U.S. Navy helicopters in combat search and rescue.

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U. S. NAVY HELICOPTERS IN COMBAT SEARCH AND RESCUE

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NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

U. S. NAVY HELICOPTERS IN COMBAT SEARCH AND RESCUE

by

Dennis James Rowley

June 1982

Thesis Advisor: Roger Weissinger-Baylon

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U. S. Navy Helicopters in Combat Search and Rescue

by

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Submitted in partial fulfillment of the
requirements for the degree of

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ABSTRACT

Research was conducted to examine the validity of the employment of U. S. Navy helicopters for the combat search and rescue (CSAR) mission. It is proposed that the Navy does not currently have the capability to conduct CSAR operations in an opposed environment with an acceptable loss rate. A mission description is offered including mission essentials, phases and profile. Current Battle Group helicopter assets are presented. Training and equipment shortfalls are noted. A discussion of resource management includes dollar, political and psychological costs. A proposal is offered to initiate a viable CSAR capability that recognizes the need for CSAR and makes its tactical development a matter of CNO policy, develops an appreciation for the fact that this is a TACAIR problem, and suggests a measured approach to solving the problem. Finally, a decision matrix is presented to assist the Battle Group Commander in the employment of his helicopter assets in the pursuit of a CSAR mission.

TABLE OF CONTENTS

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I. AN EXAMINATION OF MISSION VALIDITY

A. BACKGROUND

It is proposed that the bulk of future Naval Air action and attendant losses will occur in limited warfare or during strategic attack and interdiction. The loss of Naval aircraft implies the existence of downed aircrewmen and points to the continuing requirement for a traditional combat search and rescue (CSAR) operational capability. It is recognized that due to the dramatically changing threat environment, tactics employed by Navy helicopter crews in the Viet Nam era are not applicable over a large range of scenarios. However, until vertical lift technologies present us with a suitable alternative, the helicopter remains the most versatile air vehicle available, if not the only one, for the retrieval of downed aircrewman.

It is a sad fact that peacetime efforts to economize have all but obliterated any Navy capability to conduct CSAR in an opposed environment. Expertise is currently reposed in one reserve squadron which is attempting to maintain a nucleus for future capabilities in spite of inadequate equipment and insufficient funding. This is the result of a

de-emphasis on CSAR in the years following Viet Nam--a de-emphasis highlighted by the removal of CSAR from the required operational capability listings of Navy helicopter squadrons in the mid 1970's. The mission has been relegated to apparent insignificance due to the absence of a vital Navy policy. JCS PUB 2 states that "any available aircraft, ship, land vehicle or personnel resource may be employed during recovery operations subject to the authorization and direction of the Theater Commander" and "assigns responsibility for search and rescue operations in support of Naval Task Forces to the Task Force Commander." The Navy addendum to NWP 37, the National Search and Rescue Manual, further tasks the Battle Group (BG) Commander with search and rescue responsibilities for his own force. Beyond this, equipment, training and tactical doctrine are painfully absent.

In light of the above, it is apparent that the Battle Group Commander should not have the idea that he has a viable CSAR capability. Yet, it is a widely held belief that should Navy aircrewmen be downed in a hostile environment, Navy helicopter assets assigned to our Battle Groups would be tasked with the CSAR mission. Every helicopter and TACAIR aircrewman interviewed agreed with this premise. The

question of mission validity must therefore be addressed. It is the purpose herein to present this problem in gross form, examine mission validity, and propose a path of action toward the establishment of a viable CSAR capability.

B. CSAR EXPERTISE

Navy CSAR experience in North Viet Nam can be succintly summarized:

> 1 SAR aircraft lost per 1.4 rescues
>
> 1 SAR crewman killed per 1.8 rescues

[Ref. 1: p. 22].

These very heavy losses are not an adverse reflection on the many brave aircrews who stood in great peril to rescue downed comrades. Rather they serve to highlight the intensity of the threat, the inadequacy of the equipment and the state of aircrew CSAR training at the time. In time of war, when readiness should have been at a peak, we were clearly not prepared to successfully conduct CSAR operations in an opposed environment with an acceptable loss rate. It is suggested that in the current time of peace, with the CSAR mission being de-emphasized while opposing technology has

increased the threat by orders of magnitude, we certainly cannot expect to improve upon our record in Viet Nam unless we initiate major actions to remedy this situation.

Even more insidious than current mission de-emphasis is the erosion of experience brought about by the passage of time. Today's helicopter community cadre numbers few aviators with actual CSAR experience. To a large extent, the expertise born of necessity in combat is gone. The only Navy squadron presently pursuing CSAR tactical development is Helicopter Combat Support Squadron Nine (HC-9), a reserve squadron whose efforts to preserve and expand the Navy's tactical CSAR capabilities are, in the author's opinion, extremely impressive. These professionals are the ones who should be called upon to lead in the development of a viable capability. Their expertise must be passed on to the regular forces, for, due to the response requirements dictated by the mission, highly trained, well equipped aircrews must be on scene when hostilities commence.

C. MISSION DESCRIPTION

A full scale mission definition is beyond the scope of this thesis. However, a description of the mission is essential to an understanding of the variables and

constraints involved. Therefore, a brief discussion of mission essentials, phases and profile follows.

1. Mission Essentials

Essential to the CSAR mission is response time, pinpointing survivor location and the capacity to conduct extended operations. The minimization of response time presupposes advanced planning. When Navy aircraft are launched on a hostile target, CSAR considerations should have already resulted in a well conceived plan of action which accounts for all probable scenarios. This is particularly important in view of the relatively slow speed and limited range of the air rescue vehicle (helicopter) in comparison to Navy tactical air assets.

Pinpointing the location of the survivor is of the essence. Tactical aircraft fly at such speeds that large areas can be covered by a damaged aircraft prior to bailout by the crew. This presents a large geographic area to complicate the search phase. Once located, problems of establishing communication with the downed aircrewman as well as authenticating his identification must be solved.

As probable targets for strategic attack and interdiction are located deep within many nations' land masses,

the possibility of extended operations demands consideration. Battle Group helicopter assets are not capable of air to air refueling, and must therefore either land to take on fuel or HIFR (helicopter in flight refuel) from a capable surface vessel. The limited speed and range of the helicopter restricts the distance a rescue effort may penetrate, even over a non-hostile land mass.

2. Mission Phases

The phases of the CSAR mission are recognized as search, suppression, pick up and egress. The search phase is probably best performed by tactical aircraft on scene. With faster speed and heavier firepower, they are less susceptible to possible shoot down than the low flying, slow moving helicopter. In normal circumstances, the search phase should be coincident with helicopter transit and concluded prior to the helicopter's arrival in the pick up area. Ideally, the search phase should be completed prior to the helicopter going "feet dry" (over land).

As the helicopter approaches the pick up area, the suppression phase commences. Escort and on scene aircraft coordinate to suppress enemy fire to the maximum extent possible. The helicopter is virtually incapable of actively

defending itself during this phase, since current configuration of Battle Group helicopters does not include defensive weapons for employment against either air or ground forces.

Once hostile fire is suppressed, the helicopter moves in to commence the pick up phase. It is at this time that the mission is at its most critical, in that the helicopter is most susceptible while it lands or hovers to extract the downed aircrewman. The coordinated suppression of hostile fire remains critical to mission success.

A successful mission does not terminate with extraction, because the helicopter must then egress, again through hostile territory. The mission is complete only when the rescuee is deposited with friendly forces in a secure area.

3. Mission Profile

Mission profiles obviously vary greatly, depending upon geographic locale, composition of U.S. and enemy forces, environmental factors and terrain features. However, a typical scenario would be as follows. Coincident to the launching of strike forces, helicopters tasked with provisional CSAR responsibilities are positioned close to the hostile coast line, either at airborne holding or

positioned on air capable ships. Once the decision is made by the Battle Group Commander to prosecute a CSAR effort, briefings are completed and the helicopter proceeds. Conditions permitting, both RESCAP (rescue combat air patrol) and RESCORT (rescue escort) aircraft are dispatched to accompany the helicopter as it proceeds to the pick up area. Flight profile for the helicopter once feet dry is in the terrain following mode, flying as low and fast as possible to expedite entry while taking advantage of terrain features to mask the helicopter from hostile fire. Navigation is a problem here, in that Battle Group helicopter pilots do not receive dead reckoning navigation training that would enable them to successfully locate the pick up area under any less than ideal, unopposed conditions. Reliance on RESCORT aircraft for navigation is necessary. Once in the pick up area, survivor locale is assessed, and the Helicopter Aircraft Commander (HAC) decides whether or not a pick up is feasible. The helicopter is either landed or brought into a hover over the downed aircrewman, and the pick up ensues. The instant the rescuee is brought on board, the helicopter commences egress escorted by RESCORT/RESCAP aircraft, again using terrain

following, but not by the same route as entry was made. The mission is complete when the rescuee is delivered to friendly forces in a secure area. ;sk 2

D. BATTLE GROUP CSAR ASSETS

1. Helicopter Assets

Current Battle Group helicopter assets typically include the following mix:

Six SH-3H Sea King helicopters. Based on the carrier, their primary mission is to provide in-close anti-submarine warfare protection. They are the only air assets available to fulfill this role. Maximum speed: 120 knots. Endurance: on the order of four hours and thirty minutes [Ref. 2: p. 1-133].

One or two SH-2F Sea Sprite helicopters. Stationed on frigates and destroyers, their primary mission is to provide antisubmarine warfare protection for the Battle Group out to the second convergence zone. (Note: Convergence zones occur at intervals of 30-35 miles in temperate and tropical latitudes [Ref. 3: p. 151]. Maximum speed: 140 knots. Endurance: on the order of two hours and thirty minutes [Ref. 4: p. 1-121].

Two CH-46E Sea Knight helicopters. Stationed on support ships, their primary mission is the vertical replenishment of the Battle Group. Maximum speed: 145 knots. Endurance: on the order of one hour and forty-five minutes [Ref. 5: pp. 1-143--1-148].

None of these helicopters were designed for the CSAR mission. They lack the speed, range and low level navigation capabilities to prosecute the mission. They were not designed to withstand large amounts of damage. They have no countermeasures, they present a high radar cross section, are noisy, and have no IR (infra-red) suppression, making them easy prey to hostile weapons systems. Furthermore, they do not have a weapon capable of suppressing even small arms fire while in the pick up zone. In all, they are poorly equipped for the CSAR mission and are extremely vulnerable. This severely limits the probability of successful prosecution of a CSAR mission in an opposed environment.

2. Aircrew Training

Battle Group helicopter aircrews are extremely capable of operating in a myriad of SAR environments. The training received makes them capable, confident professionals in this field. With respect to CSAR, AIRPAC HS

squadrons frequently deploy to NAS Fallon to rehearse various scenarios with their Air Groups. This is, however, the only CSAR training presented to the Battle Group, and it is inadequate. It is inadequate in that the approach taken is one of practice vice instruction. The aircrews are called upon to practice skills that they are not trained in.

Aircrew training in general takes place at two levels, the Training Command and the Replacement Air Groups (RAGs). However, the Training Command does not offer SAR training. Furthermore, although CSAR may be informally discussed in student/instructor briefs, there is no part of the syllabus directed toward this subject. HS, HS(L) and HC RAGs conduct basic SAR training, but do not address CSAR skills. The nugget (first tour aviator) arrives at his squadron with only a vague feeling for what CSAR is all about. If the nugget is assigned to an HS squadron, he may practice CSAR rudiments at NAS Fallon without the benefit of a formal syllabus. If instead he goes to an HS(L) or HC squadron, the first time he may participate in a CSAR evolution could readily be the real thing. Such practice can only result in the proliferation of downed aircrewmen--or worse. Furthermore, the lack of a formal CSAR training

syllabus for Battle Group helicopter pilots is a serious deficiency that can predictably lead to the loss of lives and irreplacable Battle Group helicopter assets.

E. RESOURCE MANAGEMENT

1. Basics

Any discussion of the prosecution of the CSAR mission utilizing current Battle Group helicopter assets can be simplified into one core question: Can the Battle Group Commander afford to risk his helicopter assets in the pursuit of a mission for which his aircraft are ill equipped and his crews poorly trained? The answer to this question is certainly subject to a number of variables, but in its gross form must be no. Should the CH-46Es be taken out of action, there would be significant impact on the Battle Group's ability to replenish underway. Their loss could only be accounted for by spending increased amounts of time alongside supply ships, a time of great susceptibility. Similarly, the Battle Group Commander could not afford to risk his few ASW helicopter assets. (The Commanding Officer of the Argentine cruiser General Belgrano has recently learned at first hand the importance of the submarine threat in modern warfare). The tradeoff involved in sending

untrained ASW aircrews on CSAR missions would be the potential rescue of a few souls weighed against the potential loss of hundreds of lives should an enemy submarine get through the screen. Such a gamble is clearly ill advised.

2. Dollar Costs

The dollar cost of combat SAR efforts in the Viet Nam era was the subject of an Air Force Air Rescue and Recovery Service study: "Cost Effectiveness of the Combat SAR System." This study revealed the average cost to be on the order of $70,510.00 in 1973 dollars [Ref. 6: p. 32]. This amount would be almost doubled in today's dollars. Keep in mind that this is not the cost for a successful rescue, but for any CSAR attempt. Additional price tags could be hung on aircraft losses, training investment losses and the administrative costs associated with prisoners of war (POWs) and the missing in action (MIA). These prices, however, lose their significance when compared to the political and psychological costs involved.

3. Political Costs

The North Vietnamese were quick to realize and capitalize upon the political value of the prisioner of war. The majority of these men were downed aviators. Due to the

brand of restricted warfare practiced by the U. S. in Viet Nam and the strong antiwar sentiment dividing our population, the manipulation of the POW issue by our enemy significantly contributed to the outcome of the war--one which clearly favored the North Vietnamese. The prevention of POWs is one goal of combat SAR. Although the existence of even one American POW could be put to political advantage, the absolute minimization of their numbers is possible only through a thoughtful and concerted effort to maintain a viable combat SAR capability.

4. Psychological Costs

Probably the most significant costs in the pursuit of CSAR mission validity are the psychological costs involved. The American ethic leads us to believe that if an aviator is downed in combat, he has the right to expect that his comrades will make every reasonable effort to effect his rescue. Indeed, there is enough John Wayne in the average fleet helicopter pilot that there would be no shortage of volunteers to attempt even the most hazardous rescue--no matter how ill advised! A cost benefit analysis would undoubtedly show that unless chances of success were extremely high, an attempt to perform the CSAR mission would

not be prudent. Yet, there is an unspoken understanding that if American aviators are downed due to enemy action, Battle Group helicopter assets will be utilized to come to their rescue (as was done in Viet Nam, with the resultant heavy losses).

The TACAIR pilot has every reason to believe this is true. Subtle indoctrination in this respect commences the first time an American youngster views a war movie and continues through his experiences in the training command and into the fleet. The U.S. Navy takes care of its own. From the helicopter pilot's point of view, combat rescue is regarded as a true badge of honor; the most difficult, dangerous and immensly rewarding evolution to which a pilot can aspire. The opportunity to save the lives of one's comrades is a longstanding ideal of the rotary wing community.

Consider the psychological effect, then of sending TACAIR pilots into combat with the knowledge that should they be shot down, their rescue would not be attempted. Consider the helicopter pilot being told that he could not attempt the rescue of his fellows aviators. Consider the impact on the American public of the realization that its

aviators could be treated as expendable. It can be argued that the American ethic would not permit these conditions to exist. The psychological crutch of combat search and rescue is real, and can be considered part of the American fabric.

F. A PROPOSAL

Based upon the preceeding, it is advanced that:

--the CSAR mission is one of valid requirements.

--the Navy does not possess a viable CSAR capability.

The proposal to initiate a viable CSAR capability is three pronged:

-1- Recognize the need for CSAR and make its tactical development a matter of CNO policy.

-2- Develop an appreciation of the fact that this is a TACAIR problem. (The helicopter community cannot begin to address it from within its own resources).

-3- Pursue a measured approach to the establishment of a viable CSAR capability.

The first point is obvious. Without CNO involvement, resurgent tactical development is well nigh impossible. The Office of the CNO must be convinced of the validity of the

mission, be educated as to the immediacy of its need and offer its complete endorsement.

The second point recognizes the fact that although the helo community will supply the aircrews and air rescue vehicle, it cannot readily sponsor a program of such scope. Sponsorship should more properly fall to the TACAIR community, whose level of interest should equal or exceed that of the rotary wing's, and whose resources are more closely matched to the problem. Without direct TACAIR involvement, the potential for program success is limited.

The measured approach to a solution is advanced in light of the current state of the economy and the Congressional mood of the time. With the flow of defense dollars going to purchase equipment, the selling of a new program might meet with formidable opposition. Therefore, the proposal commences with the absolute minimum acceptable position and proceeds to that which will offer a viable capability.

The minimum acceptable position attacks the complete absence of training and equipment required to conduct CSAR operations. First, a formal CSAR ground/flight training syllabus for deploying helicopter aircrews is established. Up to date tactical doctrine is presented, and the skills

needed to successfully conduct CSAR are instructed and practiced. Nap of the Earth (NOE) flight, low level navigation, threat analysis, aerial evasion, insertion/extraction techniques and weapons training are taught. Pilots are required to demonstrate a minimum skill level in order to become designated CSAR aircrewmen. Note that not all pilots have to be so designated; only enough to handle contingency requirements for the duration of the deployment. The intent here is not to make all of the helicopter aircrews expert, for that is a full time, fully concerted effort. Rather, it is to bring basic knowledge and skill levels of a select group up to the point that the mission stands a reasonable chance of success.

Second, Battle Group helicopters are brought up to a configuration that enables their crews to effectively prosecute the mission. This includes adding protection for personnel and other essential components, IR suppression, IR and radar countermeasures, comm/nav gear compatible with all anticipated scenarios, downed aviator locator/identifier equipment, defensive armament and an air-to-air capability. Again, this is a minimum approach brought about by restricted funding.

A more effective but much more costly approach would be the selection of a dedicated airframe. The U.S. Air Force is currently acquiring an H-60 derivative called the Night Hawk for its HX program. This helicopter has been designed to operate in a hostile environment, and many survivablity features have been included [Ref. 7]. The Navy is studying this program and could gain much value from it. Since it is also anticipating using the Navy version, the Sea Hawk, in the LAMPS role, such an airframe should be put to work within the following framework:

--1 active duty and 1 reserve squadron on each coast, with RAG functions conducted in house.

--Detachments from active duty squadrons deploy with the Carrier Air Groups (CAGs). Functionally a part of the Air Group, they cover all CSAR contingencies. (In order to maximize their utility, and due to the similarity of flying skills required, they could be tasked with the covert insertion/extraction of special warfare personnel).

The acquisition of a dedicated airframe should provide a bona fide CSAR capability for the period of time that it

takes to develop and acquire vertical lift technology capable of overcoming the airspeed and range constraints in current helicopter design. The JVX study is pointing toward such an air vehicle. It must be emphasized, though, that we cannot afford to disregard the requirement for CSAR while we wait for such an advanced aircraft to come along. The adoption of a dedicated helicopter airframe is a necessary prerequisite.

G. CONCLUSION

It is hoped that the reader has increased his awareness of the need for a viable Navy CSAR capability. The problems associated with the development of such a capability have been presented to lend credence to the concept of mission validity. A proposal for the measured approach to the solution of the problem has been advanced. Although the casual reader might jump at this chance for a quick fix to an embarassing deficiency in overall readiness posture, it is emphasized that this approach must be prosecuted throughout its many layers to provide the potential for mission success that our TACAIR and rotary wing pilots and the American public deserve.

II. DECISION SUPPORT FOR THE BATTLE GROUP COMMANDER

A. INTRODUCTION

The Navy Addendum to NWP 37, the National Search and Rescue Manual, tasks the Battle Group (BG) Commander with search and rescue (SAR) responsibilities for his own force. However, references to combat search and rescue (CSAR) were eliminated from the required operational capabilities of Navy helicopter squadrons in the mid 1970s. While the helicopter remains the best, if not the only, air rescue vehicle available, Battle Group helicopter assets are not equipped to conduct CSAR operations. More importantly, helicopter aircrews are not trained for this difficult and dangerous mission. The lack of a formal CSAR training syllabus has made the effective prosecution of the mission in an opposed environment a highly unlikely occurrence. Consequently, the United States Navy Battle Groups do not have the organic capability to conduct combat search and rescue.

Although there is one Reserve squadron that practices CSAR, its activation could not be a certainty in limited warfare, and any attempt to use U. S. Air Force assets to

cover Navy CSAR requirements over the wide range of possible scenarios is doomed to failure. The expertise generated during the Viet Nam conflict has been largely lost to the active forces, a victim of the passage of time and a general de-emphasis in the CSAR mission. In light of the above, it is obvious that the Battle Group Commander should not hold the opinion that he has a viable CSAR capability. Yet, it is a widely held belief that should aircrews be downed in future action, Battle Group helicopter assets will be tasked with the CSAR mission.

There is much that can be done to overcome this operational shortfall. Deploying helicopter aircrews could be trained to the mission requirements, and Battle Group helicopters refitted with a complementary CSAR suit. More appropriately, a dedicated airframe, such as the H-60 derivative selected for the Air Force HX project, could be acquired to deploy with the Carrier Air Groups (CAGs). The long range approach toward the acquisition of a viable CSAR capability would be through JVX technology--the future assignment of an aircraft with airspeed and range more closely associated with the TACAIR aircraft it supports.

This chapter does not attempt to deal with the requirements for establishing a viable CSAR capability. Rather, its purpose is to offer a degree of decision support for the Battle Group Commander in striving for the effective utilization of future CSAR assets. In this regard, it is assumed that equipment and training have been brought up to a minimum acceptable level prior to deployment. A number of variables are then examined within the bounds of realistic constraints. The end product is a decision support matrix designed to give qualitative guidance to the Battle Group Commander in the formulation of his decision. Each variable will be introduced, discussed briefly and then followed with a statement of decision criteria in order of preference. Finally, the compiled decision matrix will be presented.

B. THE VARIABLES

CONDITION OF SURVIVOR--The primary item of concern in the assignment of CSAR assets following a shoot down is the condition of the survivor. First, is he alive? Was bailout observed? Was he spotted on the ground? Is he injured? The importance of this information's accuracy and timeliness cannot be overemphasized. Decision Criteria : alive or dead.

STATE OF SURVIVOR--A subset of the previous variable is the state of the survivor. He will almost certainly be experiencing at least a mild state of shock. More crucial, was he injured in bailout? Can he assist in his own rescue, or will special provisions have to be made to effect his pick up? Decision Criteria : uninjured or injured.

LOCATION--The exact location of the survivor must be known. Tactical jet aircraft fly at high speeds, and a vast amount of geographic area can be traversed after taking a hit and prior to ejection. The restrictive range of current Battle Group helicopters requires that to conserve fuel they fly as nearly a direct route to the survivor as is safe within the constraints of nap-of-the-earth (NOE) flight. The optimization of flight path selection could be critical to mission success. Pinpointing the survivor is essential to this selection. Decision Criteria : known or unknown.

COMMUNICATIONS ESTABLISHED--The potential for mission success is greatly enhanced by the establishment of communication with the survivor. His assessment of the situation can greatly ease the solution of problems that can compound the pick up phase. Additionally, the communications link serves as the best means for authentication. Decision Criteria : yes or no.

AUTHENTICATION--The enemy successfully employed deceptive practices during Viet Nam CSAR missions that extracted costs in both lives and aircraft lost. It is imperative that the survivor's identity be authenticated prior to entry into the pick up phase. Decision Criteria : yes or no.

IMMEDIATE THREAT TO THE BATTLE GROUP--Here, the threat to the Battle Group must be broken up by its nature. Each threat, subsurface, surface and air, must be assessed on its own merits and then by its contribution to the overall threat. For example, the Battle Group Commander would not want to send antisubmarine helicopters in pursuit of combat rescue if the submarine threat was high. Decision Criteria : low or high.

AVAILABILITY OF RESCUE AIRCRAFT--A question that seems superficial, but one that has taken on critical overtones in the past, concerns the availability of rescue aircraft. Is there a suitable air rescue vehicle up and ready? Decision Criteria : yes or no.

CAPABILITY OF RESCUE AIRCRAFT--This is a many faceted question. If available, is the air rescue vehicle fully CSAR capable? Does it possess the range required to successfully conduct the mission within its particular

constraints? Is its crew properly trained? In each case the Decision Criteria are the same: yes or no.

RESCORT/RESCAP AVAILABILITY--The availability of RESCORT (rescue escort) and RESCAP (rescue combat air patrol) aircraft are factors with significant effect on the outcome of the CSAR mission. Unless the decision is made for covert operations, with the helicopter proceeding independently, RESCORT aircraft provide escort services to the rescue helicopter on ingress and egress by neutralizing ground threats, providing close-in support and assisting in navigation. This latter point is critical, in that navigation over hostile, unfamiliar terrain while flying NOE is extremely taxing. Again, the limited range of Battle Group helicopter assets does not permit errors in navigation. RESCORT support is critical if ground based opposition to the pick up is expected, because RESCAP aircraft devote their efforts to neutralization of enemy air threats. Both are critical functions since Battle Group helicopters are not now equipped with defensive capabilities. Decision Criteria : yes or no.

AIR SUPERIORITY--Does the U. S. enjoy air superiority, or is the counter air threat a force to be reckoned with? Decision Criteria : yes or no.

GEOGRAPHICAL CONSIDERATIONS--The topography to be covered on ingress and egress demands consideration. Is the anticipated mission profile in any way limiting to helicopter performance? Do population centers effect route of flight? Are enemy strong points a factor? Is the topography of the pick up zone a limiting factor? Decision Criteria : satisfactory or unsatisfactory.

ENVIRONMENTAL FACTORS--Environmental factors can significantly impact the probability of mission success. Will nightfall be a factor over the course of the mission? Will adverse weather help or hinder rescue attempts? Decision Criteria : satisfactory or unsatisfactory.

OPPOSED ENTRY--The restrictive range capabilities of Battle Group helicopter assets could conceivably limit the number of routes flown into a pick up area. Are all possible flight paths exposed to some form of enemy threat? Decision Criteria : no or yes.

LIKELIHOOD OF SUCCESS--This is a subjective judgement of the Battle Group Commander, assisted by his staff CSAR/helicopter officers. This point weighs all other factors in a single subjective decision. Decision Criteria : high or low.

LIKELIHOOD OF INCURRING ADDITIONAL LOSSES--Based upon a subjective assessment of the threat, what is the probability of incurring additional losses through prosecution of the CSAR mission? Decision Criteria : low or high.

IMPACT OF LOSSES ON BATTLE GROUP--How would the potential loss of an ASW asset impact Battle Group antisubmarine warfare posture? Could the potential loss of an H-46 seriously impact vertical replenishment and cause increased susceptibility to enemy attack as Battle Group ships are forced to spend more time alongside to resupply? Can the Battle Group afford to risk the loss of one of its few ASW helicopter assets? Decision Criteria : satisfactory or unsatisfactory.

C. THE DECISION SUPPORT MATRIX

The variables listed above are the major ones attendant to the decision to employ helicopter assets for CSAR missions. They call for and result in a number of decisions made by a variety of individuals--CAG, Squadron Commanders, the On Scene Commander, the Helicopter Aircraft Commander, and RESCORT/RESCAP Aircraft Commanders, to name the most prominent. The ultimate decision, however, resides with the Battle Group Commander. He is the one who bears ultimate

responsibility for the outcome of each mission. With this in mind, the following decision support matrix has been constructed to assist him in the decision making process. Entry is made via the variables listed along the left. Reading to the right, decision criteria are offered. Proposed resultant action is displayed at the bottom and includes selections to continue with the mission, to hold for reconsideration, and to discontinue/abort. It is hoped that the matrix will offer a degree of order to the many variables involved and provide a framework for the production of a decision which maximizes the probability of mission success with minimum risk to both the CSAR and Battle Group assets.

DECISION SUPPORT MATRIX

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CONDITICN OF SLRVIVCP  |ALIVE|OEAO|
STATE OF SURVIVOR      |-----|----|UNINJUREO|INJUREO|                                      KEY:  Y-YES
LOCATION               |-----|----|---------|-------|KNOWN|UNKNOWN|                              N-NO
COMM ESTABLISHED       |-----|----|---------|-------|-----|-------|Y|N|                          S-SATISFACTORY
AUTHENTICATION         |-----|----|---------|-------|-----|-------|-|-|Y|N|                      U-UNSATISFACTORY
LIKELIHCCO OF CAPTURE  |-----|----|---------|-------|-----|-------|-|-|-|-|LO|HI|
IMMEDIATE THREAT TO BG |-----|----|---------|-------|-----|-------|-|-|-|-|--|--|LO|HI|
AVAIL. OF RESCLE A/C   |-----|----|---------|-------|-----|-------|-|-|-|-|--|--|--|--|Y|N|
CAPABIL. OF RESCUE A/C |-----|----|---------|-------|-----|-------|-|-|-|-|--|--|--|--|-|-|Y|N|
RESCORT AVAILABILITY   |-----|----|---------|-------|-----|-------|-|-|-|-|--|--|--|--|-|-|-|-|Y|N|
RESCAP AVAILABILITY    |-----|----|---------|-------|-----|-------|-|-|-|-|--|--|--|--|-|-|-|-|-|-|Y|N|
AIR SUPERIORITY        |-----|----|---------|-------|-----|-------|-|-|-|-|--|--|--|--|-|-|-|-|-|-|-|-|Y|N|
GEC. CONSIOEPATIONS    |-----|----|---------|-------|-----|-------|-|-|-|-|--|--|--|--|-|-|-|-|-|-|-|-|-|-|S|U|
ENVIRONMENTAL FACTORS  |-----|----|---------|-------|-----|-------|-|-|-|-|--|--|--|--|-|-|-|-|-|-|-|-|-|-|-|-|S|U|
OPPOSEO ENTRY          |-----|----|---------|-------|-----|-------|-|-|-|-|--|--|--|--|-|-|-|-|-|-|-|-|-|-|-|-|-|-|Y|N|
LIKELIHOOD OF SUCCESS  |-----|----|---------|-------|-----|-------|-|-|-|-|--|--|--|--|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|Y|N|
LIKELIHOCD AOD'L LOSSES|-----|----|---------|-------|-----|-------|-|-|-|-|--|--|--|--|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|Y|N|
IMPACT OF LOSSES ON BG |-----|----|---------|-------|-----|-------|-|-|-|-|--|--|--|--|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|S|U|

-----------------------------------------------------------------------------------------------------------------------
CONTINUE               |  X  |    |    X    |   X   |  X  |       |X|X|X|X| X|  | X|  |X| |X| |X| |X| |X| |X| |X| |X| |X| |X| |X| |
HOLD/RECCNSIDER        |     |    |         |       |     |   X   | | | | | |  | X|  | X| | | |X| |X| |X| |X| |X| |X| |X| |X| |X| | |
DISCONTINUE            |     | X  |         |       |     |       | | | | | |  |  |  |  | |X| | | | | | | | | | | | | | | | | | | | | |X|
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LIST OF REFERENCES

1. Every, M. G., Navy Combat Search and Rescue. BioTechnology, Inc., 1979.

2. U. S. Department of the Navy, Navy Model SH-3D/H Helicopters. Washington, D. C.: Government Printing Office, 1978.

3. Urick, R. J., Principles of Underwater Sound. New York: McGraw Hill, 1975.

4. U. S. Department of the Navy, Navy Model SH-2F/HH-2D Aircraft. Washington, D. C.: Government Printing Office, 1980.

5. U. S. Department of the Navy, Navy Model CH-46E Helicopter. Washington, D. C.: Government Printing Office, 1980.

6. Every, M. G., Problems and Alternatives in the Combat Rescue of Navy Aircrewmen. BioTechnology, Inc., 1980.

7. Foulk, J. B., "Survivability of the Army/Sikorsky YUH-60A Helicopter. 32nd Annual National V/STOL Forum of the American Helicopter Society (May 1976).

BIBLIOGRAPHY

Every, M. G., Navy Combat Search and Rescue. Falls Church: BioTechnology, Inc., 1979.

Every, M. G. and James Parker, Jr., Problems and Alternatives in the Combat Rescue of Navy Aircrewmen. Falls Church: BioTechnology, Inc., 1980.

Foulk, J. B., "Survivability of the Army/Sikorsky YUH-60A Helicopter." 32nd Annual National V/STOL Forum of the American Helicopter Society (May 1976).

Hartley, D. G., "Combat Rescue Deficiencies and Remedies." Paper Submitted to Naval War College, 1981.

Hobdy, C. C., "Search and Rescue as an Instrument of National Policy." Paper, Air War College, 1970.

Martin, J. T., "Future Search and Rescue (SAR) Forces: How Much Do We Retain?" Paper, Air War College, 1975.

Reed, M. M., "Combat Search and REscue (CSAR) Capability Within the Carrier Battle Group." Paper, Naval War College, 1981.

Strauss, W. J., N. D. Bailey and G. R. Johnson, Combat Rescue Mission Analysis (CRMA) Simulation Model. Chicago: Kearny, Inc., 1977.

Urick, R. J., Principles of Underwater Sound. New York: McGraw Hill, 1975.

U. S. Department of the Army, Viet Nam Lessons Learned No. 72: Search and Rescue Operations. Washington, D. C.: Government Printing Office, 1968.

U. S. Department of the Navy, Navy Model H46-E Helicopter. Washington, D. C.: Government Printing Office, 1980.

U. S. Department of the Navy, Navy Model SH-2F/HH-2D Aircraft. Washington, D. C.: Government Printing Office, 1980.

U. S. Department of the Navy, Navy Model SH-3D/H Helicopters. Washington, D. C.: Government Printing Office, 1980.

Yesensky, D. A., "Combat SAR and Today's Seabased Helicopter Pilot." Paper, Armed Forces Command and Staff College, 1981.

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