639(45%)</td>
<td>564,315.00</td>
</tr>
<tr>
<td>20 mm</td>
<td>71,030</td>
<td>88,287.50</td>
<td>29,505(41%)</td>
<td>36,875.00</td>
</tr>
<tr>
<td>.5 Cal.</td>
<td>435,134</td>
<td>134,891.54</td>
<td>212,844(49%)</td>
<td>65,981.64</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,859,357.00</strong></td>
<td><strong>853,546.64</strong></td>
<td><strong>870,253.20</strong></td>
<td><strong>125,557.20</strong></td>
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</tbody>
</table>

* The napalm cost is not exact. The proportion of 500 lb and 750 lb bombs used is not known in JOMI-V. An assumed ratio of 1:1 was used.

** In computing the numbers in column 8, "Units of Ammo Which Contributed to Reported VC Casualties" if on any sortie a VC casualty was reported, all types of ammunition expended during that sortie were considered to have contributed to the VC casualty and are included in the column 8. It is interesting to note that four armed helicopters could be purchased for the funds spent in May for 2.75 inch rockets alone. Yet in Annex 1, page 15, the Deputy Director, JOMI-V, points out that 2.75 inch rockets are considered ineffective in the delta and in the jungles except "under rare conditions where troops are attacked in groups in the open."
These advantages have been demonstrated by the few Eagle Flights that have been conducted in what amounts to a modified escort role, using "ski-cavalry" tactics developed by the Army during the past 10 years. This role still exploits only a small portion of the overall potential of the helicopter.

In view of the above, I am led to the strong conviction that the armed helicopter, working closely with a limited number of transport helicopters, provides the best and only air weapon system that can revolutionise counter-insurgency warfare. By capitalising on surprise and shock action, as well as on the inherent discriminating capabilities of such a force, we can have a most effective means of separating the guerrilla from the people, thus breaking the back of the insurgency force. This must be done before the enemy strength can develop to the point where the helicopters will be forced to alter their tactics because of vulnerability.

FINDINGS

1. Based on observing counterinsurgency operations for three and one-half years in Malaya and eight (8) months in HW, and following carefully the armed helicopter operations during and following the test period, I find the armed helicopter, and the transport helicopter it supports, the most effective single aerial weapons system in counterinsurgency. It offers the best means of finding and dealing with small, scattered guerrilla bands in the delta, and practically the only means of enabling troops to reach WC jungle bases elsewhere in the HW. Properly used, it can separate the guerrillas from the people thereby contributing to preventing the war from escalating. If the war does escalate, experience shows that guerrilla action will continue to be a major part of all insurgency operations. Hence the helicopters, armed and transport, will always have a major role to play in wars of this nature.

2. The armed helicopter does not eliminate the requirement for fixed-wing aircraft in close support of counterinsurgency ground forces. Rather, the armed helicopter is just another weapon (but a most valuable one) in the total array of weapons available for counterinsurgency operations. It should augment, complement and supplement the close support provided by fixed-wing aircraft by performing those functions which fixed-wing aircraft cannot perform.
A final matter of joint interest is the question of effectiveness. This is a delicate matter and would not be mentioned except for the fact that 2d Air Division, at Annex 2, raises the point. Annex 2 attempts to discredit the armed helicopter by comparing the "killed" record of the VNAF/USAF to that of the armed helicopter. The point is made that the VNAF/USAF inflicted 1.2 casualties per sortie in the time period coincident with the armed helicopter test, and that this rate was 17.1 times greater than the 0.07 casualties per UH-1 sortie. This is an impressive figure and since the evaluator has no way to confirm or refute either the claims of the UH-1 or the VNAF/USAF it would be improper to comment on the exact figures given. It should be pointed out again, however, that the UTTHCO was testing a concept. The mission of the armed helicopter was not to kill VC but to protect the transport helicopters. Neither the ideal aircraft nor the most effective armament was used during the test period.

Another factor pertinent to the casualty question is the small number of VC contacted during the numerous operations that were conducted during the test period. As pointed out in Annex 3, on only three occasions during the test period were hostile forces encountered of platoon-size or larger. All of these operations included fixed-wing support except when weather prevented such support. It must be assumed, then, that the high rate of kills by the VNAF/USAF were equally low during these particular operations and that therefore the VNAF/USAF casualties must have been inflicted in other operations, the majority of which did not include a follow-up ground action. During May, for example, of the 586 VC reported killed by VNAF/USAF in the APEX OPSACT reports, 401 were reported to be the results of interdiction missions. This is not to say that the VNAF/USAF are not more capable of locating larger VC concentrations than are large numbers of ground forces. It is important, however, that attention be focused on a comparison between the fixed-wing and armed helicopters when they were operating together. As pointed out by the 2d Air Division (Annex 2) fighter aircraft have the flexibility that allows their use on other targets before returning
home if their ordnance has not been expended in support of the heliborne operation. It is difficult to understand, however, why targets of this nature were not given a higher priority by the ground forces if they proved to be so productive to the VNAF/USAF. Of interest, too, is the ratio of killed to wounded reported by the VNAF/USAF. During the period 1-31 May the VNAF/USAF reported approximately 586 killed and 86 wounded, a ratio of 6.8 killed to 1 wounded. Both ARVN and UTHC0 reports show a similar disproportionate ratio of killed to wounded.

In a study by RAG which reviewed the casualty figures for all wars for the past 400 years (including WWII and Korea) the ratio of killed to wounded varied between 1 to 4 and 1 to 4.6. It was concluded that this was due to the physiological construction of the human body. Such a difference in the experiences of the RVNAF could be explained by the difficulty of counting the wounded since many wounded are carried away by the VC. However, since the VC are also known to carry away their dead it is assumed that a similar difficulty would be experienced.

The foregoing facts cast doubt on all reported VC casualties in the RVN. There is no reason to believe that an empirical ratio prevalent over a period of 400 years has suddenly changed in the war in Vietnam. If the ratio is valid, and if the number of VC claimed to have been killed by the RVNAF is accurate, the combined total of killed and wounded would be such that very few VC would be left to fight.

OTHER ROLES FOR THE ARMED HELICOPTER

From both the command and joint interest point of view, it is essential to consider the potential of the armed helicopter unit for employment in other roles in counterinsurgency. Since its ability to operate at the current level of operations has been demonstrated, it follows quite logically that there are other, and perhaps more important, roles for an armed helicopter organization. If the rules of engagement permitted, the fire support provided the transport helicopters could very readily be provided to ground operations to include: ground convoy escort, aerial reconnaissance and security, security for ground operations, support for ground action, and a quick reaction force to repel attacks on villages, hamlets and outposts. Its potential is a stimulant to the imagination. This
potential has been recognized by all ground advisors who, considering existing circumstances, wish to employ the armed helicopters in these roles. The commanders of the UTTHCO and the pilots of these aircraft are particularly enthusiastic about such roles.

Such support would not be for the purpose of replacing the fixed-wing support now provided for these types of operations. Rather the UTTHCO, working with a few transport helicopters, would augment the close support given by the fixed-wing aircraft, at the same time providing the ground unit with an integrated, responsive fire and maneuver element with great surprise and shock capability. Against light, scattered opposition, as is so often encountered in counterinsurgency operations, the armed helicopter support would be adequate. Fixed-wing aircraft could then be released for more important tasks.

Indicative of their potential has been the "Eagle Flights" that have been conducted in the 21st Division Tactical area since the test ended. The concept of the "Eagle Flight" is that four unarmed UH-1B's will carry 40 ARVN soldiers. These four transport helicopters are escorted by four or five armed UH-1B's. The mission of the "Eagle Flight" is to swoop down on suspected VC areas for search. If the enemy is found they are engaged or suspects are picked up. During this time the armed helicopters are in effect flying cover so as to protect the transport helicopters that are orbiting above the discharged ground troops at about 1500 feet for easy recall. If, after a quick search, no enemy or suspects are found the transport helicopters are called down, troops are re-loaded and flown to another suspect area where the process is repeated. While the concept is still in its infancy the few operations that have been conducted to date have had most encouraging results, compared to large scale operations. They have the advantage of surprise over the large scale operations which invariably involve considerable movement of men and material near the objective area the day or night before. They of course conserve resources and yet are able to cover a much greater area than has been covered by large formations in the past. The enemy can fade away before these large formations but he never knows where the "Eagle Flight" will land next.

As a firsthand example of the effectiveness of these flights, on one
occasion recently a heliborne operation of three battalions was conducted. I went in with the leading battalion. The area was almost completely VC dominated. We landed approximately 800 yards from the objective. By the time the battalion reached the objective area only old men, women, and children could be found. This is a common occurrence. I then joined an Eagle Flight. Within 30 minutes seventeen (17) young, healthy-looking suspects had been picked up. Within one and one half hours a total of 35 real suspects were brought in. To appreciate the significance of this, one must accompany ARVN units on a number of operations and see how seldom men of fighting age are seen in the villages.

Another Eagle Flight on 22 May, mentioned in Annex 3, resulted in sixty-seven (67) Viet Cong captured, thirty-three (33) killed, and eighteen (18) weapons captured, at no cost in friendly casualties.

These two examples and the after action report at Annex 10 illustrate the real potential of the armed helicopter and more nearly demonstrate its proper role. It is the answer to the "surprise" element, so essential, and so often referred to by armed helicopter supporters, but seldom achieved during the test period. The fact that surprise was not achieved in the role in which it was employed neither refutes surprise as a principle of war nor denies the ability of the helicopter to achieve it. As pointed out earlier, heliborne operations conducted in the RVN are normally preceded by a relatively massive staging operation of troops and materiel near the objective area the day or night before the heliborne operation occurs. This naturally alerts the VC and makes surprise difficult. Employing the Eagle Flight concept has many advantages: 1) It forces the ARVN to operate in smaller groups — something COMUSMAC-V has been encouraging for a long time. 2) It makes maximum use of the surprise and shock action. 3) It exploits the great flexibility of both the transport and armed helicopter. 4) It conserves resources by making it unnecessary to commit large forces on unproductive targets. Yet it can tie down large VC forces until heliborne reinforcements can arrive. 5) When used in conjunction with large forces it can discourage the enemy from fading away in front of these forces as they usually do, or block or destroy the VC if they attempt to withdraw.
large gulps, while disappointing, can be, and is, recompensed in other ways. For example, Psy-Warfare programs can be extended into areas heretofore unreachable by the GVN. The presence of RVN troops in some cases reassures the potentially friendly populace of the benevolent intentions of the government to protect them from the VC. In other cases, it convincingly demonstrates to VC sympathizers that their "protectors" do not dare to contest GVN forces. Destruction of food caches and materiel stockpiles causes the VC to make additional impositions on the populace and emphasizes the parasitic nature of the insurgents. Finally, the repeated and often unimpeded destruction of hurriedly abandoned VC workshops, base installations and other facilities and resources cannot fail to give supporters of the VC, the VC themselves, and uncommitted observers, serious doubts about the relative power of Government and VC forces.

b. The list of interrelated objectives of the NCF is long and need not be recited here. It is significant, however, that the success of these objectives depends on the presence of RVN representatives. Success does not depend on, nor is it measured solely by the number of VC killed.

c. Fundamentally, the helicopter is best utilized when exploiting its unique features which permit vertical take-off and landing while transporting personnel and material. There is a vital mission to be performed which requires these performance characteristics and at this time there is no other vehicle to compete with the helicopter in the VTOL field. Further, there is not likely to be a reasonably economical and effective substitute for these functions in the next few years.
d. The addition of impediments, such as armament systems, ordnance, and gunners, degrades the performance and load-carrying capability of the helicopter and limits its effectiveness as a transport. The majority of the UH-1s employed during the test were not used in a manner which would exploit their basic and unique design characteristics. Instead, these aircraft were used as a substitute for other available tactical resources designed specifically to perform the mission which the UH-1s attempted.

e. Surprise movements against the VC in the Delta have proven difficult to execute and exploit. However, other equally important military and civic objectives do not require the element of surprise in order to be achieved effectively. These should stimulate a review of the tactics and options by which to capitalize on the basic characteristics of the helicopter.

5. Options:

a. Option A:

(1) The abundance of rice paddies in the Delta which normally are acceptable as landing zones for helicopters provides the basis for developing tactics that will emphasize passive defense measures. Enroute altitudes should be selected to provide maximum safety from ground fire. When feasible, as determined by the tactical requirements of the ground operation, landings in open areas devoid of surrounding cover will reduce the risk of exposure to VC fire during the vulnerable landing phase. Under these circumstances, fewer precautionary measures for the protection of the heliborne forces would be required.

b. Option B:
EVALUATION OF OPENAH

INTRODUCTION

1. The terms of reference for JORG-V require an evaluation of all test results of OPENAH which have joint implications.

2. Objectives 1, 2 and 6 have common points of consideration and have joint aspects which require comment. These objectives have been evaluated in Annex A.

3. Similarly, Annex B of the evaluation covers the overlapping joint factors on objectives 3 and 5. These two annexes complete the JORG-V evaluation of this report.

4. A summary of these evaluations precedes these annexes.
ANNEX A

OBJECTIVE 1

To determine the tactics and techniques employed in providing armed escort for transport helicopters.

1. Conclusion Cited from the Report:

In Delta-type terrain, against an insurgent force similar to the VC, armed helicopters employing tactics and techniques developed by the UTTHCO in the RVN can provide adequate protection for transport helicopters engaged in airmobile operations.

2. Discussion:

a. Role of the Armed Helicopter:

(1) The conclusion above is misleading. There should be no inference that armed helicopters can effectively protect transport helicopters under all conditions throughout the heliborne operation. The tactics and techniques employed in RVN placed supporting fire for the defense of the operation during the approach, landing, unloading, and withdrawal period (which normally lasted from one to three minutes). This was the only appreciable fire support delivered by UH-1s. The concept of employing armed helicopters in an escort role was abandoned during the test, since they lacked significant speed advantage over the CH-21s and therefore could not be effectively employed during the enroute phases. This problem will be accentuated by the replacement of the CH-21 with UH-1B transport helicopters.

(2) Use of the term "escort" in connection with heliborne operations in RVN is confusing and should be discontinued. The fact that the
UH-1s flew in close proximity to the OH-2ls had no bearing on their fire support responsibilities. It may be more convenient to avoid timing and navigational difficulties by rendezvousing immediately after takeoff; however, during the enroute phase, the Army does not consider the armed helicopters to have a defensive responsibility. A more appropriate description of the role of the armed helicopter as employed during the test is reflected in the term "common fire support". This supporting fire augmented the defensive fire from crew positions in the transport helicopters during the landing phase.

b. Roles of Other Forces:

(1) Other elements of the resources committed to individual heliborne operations participated in accordance with their traditionally accepted capabilities. Artillery fire, when available and when requested, was used to place suppressive and destructive fire against areas suspected to contain enemy positions.

(2) VNAF fighter-bombers, when requested, were given varied responsibilities according to the requirements of the operation. Fighter-bombers were used on occasion to soften the resistance in the landing zone by placing suppressive and destructive ordnance against suspected enemy positions. Close air support was provided to assist the ground forces in attaining their objective.

(3) On para-drop operations, fighter-bombers accompanied the troop-carrying aircraft to put down anti-aircraft fire directed against these aircraft. When requested, the same type enroute protection was provided by the VNAF to the transport helicopters.

Annex 1
c. Need for Options:

(1) The test clearly established the need for joint effort if transport helicopters are to be employed with minimum risk. No attempt was made, however, to establish conclusively the optimum apportionment of responsibilities since all the available options for employment of resources were not tested. Although the formation flown by UH-1s was varied slightly, the method of employment was essentially always the same. As further illustration, fighter-bombers, when used, were not permitted to participate actively in the landing and withdrawal phase when armed UH-1s were used.

(2) The implications from this rigid adherence to test concept are a basis for evaluation of the effects of tactics prescribed for the armed helicopter. The fact that the test demonstrated that the armed helicopter cannot be considered a replacement for the other capabilities is reason enough to explore other options in an attempt to establish the optimum protection which can be provided with available resources.

(3) The tactics used by the ground commander to employ Heliborne forces have a decided influence on the exposure incidence of the transport helicopters. This indicates that these tactics should serve as a point of departure in developing proper supporting tactics. The validity of this approach becomes more apparent as other factors are added.

(4) Figure 2, Section III of the final report shows that entry to and exit from the battle zone can be conducted in relative safety when approach and departure altitudes of 1500 feet or above are used.
(4) It would be ideal if vulnerability could be similarly minimized or eliminated by employing passive measures in the landing zone. The requirement for protection would then be minimal and tactics could be altered, thereby releasing valuable resources for more productive tasks. Since vulnerability is synonymous with exposure, it follows that tactics permitting the least exposure are the best protection which can be afforded. If the enemy is not present, suppressive fire is not needed. If minimal exposure tactics do not have unacceptable impact on the mission of the ground operation, they can be considered optimum.

(5) If tactics providing minimal exposure cannot be used without jeopardizing the success of the ground operation or if the probability of exposure cannot be predicted, optimum precautionary measures must be taken. The options then lie in the selection, from available resources, of those capabilities most suited to minimize the risk while accomplishing the mission of the ground forces. There is no assurance that the test uncovered the best distribution or utilization of resources.

(6) The test indicates satisfaction with the tactics of the armed helicopters. This indicates, in turn, continued reliance on suppressive fire rather than destructive fire as the means of providing security to heliborne operations. The selection of UH-1 suppressive fire as the primary tactic was made apparently without regard for the availability and capability of other resources. This concept should be re-evaluated in view of the difference in firepower between the UH-1 and fighter-bomber aircraft. The UH-1 suppressive fires and fighter-bomber destructive fire cannot be delivered simultaneously against the same
targets for reason of air safety. The armament of the UH-1 is light, and ineffective against prepared emplacements. The fighter-bomber ordnance load is versatile and a variety of truly destructive weapons can be delivered against all types of VC positions. By way of comparison, an A-1H will carry more than 10,000 pounds of mixed ordnance including napalm, frag bombs, rockets, WP Bombs, GP Bombs and 20MM cannon. This compares drastically with the four 7.62MM machine guns, and the 16 rockets of the UH-1 which delivers a total weight of 231.7 pounds of ordnance. Essentially then, each A-1H carries more destructive ordnance than 10 UH-1s. When weapons effectiveness is considered, even this illustration does not reveal the true extent of the disparity since the anti-personnel potential of the A-1H weapons is far in excess of those carried by the UH-1.

(7) Many, if not most, of the enemy fire against and damage sustained by, helicopter formations were on a relatively few missions. In most of these instances, heavily armed fixed wing escort was either not present or requested; was not cleared to engage the enemy; or was cleared to engage after the damage had been done. The report does not provide the data, however, for precise determination of the degree to which available resources were not employed or employed too late.

3. Correlation of Test Results to Test Concept:

a. Annex A of Test Report #3, after acknowledging that the success of the VC on 2 January 1963 at Ap Bac, will cause them to apply these same methods (..... of offering sustained resistance) more widely in the future, retains the notion that there is a continuing requirement
to land heliborne troops close to suspected insurgent forces, ACTIV reports contend that this technique maximizes the unique capability of the helicopter to achieve surprise; thereby fixing in position an enemy who is characterized by adroitness in "melting away" when confronted by a superior force.

b. This contention is not substantiated by the test results. On the contrary, analysis of the VC casualties inflicted on heliborne operations during the test period shows that surprise was not achieved either by the ground forces or the helicopter units or, if achieved, could not be exploited.

c. Section II of the final report records only 73 landing zones contested by the VC out of 257 zones entered during the test. Section III of the final report claims only 246 insurgency casualties as a result of fire from the armed helicopters. In the latter case, the low effectiveness of the UH-1s is partly explained by the influence of the rules of engagement applied in RVN.

d. Regardless of the cause, and with full consideration for the realism of restrictive controls imposed during counter-insurgency operations, the end result was less than one VC casualty per landing zone. This low rate indicates that the element of surprise should have little bearing on the problem of developing tactics best suited for protecting helicopters.

e. Analysis of other phases of the operations shows a similarly low VC casualty rate throughout. During 50 operations conducted during the latter part of the test period (considered as typical for analysis purposes on the basis that a learning period had elapsed), the total number of VC
KIA exceeded 50 on only 10 (20%) of the operations. On 28 (56%) of the operations the total KIA did not exceed 15 VC, and on 18 of these, or 36% of the total, less than five VC were KIA with no contact reported on six (12%) of the total.

f. Many of the operations were not completed in one day; the durations varying to six days. A breakdown of this data, to isolate those casualties inflicted on the first day, shows that on only five (10%) of the operations were there 50 or more killed; that less than five VC were killed on 30 (60%) of the operations on the first day; and on 13 (26%) of the operations no contact was made in the initial assault.

g. The trends above suggest that operations must be planned in such a fashion that their success does not depend either on tactical surprise, where a principal objective is to envelop and destroy the VC, or on immediate surprise where the principal objective is to engage the enemy before he melts away.

h. On the other hand, the VC have demonstrated that when present and willing to fight, they can employ counter-measures which prevail over the capability of the UH-1 tactics. The Ap Bac operations on 2 January, where hits were received by the majority of the aircraft, is a prime example of the effectiveness of VC anti-helicopter tactics. That this case is not singular is evidenced on Figures 2 and 3 Tab II, F and G, and page 8, Tab B, Section XI of the final report, which reports other hits received by CH-2ls and UH-1s.

4. Application of Fundamental Principles:

a. Failure to achieve absolute surprise and consume the enemy in...
(1) When the tactical requirements of the ground operation preclude selection of landing zones removed from potential sources of hostile fire, as in the jungle, mountains or, in certain cases, in the Delta, precautionary measures would be increased. Tactics in this case should consider such factors as the proximity of civilians to the landing zone and the probability of resistance from the VC.

c. Option C:

(1) In some instances, when civilians are not in the vicinity, and there is strong reason to expect determined resistance from a well-defended perimeter, it may be prudent to take all available precautionary measures.

6. Correlation of Experience During Tests to the Above Options:

A. Option A:

(1) It may not be necessary to commit a platoon of UH-1s in the role of common fire support with the sole responsibility of providing suppressive fire. Resistance, if encountered, can be expected to be limited and to be adequately suppressed by the aircrew manned weapons of the transport helicopters. Reconnaissance by the pathfinder immediately prior to landing should reveal the extent and location of the resistance, since there is normally little opportunity to conceal forces, capable of offering heavy resistance, in a rice paddy.

(2) Aircraft provided for close air support can be quickly directed to an attacking position over bands of escaping VC which may be flushed by the heliborne operation. These aircraft are also available for air cover. In emergencies the transport helicopters could abort

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Annex 1
the landing, if necessary, and wait until the resistance is put down. Tactics such as those above are consistent with the tactics normally employed in the overall conduct of the ground operation. These anti-guerrilla tactics are planned to encircle the VC in what is popularly termed a "hammer-and-anvil" situation with heliborne forces as the maneuvering element of this encirclement. Generally, these are large scale operations involving up to 1000 personnel and covering rather large areas.

(3) The size of the operation dictates the number of shuttling trips flown by transport helicopters. During the test period the majority of the operations required an average of three shuttles. The probability of success overall would be enhanced if delays in positioning these forces are reduced. Release of UH-1s to the primary role of transport would contribute to this end. If the XL-6 kit were to be used in the same manner as aircrew manned weapons in the CH-3ls the ammunition carried should not exceed that needed to respond to sporadic resistance.

(4) Fighter-bombers have been used effectively as air cover patrolling the area during the ground operations. This tactic should be continued and be used to provide close support of friendly troops and to a modified version of the role of armed reconnaissance. When used in conjunction with VNAF O-1s carrying FACs these strike aircraft can detect and destroy VC attempting to escape the dragnet.

b. Option B:

(1) When landing a blocking force by helicopter or plugging a
gap in the planned encirclement, it may be necessary to select a
landing zone near an area which provides natural cover. This natural
cover can harbor VCs who, by hiding and holding fire, can threaten
the heliborne forces when they are committed to the landing phase.
This has occurred frequently and, as cited in the report, seems to
be the primary tactic adopted by the VC. Intelligence has not been
good enough to predict the presence of VC in these pinpoint areas.
The abundance of hiding places throughout Viet Nam makes accurate
prediction of the location of these covered positions difficult.

(2) Each operation, therefore, must be conducted with the
assumption that anti-aircraft fire can erupt from natural cover. When
natural cover cannot be avoided, suitable precautions must be taken.

(3) The tactic of placing suppressive fire by UH-1s may not
be the optimum precaution. Suppressive fire is not an optimum tech-
nique against a determined enemy. One method available is to employ
the maximum firepower possible. This firepower should optimise the
use of anti-personnel munitions, bearing in mind the possibility that
the cover may conceal prepared defenses. None of the cover should be
overlooked. The number of aircraft and the ordnance load should be
selected after considering these factors in the planning phase of each
mission.

(4) It was found that it is not always feasible to employ
optimum munitions because of the presence of the populace in areas
where the VC could be concealed. In these instances the principle
does not change — only the tactics. Prime consideration should be
given to preventing the VC from delivering anti-aircraft fire against
the helicopters. One method as yet untried operationally in RVN is
to employ smoke to screen the landing forces. Farm Gate has demonstrated
a capability for delivery of smoke grenades. Equipment is available
for Farm Gate and can be procured for the VNAF. FS and White Phos-
phorus grenades are available in quantity in RVN and can be resupplied.

(5) FS has the least anti-personnel effects and appears to
be the best munition for generating smoke when the grenades must be
dropped near an area containing civilians. White Phosphorus is a good
anti-personnel munition as well as a smoke agent and could be used for
dual purposes when civilian or friendly troops are not jeopardized.

(6) There is good reason to believe the above methods (Destructive fire and smoke) used singularly or in combination would meet all
the conditions normally encountered when anti-aircraft fire from
natural cover is a threat. Since the usefulness of smoke is not yet proved,
however, it is necessary in the interim to provide for those instances
where optimum munitions cannot be employed. The UH-1 employed in the
role of fire suppression was almost exclusive, the sole resource employed
during the test in the Delta against the threat in the landing zone.
Fighter-bombers were used in support of the landing zones in the North.
A comparison of these capabilities is discussed later in this evaluation.

c. Option C:

(1) There is little combat experience to date where optimum
anti-personnel munitions were employed prior to heliborne landings.
Fighter-bomber aircraft have been used effectively in pre-strike
employment, but the optimum munitions have not been determined since all the potentially useful ordnance available in US arsenals have not been made available in the RVN.

(2) CS munitions have characteristics that indicate that employment along the perimeter of the landing zone would neutralize VC resistance. The political and military considerations involving this munition are recognized; however, these weapons are mentioned here because of their potential in the development of concept.

(3) As outlined under Option B above, White Phosphorus grenades are an excellent anti-personnel munition. These weapons provide casualty-producing coverage over a relatively large area with optimum pattern density when delivered by air from a tubular dispenser such as the P-2 used by Farm Gate. The grenades fall in a linear pattern with the effective radius of the grenades overlapping slightly. The linear pattern is widened by using multiple launchers on a single aircraft and by dropping simultaneously from two or more aircraft flying side-by-side.

(4) BLU type munitions can be delivered in a pattern similar to that described for White Phosphorus grenades. These munitions have proved, under test conditions, to be excellent anti-personnel devices. Other military considerations governing their employment in RVN are recognized. However, the great tactical potential of these munitions warrants continued review of these considerations in the event circumstances change to permit employment routinely in RVN, or in the event escalation of the threat to heliborne operations requires stronger
counter-measures.

(5) Initial reports from CAG at Eglin indicate that the 40MM gun can be mounted on the T-28 and B-26 aircraft and that the 40MM round is an excellent anti-personnel munition. The reports also indicate that a high degree of accuracy can be achieved during a conventional strafing run where the rate of fire of the weapon permits a linear pattern with the radius of effectiveness of each round overlapping. This weapon is scheduled for delivery to Farm Gate in RVN in the near future.

(6) Napalm and 20-lb fragmentary bombs appear to be the best anti-personnel munitions presently available. 2.75 in rockets are effective against personnel only under certain conditions. In the Delta, for example, most of the fragmentation effect is lost because the warhead is buried in the mud before it detonates. The weapon is detonated by the limbs of trees in the jungle, and the energy of the fragments is absorbed by the trees before reaching troops on the ground. Rockets are effective under the rare conditions where troops are attacked in groups in the open. The degree of effectiveness depends on how the rockets are mounted and the sequence in which they are fired. Generally speaking, however, the shot-gun effect caused by the dispersal pattern of multiple rocket launching produces a high probability of kill against groups of personnel in the open.

(7) Machine guns are limited in their effectiveness against personnel. The limitation varies with the caliber and type of round used, with the rate of fire and number of guns employed, and with the
protection available at the target. The concentration of fire from 4 to 8 large caliber guns, as installed on A-1Hs and B-26s, provides relatively high density patterns, which is effective against troops in the open. When the HE round is used with the combined rate of four 20MM guns from the A-1H, the resultant destructive effect makes this weapon effective for anti-personnel work. The probability of kill against troops in prepared positions, particularly where the precise location of these positions is undetermined, is extremely low. Nevertheless, there are definite psychological aspects caused by 20MM HE bullets impacting near the individual soldier.

(8) The combination of napalm, fragmentary bombs and machine guns is effective, though not the most efficient load when compared to technically improved munitions in being today. Planning for operations where Farm Gate or VNAF fighter bombers are employed to support heli-borne operations should provide for use of anti-personnel munitions.

7. Analysis of the Concept of Suppressive Fire:

a. The reliance placed by the UH-1s on suppressive fire during the test is cause for close scrutiny of the cost and effectiveness of this controversial tactic. Generally, suppressive fire is the least effective of all the tactics that are used in the conduct of warfare because the resistance is not eliminated; it is at best only quelled. When suppressive fire is stopped, the resistance can appear again with little or no reduction in intensity. If misdirected or inadequate, suppressive fire has virtually no effect against a disciplined or desperate military unit.

b. With relation to its effectiveness, suppressive fire is expensive
if used extensively; is wasteful if the precise location of the enemy is unknown; and has little usefulness if placed in an empty area. Penalties, adversely affecting the primary mission are incurred in the nature of increased logistics, decreased payload per unit of transport, and degradation of aircraft performance.

c. The expense is not important in a serious tactical situation. However, it is an important factor in determining the propriety of a concept. Penalties degrading the primary mission are important. These penalties are unjustified if the usefulness of the tactic is not clearly established.

d. On page 7, Tab 1, of the Final Report, it was concluded that the suppressive fires delivered by armed escort helicopters were highly effective in reducing the amount and accuracy of insurgent fire placed on transport helicopters as reflected by the number of hits received by the transports. In the rationale leading to this conclusion, effectiveness is attributed both to the presence of armed helicopters and the delivery of suppressive fires from armed helicopters. In arriving at this conclusion, hits per flying hour on transport helicopters on "dangerous" combat support missions is related with the rate per flying hour for all other flying done by the 45th Transportation Battalion.

e. An assumption is made that the presence of armed helicopters on heliborne operations caused this rate of hits to decline during the test period rather than doubling as was the case with the rate for all other helicopter activities.

f. The assumption is not substantiated in the report. There is no
discussion of the factors influencing the two rates, or a comparison of the mutual effects of such factors. For example, there are no computations to show the strength or presence of VC resistance. Also, there are no computations to show the total protection afforded. Additionally, there probably is no way of knowing whether the enemy possessed the will to resist. Consequently, the assumption as to the effectiveness of the concept is conjecture.

On the other hand, there is some evidence which indicates the effectiveness of the armed helicopters was relatively low. As cited previously, resistance did not appear during 71 percent (184 out of 257 landing zones) of the UH-1 missions. Hits were received on both the UH-1s and the CH-21s. On the one occasion, which was the only instance where concerted resistance was encountered, all the helicopters were damaged by the VC.

Section II of the Final Report, in presenting the arithmetic used to determine a day of supply of ammunition, shows that on average, only 90 rounds per gun will be expended each month. The highest expenditure during a 30 day period was 29,000 rounds. During one 30 day period, only 7,200 rounds were expended — 9,650 rounds (the highest single expenditure annotated) were expended on 2 January.

80,360 rounds were expended during the test period for an average of 312 rounds per landing zone for 73 contested landing zones. During contested landings, using five UH-1s as the average employed each mission, less than 60 rounds were fired from each gun. With all guns firing simultaneously, this represents 5 seconds of fire from each aircraft.

The low expenditure rate viewed from various ways indicates
low participation overall. Since the presence of UH-1s did not deter the VC and since participation was limited, effectiveness could not have been high.

k. The expenditures dramatically illustrate the weight penalty associated with suppressive fire. 6,000 rounds are carried by each UH-1B into the landing zones. On an average approximately 360 rounds were expended at each of 257 landing zones, or about 60 rounds by each of five UH-1Bs. Categorically, 100 times the average requirements were carried for an eventuality which, when encountered on 2 January 1963, could not be neutralized.

l. The same weight penalty and low ratio of rounds expended to rounds carried, applies to the UH-1 rocket capability. This armament load has a larger effect per round on troop carrying payload because of weight and drag of the installation.

m. A UH-1, carrying gunners (2), aircrew (2), and observers (1 or 2), with rockets, machine guns, and 6,000 rounds of ammunition, cannot transport combat troops. The sum of these weights represents 90 - 100 percent of its carrying capacity, the percentage varying with the altitude and temperature and fuel load during takeoff or landing.

n. An unarmed UH-1B can transport 10 Vietnamese with normal field equipment. It is readily apparent that each armament system reduces the gross weight available for troop transport by a relatively high percentage.

8. Employment of UH-1s in the Options Above:

a. On page 4, Tab I, of the Final Report, it is stated that there
where no pressures contributing to a determination of minimum force for the task. It was stated further that stimulus in the opposite direction was provided by the relative abundance of armed helicopters in relation to the number of transport helicopters needing escort.

b. The need for flexibility in a test program, if this explains the over-abundance of UH-1s during the test period, is understandable. As pointed up on page 3, Tab II of the Final Report, however, resources will be limited in most counterinsurgency situations. Utilization of available resources is, and will continue to be, a predominant factor in the prosecution of war and the expense involved is, and will continue to be, an important secondary consideration.

c. Optimum utilization is not made of the UH-1 when it is committed to roles that degrade its established troop transport capability or do not fully utilize the characteristics which differentiate helicopters from other aircraft.

d. Maneuvers executed during the landing phase resemble closely maneuvers performed routinely by fighter-bombers. Fires were delivered at speeds up to 100 knots limited in the upper spectrum only by the aircraft performance. Fires were not delivered from the hover in Jack-in-the-Box fashion (ref page 8, Tab II, final report).

e. Better utilization would be realized if UH-1s were integrated into the operation as troop transports. The degree of utilization then would vary only with armament load carried. Tactics developed around these principles could be employed in each option. A slight variance in tactics to fit the circumstances expected in each option would permit maximum utilization.
f. Overall expense is minimized when resources best suited for each task are used accordingly, assuming that all tactical requirements are met in the process. Arguments presented in this discussion were developed with that principle in mind. Selection of options, selection of resources to meet the tactical conditions of the option selected, and improvements in the utilization of the resources selected, should minimize overall costs.

10. Evaluation:

a. Test results show that heliborne operations are most vulnerable at low altitudes and when flying and low speeds. Since there is no tactical advantage to operating in this region, the risk is not warranted.

b. Tactics for the transport helicopters were revised accordingly. Protection, passive or active, can now be concentrated upon the landing phase.

c. Tactics for UH-1 aircraft should be varied in consideration of passive measures available and other resources provided. In developing suitable tactics, it is prudent to maximize the utilization of the UH-1 as a troop carrying transport.

d. The concept of applying limited amounts of suppressive fire from an exceptionally vulnerable vehicle is still not proved for two reasons; first, because suppressive fire rarely achieves any lasting result of consequence; secondly, conversion of the helicopter to an armed configuration essentially eliminates its use in a role for which it is better suited, that of helicopter transport. Application of limited amounts of suppressive fire cannot be favorably compared with the destructive capabilities of ordnance delivered by artillery or fixed-wing aircraft.

Annex 1
Objective III:

Determine optimum control communications and coordination procedures used between the transport unit, armed escort, supported ground commanders, and tactical aircraft.

1. Conclusion Cited in the Report: Use of an airborne command post in contingency operations should be tested to determine the degree to which such a vehicle offers improved means of command and control.

2. Discussion:

a. Concept: The basic issue raised in Section IV of the final report is whether the elements of an operation can be responsive to the individual charged with the responsibility of conducting the operation without being under his command.

b. The location of a Command Post, whether in a UH-1, on the ground or underground, has little bearing on the basic issue. A Command Post serves as a battlefield communications center from which command control exercised over units assigned or attached for ops control, and coordination is effected with all other units. Responsiveness is the end result of this command control and coordination. The location of a Command Post may assist in increasing the responsiveness to authority, but it does not change the authority vested in an individual.

c. In RVN, resources, used in a large-scale operations command, allocated from several commands or service components.

d. To conclude that resources must be commanded by a single individual is to conclude that all forces in RVN must be placed either

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under the command of the JCS or under the command of COMUSMACV. Such a command relationship is not consistent with current US policy and the placement of US-VN forces under the jurisdiction of a single commander would require a radical change in national organizational concept. Before any effort is made to effect such a major change, the existence of this problem should be clearly established, and it should be determined that the proposed command structure would be the best solution.

3. Review of Factors Affecting Current Practices:
   a. Review of current practices for joint implications is directed toward these organizational arrangements in RVN. The use and value of an airborne command post is discussed following this analysis.
   b. Documentation is not presented in the report to show where the causes for apprehension originate. Specific recommendations are not made which would permit alleged deficiencies in current practices to be traced. There appears to be no attempt made to find other means of improving communications in addition to, or in substitution for, an airborne command post. In lieu of such background information from the report, command and control arrangements in current practice are reviewed herein, so that the reasons for establishing them are understood. The establishment of the USAGV is significant because of the apparent departure from US Army doctrine that it represents. Designation of Senior US Army Advisors as control agencies within the operational chain of command is significant also, since this establishes an artificial system in RV which parallels US Army organic air concept.
c. The specific reasons for establishing USAGV are not known. It would appear, however, that the advantages associated with central-ized control might have served as a basis for activating this unit. In so doing, maintenance and supply efforts are consolidated and located centrally where adequate facilities can be provided. These require-ments were integrated in the base loading planning for PAVAF & USAF units. Close supervision and standardization of operating and main-tenance practices are inherent in the assignment of all US Army aviation units under the single headquarters. Utilization of aircraft and the flying hour program can be monitored closely to insure conformance to maintenance and supply programs and to facilitate the forecasting of additional flying hour requirements. This capability is normally realized through consolidated record keeping and with proper coordina-tion with central planning agencies.

d. The factors above are consistent with key US policy guidance as discussed in previous Secretary of Defense conferences. This guidance directs economy of force and unity of effort in US Military Assistance programs with the goal of transferring these activities, at an early date, to the RVN. These objectives in US Policy have further significance since it is reasonable to believe that this policy will not vary appreciably in other counter-insurgency actions in view of the similarity of political environments where insurgencies are normally initiated.

e. The delegation of operational control to the Senior US Army Advisor is another modification to US Army doctrine. Together, the
establishment of the USAGV and the placement of operational control of US Army resources with the Senior US Army Advisor provides a chain of command parallel to, and separate from, the RVNAF chain of command. In this way, US Army doctrine is simulated at ARVN Corps level in the absence of full scale US Army participation; i.e., when US Army TOME units are actively engaged in combat.

f. This simulation is significant because it means that the ARVN ground force command all the elements participating in airborne operations. It is significant also, that the Senior US Advisor does not command (nor is there any intent to designate him commander) of US Army units. Consequently, control measures should be established with these facts of life in mind. Further, were the Senior Advisors designated as commanders, quid pro quo, it would still not be possible to appoint an individual having singular command responsibilities for operations with US Army and ARVN resources participating.

g. Elimination of USASCV, while moving closer to US Army doctrine regarding administrative and material channels by eliminating one headquarters, could not contribute to the basic issue of establishing a single command. Therefore in lieu of evidence that abolition is otherwise necessary, there appears to be no reason to abolish the centralized logistics and administrative control system.

h. With this point established, some procedural spade work is necessary in deference to the combined military effort in RVN. Established control measures are reviewed herein to look for deficiencies in current practices. Generally, controls are similar in RVN and US

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military channels. COMUSA CENTAC, as the senior US Military Representative in SVN, exercises operational command over all US military units, and these resources are employed in accordance with his directives.

i. In the case of US Army units, MACV directives place them in direct support of ARVN units (usually at division or corps level) for extended periods. When so placed, and under the operational control of the Senior US Army Advisor, the unit commanders are required to support ARVN operations at the direction of the Senior Advisor. They are also required to furnish this support in the manner prescribed by the Operations Plan published by the ARVN Commander and endorsed by the US Army Senior Advisor.

j. In the case of USAF resources, operational command is exercised by COMUSA CENTAC through the Air Force Component Commander. USAF resources supporting ground operations are required by operation orders (and fragmentary orders thereto) to provide support according to the plan prescribed by the ARVN Commander and normally endorsed by the US Army Senior Advisor.

k. In the case of the VNAF, operational command is exercised by Chief of VNAF Joint General's Staff in the same manner that operational command is exercised over US personnel by COMUSA CENTAC. When supporting a ground operation, the VNAF are required by military operations orders (or fragmentary orders thereto), to provide air support in accordance with plans developed by the ground forces commander. In all cases failure to comply with the instructions of the operations orders (and the order placing US Army units in direct support of the ARVN Corps through the US Army Senior Advisor) constitutes failure to obey a lawful order, subjecting US personnel to prosecution under the Uniform Code of Military Justice.
4. Analysis of Factors Affecting Current Practices:
   
a. An ARVN Division Commander may request certain tactical support for an operation, but he does not have the authority to dictate allocation of these resources. For example, the US Army Advisor to the Division Commander will receive US Army resources at the discretion of the US Army Senior Advisor to the Corps Commander. Similarly, ARVN resources to support this operation will be allocated by the ARVN Corps Commander in accordance with the priority of operations within his Corps' Tactical Zone.

b. In the case of VNAF/USAF, resources are distributed in accordance with priorities established by the JCS commensurate with current operations throughout SVN. It is conceivable that over-riding priorities outside a particular corps could preclude commitment of VNAF/USAF resources to an operation within that corps although all other tactical resources were available. It is more realistic to assume, however, that a ground operation of such importance to warrant commitment of other air resources would be considered by the JCS to have a priority sufficient to receive a proper share of all available resources. In actual practice, allocations are made in advance to permit rapid reaction.

c. Once forces have been committed, it has been shown that control measures are established to insure conformance with the operational planning. Deviations from the pre-planning, which are necessary to react to changing conditions experienced by the ground forces, can be directed by the implementing operations order. For example, the order committing transport helicopters can require that the heliborne force be landed at any suitable place designated by the ground force commander.
Air support can be similarly directed to support those ground units designated by the ground commander.

5. Current US Army Practices:

a. In Section IV of the Final Report, control measures are described wherein the control of helicopter aircraft is passed among designated individuals as the operation progresses. During the enroute phase, from take-off until final approach to the landing zone, the formation of transport and armed helicopters is under the control of the Transport Unit Commander. One minute out of the landing zone control of the transport helicopters is placed with the pilot of the lead helicopter, and control of the armed helicopters is placed with the UTH Company platoon leader. As the troops unload from the transport, they revert to the control of the ground commander. One minute after the transport has left the landing zone, control of the heliborne formation passes back to the helicopter control aircraft for the return trip to the loading point.

b. It is significant that in this US Army practice, control, during the operation, is exercised by persons best qualified to carry out that portion of the operation. It is also significant that these procedures were established by the 45th Aviation Battalion under supervision of Headquarters USAASG. It is through these channels that technical and professional supervision is exercised. For the purpose of this evaluation technical supervision is defined as the all-inclusive management practices contributing to professional job accomplishment. This technical supervision includes adherence to prescribed aircraft operating instructions, prescribed maintenance instructions, selection of aircrew personnel, and