28 February 1968

From: Commanding Officer, Helicopter Anti-Submarine Squadron SIX

To: Commander, Naval Air U.S. Pacific Fleet

Subj: Search and Rescue equipment and procedures: recommendations for improvement of

Ref: (a) HS-2 ltr ser 001 of 16 November 1967

1. Reference (a) explores in depth the present assets, training and technique used in accomplishing the Naval SAR mission in the Tonkin Gulf. The recommendations set forth in reference (a) are strongly endorsed and the following comments are offered as an amplifications of various facets of training and equipment in the hope that when HS squadrons must engage in similar operations in the future they may come to their task more fully prepared.

2. Pilot/Aircrew Training

The general syllabus of training as presented in enclosure (1) to reference (a) is extremely well thoughtout and complete. However the idea that such a program of training may be mutually exclusive with a full calendar of First Fleet ASW training requirements is not necessarily valid. It is felt that a meaningful pilot/aircrew SAR training program can be developed by HS squadrons without detriment to the ASW training requirements. In some cases the two types of training will be compatible for scheduling purpose and dual mission training flights can be planned. Maximum use of close, convenient areas and facilities is important to make the most effecient use of funds and manpower. Training areas discussed in reference (a) which are deserving of further comment are as follows:

a. Overland Navigation/Rescue Training

The problem of D. R. Navigation can be learned as readily and be as valuable when presented on the topographical format of the local flying area as they would be if practiced over a tropical terrain similiar to Vietnam. The reliance on physical features of the land and a lack of prominent points can describe a navigation training route which covers the area North and East San Diego. Such flights commencing with overwater legs could require D. R. Navigation to a coast-in point, and can utilize the rough terrain landing sites near NAS Imperial Beach for approach and landing practice during the final portion of their planned mission. The altitudes of these sites provide ambient conditions similiar to the high sea level density altitudes found in South East Asia.

b. Overwater Rescue Training

In addition to the valuable over water rescue training that is provided by the Air Pac Deep Water Survival course, Underwater Demolition Team 12 and Seal Team 1 stationed at the Naval Amphibious Base, can assist in further training. Normal rescues using all types of equipment and unconcious-man rescue in which the crewman enters the water to assist the survivor can be practice to perfection. With these two units there is considerable latitude in scheduling and the convenience of San Diego's South Bay allows maximum utilization of helicopter time. This command has already made recommendations concerning the validity and importance of the use of the Combat Paramedic Rescue School located at Cubi Point, P.I. The curriculum of this school should be provided in the San Diego area for all helicopter aircrewman.

c. Coordinated SAR Training with Attack Squadrons

Coordinated SAR Training of Helicopter Squadrons with Attack Squadrons provides a rather high ratio of transit flight hours to training flight hours because of the distance to facilities where such training can be conducted. During the past shore training cycle completed by this command. This training was conducted out of MCAF Yuma and NAF Fallen, Nevada to the benefit of all units concerned. The flight profiles closely paralled actual SAR missions and the combined briefs and debriefs bring a much clearer understanding and appreciation of individual problems and make possible better coordination of SAR efforts.

d. In-flight firing of M-60s

Off shore firing areas can be scheduled for M-60 firing and this training can be conducted as an additional mission on ASW training flights. The cross country navigation flights can be routed through Camp Pendleton at prearranged times to utilize the Santa Rosa impact area for M-60 firing.

e. First Aid Training

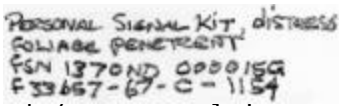
It is felt that a squadron level program of first aid training is possible and also the most beneficial way of approaching the problem of airborne casualties. The squadrons flight surgeon can effectively administer the program prior to and during deployment. As a sustained program with monthly refresher lectures and demonstrations the level of knowledge and proficiency in first aid techniques is always high. In-flight emergencies simulating situations which require first aid would be a valuable adjunct to the ground training syllabus. Once again, due to the very nature of the helicopter and it's potential of becoming a SAR vehicle at any time, thorough first aid training for all helicopter aircrewman is a necessity.

f. Coin and Hand Combat Training

Some training suggested in reference (a), the time for which might be more profitabaly used, is the COIN school and hand to hand combat training, These would be particularly desireable for land operations or counter insurgency measures in enemy territory, but the benefit from them in relations to the time they take from more useful flight training is questionable. It is felt that the desirebility of engaging the enemy on these terms while in an evasion situation is not in the best interest of survival, evasion, or escape.

3. Suvival Equipment

a. In the category of signalling devices an improvement on the very valuable penguin flare gun kit is the gyro stabilized flare (MBA-201) used by the USAF.



b. Due to differing personalities and subjectives needs/ personnel,in preparing a personal survival kit, tend to choose either too little or too much equipment, thereby limiting their survival capability or overburdening themselves. With the advent of overland rescue missions in North Viet Nam it is felt that a compact kit should be provide for SAR crews in addition to the Seek Kit. This kit should contain as wide a range of survival equipment as is feasible within prudent limitations of weight and bulk. Such a kit was made up by this command and provided a valuable supplement to the regular issue kits. The kit consisted of a knapsack, measuring 5″x8″x13″ with adjustable shoulder straps so that it can be worn as a back pack, weighing 12 pounds when full and containing the following items;

1. 1 Poncho (rubberized fabric)
2. 4 Meat bars (Armour dehydrated meat product)
3. 1 Pocket knife (Navy issue with awl, blade, screwdriver, canopener)
4. 1 Day glow cloth (3' x 3′)
5. 50' of shroud line
6. 2 Water containers (1 quart each)
7. 1 Pack of plant recognition cards
8. Evasion charts (EVC 250 sections 1-6, scale 1:2500,000)
9. 1 Chinese "Pointy-talky"
10. 1 Vietnamese “Pointy-talkey"

11. 1 Container (strike-anywhere matches in waterproof container)
12. 1 Chap stick
13. 1 Toilet paper cloth (chamois)

Two external side pockets are provided for carrying the survival radios.

c. Of the three types of life preservers which are generally available the LPU-2p (Mil-26558B USAF) is considered the most desireable for helicopter use. It offers the same bouyancy as the MK-3C and twice the bouancy the MK-2. It's main advantage is compactness, which is a factor for improved cockpit comfort and for ease of egress in the event of a crash landing. In a recent accident (HS-6 AAH2-68A) in which there was difficulty by the copilot in jettisioning his window, The LPU-2 made it possible to egress through the restricted space available when the window is slid to the full open position. The bulkiness of the MK-3C would make such egress considerably more difficulty. Although the LPU-2 package does not contain any dye markers or day/night flares these items can be stowed in the SV-1 survival vest which is worn along with the life preservers.

4. Flight Clothing

Reference (a) proposes the need for a camouflaged, light weight, durable flying coverall without giving due credit to the presently available Green Nomex flight suit. In defense of the Nomex flight suit it is offered that it is superior to any other in light weight, stength, and fire retarding ability. The open weave of the fabric is such that a slight breeze will offer sufficient cooling on even the hottest days. The scratchiness of the fabric which initially makes the suit uncomfortable to some wearers is alleviated after one or two launderings. The worth of the suit is best given in an article which appears in the 17-23 December 1967 Weekly Accident Summary - to quote "The fire was so hot that the nylon of his shoulder harness completely melted and dripped on his flying suit.. his only burns were first degree and superficial second

degree…his nomex flight suit never caught fire although the heat from the flames tra nsmitted through the fabric burned his skin."

5. Night Rescue Lighting

For night rescue work an attractive alternative to moonbeam lighting may be a helicopter installation of the Xenon Type Searchlight (28 volt, 100 AMP, 75,000,000 candle power, model 9910, Varo Manufacturing Co. FSN 623-7UO-3280), a 230 pound self contained unit which can provide infrared or white light at a 7.5° or 12° beam width. The potential covert capability of a SAR aircraft configured with such a light-weight, single unit package is worthy of further investigation. This command conducted preliminary observation of the searchlight operation at Camp Pendleton where the units are mounted on tanks. Development of the night rescue concept should also include the incorporation of an infrared capability in the pilot's strobe light (FSN 6230-067-5209). Search aircraft in which the pilots and crew were provided with receiving glasses for the infrared light source could then considerably expand the search area with the searchlight equipped helicopter serving as the rescue vehicle.

6. Forward Firing Machine Gun

Past operations in Southeast Asia with SH-3A aircraft have indicated the desirability of a forward firing machine-gun. The present M-60 machine guns mount in the personnel door and cargo door and are designed so that neither affords a field of fire directly forward of the aircraft. Furthermore, during rescue operations, the forward port firing mount is often unattended while both crewmen are involved in operating the rescue hoist and aft mount.

Obviously, while effecting a rescue from a hover, the cockpit may be subjected to ground fire from forward and to port. The development of a fixed standard M-60 to be located on the outside of the aircraft and below the exist¦swivel mount was the desired goal.

Important requirements to be met were:

1. Developing an adequate fixed mount that would not interfere with flexible mount.

2. Maintaining adequate fire control over the weapon by the pilot and/or the co-pilot.

3. Loading and servicing the weapon in flight.

4. Retention of expended brass and links within the aircraft.

5. Minimizing effects to the aircraft caused by firing.

Positioning an M-60 in relation to the flexible mount indicated that the first requirement could be readily met. From available materials the mount pictured in Encl.(1) was constructed. Exact dimensions for materials used was not carefully considered as long as they were obviously adequate to meet anticipated forces.

The forward firing M-60 mount is divided into two separate assemblies. The rear half is so designed that it will accommodate either the M-60 or the M-60D mounting bracket. A lock pin engages lugs on these brackets and corresponding lugs on the gun, thus restricting canting and lateral motion of the weapon. The front half of the mount was initially designed to utilize existing bi-pod mounting bolts but later modified to facilitate quick removal of the gun.

The second requirement, that of controlling the firing of the weapon, was first attempted through the use of electrical solenoids. No units which provide a long enough throw or reliably to overcome the forces inherent in the weapons firing mechanism were available. A satisfactory means of control was developed through the use of a linear actuator (FSN-1680-858-6803-ABN). This unit provides sufficient power to reliably actuate the M-60 firing mechanism. Its primary drawbacks are that it operates more slowly and lacks the fail safe cease fire qualities of a solenoid. Electrical power drives the actuator to the fire position. A reversal of electrical polarity is necessary to drive the actuator to the cease fire postion.

In the event of electrical power failure the actuator remains in its last position. Control of the actuator is achieved by an electrical relay through the weapons release button on each cyclic, either of which serve to operate weapon. Emergency stoppage of the weapon is readily effected through release of the feed mechanism latch. Further positive electrical safing is provided by routing actuator power through the master armament switch of the aircraft.

The third requirement, effective feeding of ammunition to the weapon, was achieved through the use of a feed chute. This component is locked to the weapon through an existing system of latches and the plate from a standard 100 round magazine. The chute angles inward beneath the weapon and penetrates the armor plate. Ammunition is drawn from containers inside the aircraft and fed through the chute into the gun. No difficulties in feed with this arrangement have been encountered. Firing tests indicated the workability of the system with new or rebuilt guns. However, in older weapons due to the wear of certain components, it frequently misfired with belts containing more than twenty (20) rounds. During these tests the ability to service the weapon under flight conditions was proven by the rapid clearing of jams, etc.

Quick detachment of the weapon to facilitate replacement or in-flight servicing of the weapon was deemed a desireable feature. Redesign of the front mount (Encl(l)) to accomplish this consisted of fabricating a triangular shaped plate with a flange welded to its base. Two bolts through the flange secure the plate to the armored door slightly forward of the original mount and the plate is drilled to receive the muzzle break. This assures accurate alignment while allowing more rapid removal of the gun. Removal of¦the feed chute using the existing latches, breaking the electrical

connection at a cannon plug, and removing the lock are the other simple steps for detaching the weapon.

The fourth requirement, to retain expended brass within the aircraft, was felt necessary to safeguard the tail rotor in all flight attitudes. Jamming was experienced initially but by cutting away the forward side of the standard ejection chute this problem was eliminated.

The fifth requirement, minimizing effects to the aircraft caused by firing, was met by locating the weapon so that the muzzle was over the one-half (1/2) inch aluminum armor plate. Encl.(l) shows the effects of in-flight firing to the aircraft. Other than smoke smudges along the fuselage no undesireable effects could be determined. Muzzle blast noise in the cockpit is not of sufficient magnitude to be significant. The weapon is depressed five (5) degrees below the longitudinal axis of the aircraft. This causes the point of impact of the bullets to appear nearly level with the pilots line of sight in an 80 to 100 knot attitude at a mean range of 700 feet. Point of impact was directly ahead of the aircraft and could easily and rapidly be controlled through normal displacement of aircraft controls. A high degree of accuracy was obtained on stationary surface targets during the test flights consideriing the lack of a gunsight. A simple sighting system would improve accuracy in situations where hits are not readily apparent, such as in heavy foilage.

The M-60 machine gun provides considerably less fire power than the HH-53 mini-gun installation but it does offer a simple and effective forward firing weapon using readily available equipment.