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AIRBOATS (U)

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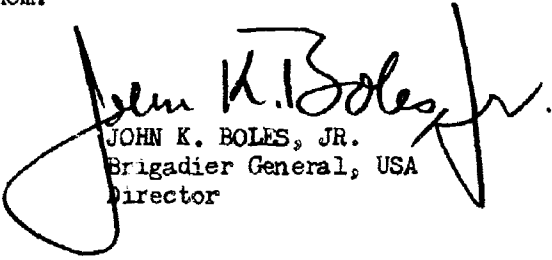
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JOINT RESEARCH AND TEST ACTIVITY
Office of the Director
APO San Francisco 96309

REPORT OF EVALUATION BY DIRECTOR, JRATA

This report is an excellent documentation of the initial employment of airboats in combat. The report is a reminder of the patience required of test and evaluation personnel during the initial employment of weapons or equipment. The results of the airboat evaluation conducted during the rainy season of 1964 were quite discouraging, and left unanswered the question of tactical effectiveness of the airboats for Republic of Vietnam operations. A much more aggressive program was instituted during 1965. During the months of August through November 1965 the airboats were used in 104 operations, and Viet Cong were contacted during 84 of these missions. The airboats were particularly effective when used as a flank security element during coordinated offensive operations or as a pursuit force. The airboats were used in these roles on fifteen operations, and during these operations accounted for 81 Viet Cong killed in action. Only five Viet Cong were killed in action during the other 89 operations, principally reconnaissance patrols. The performance of the airboats during the 1965 evaluation clearly demonstrated that they are a valuable vehicle for ground forces operating in the Mekong Delta or Plain of Reeds. The conclusions and recommendations of the report are substantiated and I concur in them.

15 April 1966


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

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ARMY CONCEPT TEAM IN VIETNAM
APO San Francisco 96243

FINAL REPORT

AIRBOATS (U)

JRATA Project No. 1B-159.0

15 April 1966

Approved:

Merrill G. Hatch

MERRILL G. HATCH
Colonel, Artillery
Chief

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ARVN 5th Division
ARVN 9th Division
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I. (C) PREFACE

A. ABSTRACT

The purpose of the evaluation was to determine if the use of airboats would increase the capability of the Army of the Republic of Vietnam (ARVN) to intercept insurgent forces operating in inundated areas containing aquatic grasses.

The Army Concept Team in Vietnam (ACTIV) evaluation of the Susquehanna Skimmer and Hurricane Airtat airboat was conducted in two phases. Phase I was conducted during the later part of the 1964 rainy season (November) with the ARVN 5th, 9th, and 21st Divisions and the 875th Regional Force (RF) company. As the airboats had not arrived in the Republic of Vietnam (RVN) until October 1964, there was insufficient time to accomplish the necessary training and adequately evaluate the airboats prior to the end of the 1964 rainy season. An interim report of phase I findings was published by ACTIV on 15 March 1965. The operational missions undertaken during phase I were confined largely to established water-ways and involved patrolling, escorting, and troop movement. Data collected during phase II of the evaluation were obtained during the 1965 rainy season. At this time, the boats were placed with the Vietnamese Special Forces (Luc Luong Dai Biet - LLDB) operating in the Plain of Reeds. Operations undertaken during phase II were confined largely to this area and involved pursuit, interception, screening, raids and ambush. The airboats were more aggressively employed than they were during phase I. They were found to be particularly effective when employed as an element of a coordinated offensive operation. During the months of August through December 1965, aggressive employment of the airboats was a major contributing factor in friendly operations resulting in 46 Viet Cong (VC) killed in action, 41 suspected VC captured, and numerous VC structures and sampans destroyed.

Data collected through interviews with members of the LLDB and their respective US Army Special Forces divisions revealed that the airboats provided the Vietnamese with useful mobility means that was immediately responsive to the commander's operating against the VC off established water-ways in the delta during the monsoon season.

The Hurricane Airtat boat with modifications better meets the requirements of the Commander, US Military Assistance Command in Vietnam (MACV) than the Susquehanna Skimmer. It is recommended that the modified Hurricane Airtat be considered for inclusion into the Military Assistance Program for issue to the ARVN Special Forces and Infantry divisions deployed in the Mekong Delta. To insure proper commands that this vehicle be considered for issue to US Army Special Forces.

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B. OBJECTIVES AND METHODS

1. Objective 1 - Organization

Recommend a suitable organization and manning for units equipped with airboats.

The methods for meeting objective 1 included interviews with ARVN commanders and US advisors, observation by US evaluators of airboat operations, analysis of after-action reports, and application of lessons learned during the evaluation.

2. Objective 2 - Training

Determine the training and individual skills required by crewmen of airboats in counterinsurgency operations in Vietnam.

The methods for meeting objective 2 were the same as those for objective 1 but in addition included analysis of data extracted from questionnaires.

3. Objective 3 - Crew-served Weapons

Assess the adequacy of airboats as platforms for infantry crew-served weapons.

The methods for meeting objective 3 were the same as those for objective 2.

4. Objective 4 - Employment

Determine if airboats provide the capability for ARVN forces to pursue, intercept, and destroy Viet Cong boats operating off established waterways in the delta during the monsoon season.

The methods for meeting objective 4 were observation by US evaluators, participation in operations, interviews with US advisors, and analysis of data extracted from questionnaires.

5. Objective 5 - Tactics and Techniques

Recommend suitable tactics and techniques of employment for airboats used in counterinsurgency operations in Vietnam.

The methods for meeting objective 5 were observation by US evaluators of operations in Vietnam, analysis of data extracted from after-action reports, and analysis of data extracted from organization and training checklists.

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6. Objective 6 - Maintenance

Determine the maintenance problems, if any, encountered in the employment of airboats in counterinsurgency operations in Vietnam.

The methods for meeting objective 6 were observation and inspection of equipment by US evaluators, and analysis of data extracted from an organization and training checklist.

C. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Airboat platoons of six modified Hurricane Aircats crewed by five men and armed with one caliber .30 machinegun, provided LLDB forces with a vehicle that was immediately responsive against VC operating off established waterways in the Mekong Delta during the monsoon season. The airboats also provided commanders with an effective psychological warfare weapon and contributed materially in coordinated offensive operations against insurgents deployed throughout the delta. Proper tactical employment of the airboats demonstrated that disadvantages of the high noise level of the engine/propeller could be minimized to an acceptable degree.

Consideration should be given to the introduction into the LLDB and the ARVN Divisions operating in the Mekong Delta of airboat platoons organized, equipped and trained under the Military Assistance Program.

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II. (C) INTRODUCTION

A. PURPOSE

The purpose of the evaluation was to determine if the use of airboats would increase the capability of the ARVN to intercept insurgent forces operating in inundated areas containing aquatic grasses.

B. BACKGROUND

The Viet Cong (VC) insurgents move men and supplies by motor or paddle sampans on the numerous canals, streams, and rivers in the RVN. If detected and pursued by the government forces in conventionally powered boats, the VC often leave the established waterways and move across the grass-covered inundated areas using manpower to propel their sampans.

The government forces in the Mekong Delta were equipped with four types of boats: the landing craft vehicle, personnel (LCVP); the 14-foot plastic assault boat; the swimmer support boat, normally propelled by a 25-hp or 40-hp outboard motor; and the sampan. None of these were satisfactory for cross-country pursuit of VC sampans in low water and heavy aquatic growth. The aquatic grasses fouled the propellers of the LCVP and the outboard motors, and the government sampan had the same characteristics and speed as the VC sampan.

In 1961, at the request of the Commanding General of ARVN Field Command, airboats were brought into Vietnam and tested by the US Navy. The US Navy test established that airboats could operate satisfactorily in the environment of Vietnam but that the high noise level gave the boats little military value in counterinsurgency operations. Additionally, the US Navy test had revealed the unacceptability of water jet boats and various configurations of screw propeller boats.

During the spring of 1964, US special forces advisors and the senior advisor to the ARVN IV Corps expressed a requirement for fast, shallow-draft boats capable of operating effectively in off-canal areas. In June 1964, COMUSMACV stated an operational requirement for special boats capable of attaining speeds up to 20 miles per hour, carrying 4 to 5 combat troops, mounting crew-served weapons, and capable of operating across swamps, inundated rice paddies, and in water containing heavy aquatic growth.

On 19 June 1964 GINCPAC approved the COMUSMACV request for a new evaluation of airboats and immediate action was taken by ACTIV to procure six each of two types of commercial airboats. The airboats selected had proved to be the best of those tested by the US Navy in 1961. It was

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anticipated that the limitation imposed by the noise of the airboats could be overcome by developing appropriate tactics and techniques of employment.

Because the Aircat and Skimmer airboats were built by small companies with limited production capabilities, there was delay in procurement and the boats did not arrive in Vietnam until October 1964. The training program was begun immediately upon arrival of the boats but they were not employed in combat until 1 November. Because of the receding water level, phase I of the evaluation was terminated on 1 December. As insufficient data were collected to draw final conclusions and recommendations, a phase II evaluation was conducted during the 1965 rainy season. During phase II of the evaluation the airboats were placed with the Vietnamese Special Forces operating in the Plain of Reeds.

C. DESCRIPTION OF MATERIEL

The two types of airboats used in the evaluation, the Susquehanna Skimmer and the Hurricane Aircat, were manufactured commercially in the United States. Each was 17 feet long, approximately 7 feet wide, weighed approximately 1200 pounds empty, had twin rudder steering, and was powered by a Lycoming O-360, 180-horsepower air-cooled gasoline engine. The Skimmer had a semi-V bottom hull made of fiberglass-covered 3/8-inch plywood and the Aircat had a semi-catamaran hull made of molded fiberglass. Six of each of the boats were procured and evaluated. A more detailed description of the two boats is found in annex B.

D. SCOPE

1. Definition of the Project

The project included an evaluation of the performance characteristics of two different models of airboats under varied trafficability conditions; the most suitable armament to be incorporated; the most effective size and composition of the crew; and the tactics and techniques to be employed in combat.

2. Setting of the Evaluation

The evaluation was conducted in the Mekong Delta to take advantage of the many streams and inundated areas. Annex A contains a description of the evaluation environment and military elements involved.

E. EVALUATION DESIGN

1. Methodology

a. Data Collection Methods

Observations of training and operations, based on a checklist,

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were performed by evaluators. After-action reports were prepared after each airboat mission. Interviews with personnel assigned to airboat units were conducted using the same questions for each interview.

Unit commanders and US advisors were requested to keep operating records which included maintenance performed and data concerning each airboat operation.

B. Analysis Methods

Analysis of the data produced during the evaluation was accomplished by careful screening and comparison of all questionnaires and reports. Analysis also included the professional judgement of the military commanders and project officers who participated in actual operations.

2. Limitations and Variables

The basic limitation encountered was the seasonal change in water level in the inundated areas of the delta. Phase I of the evaluation did not commence until near the end of the rainy season (November 1964). The water level in the delta fell rapidly and the inundated areas became dry. Only 6 weeks remained for training and combat operations, which proved to be inadequate for a proper evaluation of the airboats in their combat role. Additionally, some ARVN commanders were reluctant to commit their airboats to shallow-water operations until the crews gained skill and confidence.

Phase II of the evaluation was delayed by the unusually late start of the 1965 rainy season. The rains did not become steady until mid-July and paddy land of the delta did not become sufficiently flooded until mid-August.

Difficulty was encountered in obtaining high mortality repair parts from COMUS since the airboats were peculiar items to the Army supply system and parts had to be specially procured. In one case, urgently needed starters were procured and shipped on an expedited basis, but 8 of the 11 airboats were deadlined for a period of 2 months while waiting for delivery of these parts.

The training required for airboat tactical operations proved to be a variable. To attain the high degree of operator proficiency needed for tactical operations, such as low speed steering techniques and the use of power to prevent the boats from becoming mired or stalled, driver experience beyond that acquired through the normal operator training course was necessary. The phase II training program was expanded to allow for additional time to develop operator and maintenance skills.

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3. Support Requirements

The US Army Combat Developments Command provided funds to purchase 12 airboats, an initial 180-day supply of repair parts, and modification components and additional repair parts for the phase II evaluation.

Two officer evaluators were furnished for a period of 60 days during the phase I evaluation by the United States 25th Infantry Division.

A noncommissioned officer qualified in the operation and maintenance of airboats was furnished by the 497th Engineer Battalion, Fort Belvoir, Virginia for a period of 45 days TDY during phase I to assist in training Vietnamese operators.

Part-time assistance was provided as required by qualified aircraft mechanics from repair units in Vietnam and the ARVN Combat Development and Test Center-Vietnam (CDTC-V) from December 1964 through November 1965.

A noncommissioned officer was furnished by the 497th Engineer Battalion, Fort Belvoir, for a period of 120 days TDY during phase II to assist in maintenance and repair of the airboats and to assist in training operators and crews from the US and Vietnamese Special Forces.

The airboats remaining after the evaluation should be issued to the US Army Special Forces units that cooperated in the 1965 evaluation.

4. Time Schedule

15 Sept 1964	Arrival of first officer evaluator and maintenance NCO
28 Sept 1964	Arrival of second evaluator
2 to 31 Oct 1964	Arrival of airboats, training of Vietnamese crews, and distribution of airboats to tactical units
1 to 30 Nov 1964	Operations and data collection
1 to 31 Dec 1964	Analysis of data and preparation of interim report
1 Jan to 28 Feb 1965	Limited repair, maintenance, and training
1 Mar to 1 May 1965	Modification and repair of airboats and training of CDTC-V mechanics by TDY maintenance NCO

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1 May to 30 Jul 1965	Training of ARVN Special Forces operators and crews
1 Aug to 6 Dec 1965	Operations and data collection
7 Dec to 31 Dec 1965	Analysis of data and preparation of final report

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III. (C) DISCUSSION

A. OBJECTIVE 1 - ORGANIZATION

During the 1964 and 1965 rainy seasons, airboats were employed in different operational roles and in different organizations. In 1964, nine airboats were attached to the combat engineer battalions of ARVN 5th, 9th, and 21st infantry divisions and employed in support of combat elements of those organizations. One boat was lost during this period. Three airboats were assigned to the 875th Regional Force Company and employed by the company on tactical missions. In 1965, 11 airboats were assigned initially to one US Special Forces A detachment and employed on tactical missions. Later, 5 of the 11 airboats were transferred to another Special Forces A detachment and 6 to a third detachment.

1. Composition of the Airboat Crew

Airboats were operated in open water with as many as 12 soldiers aboard. The weight of this size crew reduced the effectiveness of boat operations in established water ways and made boats impossible to operate in shallow inundated areas. In December 1964 an airboat with 11 ARVN soldiers on board swamped and sank in the Mekong River, drowning 5 soldiers. On-the-spot observers believed that the large number of men in the boat contributed to the accident. During the 1964 evaluation, various crew sizes, ranging from five to seven members, were used.

During 1965 combat operations, it was determined that the airboat would achieve a greater flexibility of operation with less weight on board. A 5-man crew was developed which was composed of:

- a) One commander/operator
- b) One radio operator/assistant machinegunner
- c) One machinegunner
- d) Two riflemen

This smaller crew was capable of freeing the boat when it became mired or stalled, yet large enough to accomplish its combat mission.

2. Tactical Organization for Airboats

The organizational concept at the start of the 1964 evaluation was to assign airboats to the boat companies organic to the ARVN division engineer battalions (combat). In the 5th, 9th, and 21st Divisions, the

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engineer battalions provided the operators and boat commanders, and the infantry regiments or the division reconnaissance company provided the crews. Although this arrangement was workable, it produced problems of command, control, training, and coordination. Another concept was used by the 875th Regional Force Company, which provided both the operators and crews. As a result, the employment of boats by this organization was very responsive to the needs of the commander.

During 1964, no more than four airboats were used together in any one operation and control of this number of airboats presented no problem. It was the opinion of the evaluators, the US advisors, and the ARVN unit commanders, that up to six airboats could be effectively employed and controlled in combat operations.

Consideration was given at the end of the phase I evaluation to the composition of a airboat unit and recommendations were solicited from ARVN commanders and US advisors concerning organization. These recommendations resulted in a proposal for a division airboat company. The organization chart for the proposed company is contained in annex C.

Because of the limited tactical operations conducted during the 1964 evaluation, it was decided that in order to obtain greater combat exposure, the 1965 evaluation should be made with the Vietnamese Special Forces (LLDB) operating in the Plain of Reeds. Operations in 1964 revealed also that there was a requirement for evaluating the use of boat formations. The 11 boats then available were distributed to 2 Special Forces A detachments.

Operations in 1965 at the Special Forces A detachments in IV Corps further emphasized the benefit of having boat crews, operators, and maintenance personnel from the same unit and under one commander. A platoon was formed at each camp for the purpose of manning the airboats. Tactical operations proved the responsiveness of the organization. The organization chart for the proposed separate platoon is contained in annex C.

Control of six airboats in a platoon presented no difficulty and the six boats provided sufficient tactical flexibility and firepower for all combat situations encountered.

3. Findings

a. Of those organizations tried during the evaluation, the most effective arrangement for employment of airboats was to place the boats, boat operators, boat crews, and boat maintenance personnel under a single commander.

b. Of all the crew compositions experimented with during the evaluation, the 5-man crew consisting of a commander/operator, radio operator/assistant machinegunner, machinegunner, and two riflemen proved

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to be the most effective on tactical operations.

c. One commander could effectively control six boats.

B. OBJECTIVE 2 - TRAINING

Training of Vietnamese airboat operators and crews was conducted prior to and concurrently with the 1964 and the 1965 portions of the airboat evaluation. Modifications were made in the program of instruction for 1965 based on experience gained during 1964.

1. 1964

Training of Vietnamese airboat operators was conducted separately for each unit by the US project evaluators. The III Corps units received their training at Saigon and the IV Corps units received their training at home stations, Soc Trang and Vinh Long. Additional proficiency training for all operators was conducted in the vicinity of the home stations. Over 30 operators were trained by the two evaluators. The training program is shown in annex D.

Formal training in airboat operations followed the same pattern for all units: the lecture portion was limited to approximately one hour and demonstrations and practical work were used throughout most of the practical training program. Each trainee was given approximately 30 minutes of practical work in low-speed operations on open water. In order to attain the minimum level of operator proficiency, some additional training was necessary. Advanced operator training included shallow water operations and crossing rice paddy dikes. At the end of 3 hours of advanced operator training, the Vietnamese were able to apply correct handling techniques, and their individual proficiency continued to improve with practical experience.

All the Vietnamese had previous experience with native sampans. The majority also had trained on and were qualified in the operation of plastic assault boats equipped with 40-horsepower outboard motors.

The only formal weapon training given the crew was that of the machinegunners. Two of the four units conducted firing during boat operation training. Each gunner fired approximately 500 rounds while the airboat moved at varying speeds. It was determined that accurate fire could be delivered at target ranges up to 200 yards from both boats while moving. Observing the tracer and bullet strike was the best method of adjustment. In the case of flanking targets, it was found that it was best to adjust the tracer for elevation and let the forward motion of the boat "walk" the burst into the target area. Speed in itself had little apparent effect on the accuracy of fire but surface conditions of the water such as height and irregularity of the waves had a great influence.

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Informal training of riflemen was conducted by stationing them in the airboat during operations and assigning them sectors of responsibility for observation and fire. This was accomplished during practical work in the later stages of the operator's training.

Maintenance training was limited to before and after operation inspections and was conducted concurrently with the operator training. No training in the adjustment or repair of the engines was given.

It was evident in 1964 that maintenance skills needed development and additional driver proficiency was required.

2. 1965

At the end of the 1964 evaluation, the airboats needed engine repair and maintenance. Since no capability had been developed during training, US aviation mechanics were called upon to accomplish repairs. Even the most elementary engine repair work required the attention of a skilled mechanic.

A factory-trained specialist, requested by ACTIV for a period of 120 days to conduct training and perform repair work, arrived in Vietnam on 2 March 1965. He trained two Vietnamese mechanics from Combat Development and Test Center, Vietnam (CDTC-V) in detailed repair and adjustment of the aircraft engines and in fiberglass hull repair. Training was expanded to give increased coverage in maintaining the boats and training boat operators. The airboats require a high degree of operator proficiency to apply correct power for low speed steering and for preventing the boat from becoming stuck on mud flats.

The Vietnamese Special Forces (LLDB), coordinated the entire 1965 training program with the assistance of the USSF, CDTC-V, and ACTIV personnel. The program was divided into three phases.

Phase I was conducted in two sessions and each session trained personnel from two Special Forces "A" detachments. Each "A" detachment sent 1 US, 1 LLDB, and 10 Civil Irregular Defense Group (CIDG) personnel. The general outline of the phase I training program followed the 1964 plan but greater emphasis was given to maintenance and repair. The program of instruction is found in annex D.

The second phase of the training program was conducted at Camps An Phu and Cai Cai. At An Phu, personnel from other camps (Vinh Gia and An Long) were also trained. Personnel at Cai Cai and Tuyen Nhon camps were trained separately. The training period at all places lasted 2 weeks. This phase developed skills largely through individual work on practical exercises. The program involved live firing whenever possible. The phase II program of instruction is found in annex E.

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The third phase involved combat operations. Overall effectiveness of the airboats increased with improved crew proficiency and confidence.

3. Findings

a. A comprehensive training program involving unit and organizational maintenance was required to keep the airboats operational.

b. A 23-hour training program was sufficient to give a basic knowledge of airboat operations to operators.

C. OBJECTIVE 3 - CREW-SERVED WEAPONS

Various types of crew-served weapons were considered for mounting on or firing from airboats.

1. Caliber .30 Machinegun

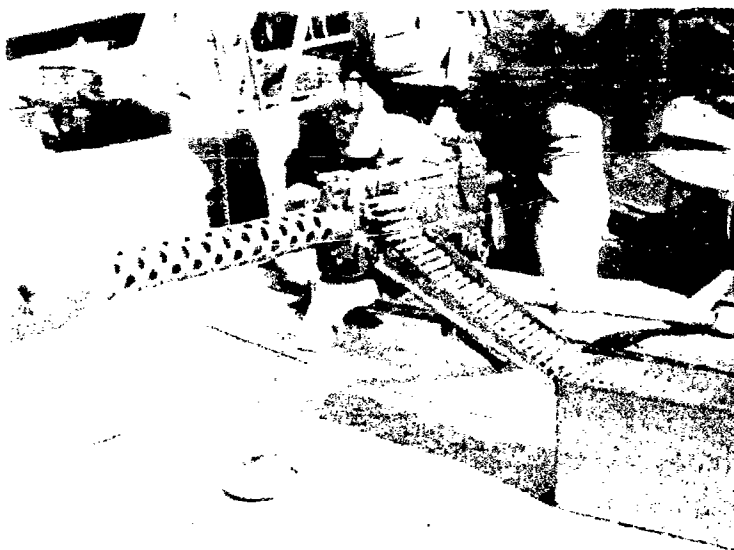
Two different types of mounts for caliber .30 machineguns were fabricated during 1964. One mount base was designed and built by the Eastern Repair Facility, RVN Navy, and consisted of two teak wood planks secured by bolts to the decked-over portion of the bow. The planks were cut to accept the leg shoes of the machinegun tripod and the underside of the deck was reinforced with planks of approximately the same size. A standard M-2 tripod was then mounted on the planks. This mount was used on the Aircat. (See figure 1.)

The second consisted of a pintle mount designed for use with the engineer plastic assault boats. This mount was also installed by drilling holes in the decked-over portion of the bow and reinforcing the underside of the deck. This mount was used on both the Skimmer and the Aircat. (See figure 2.)

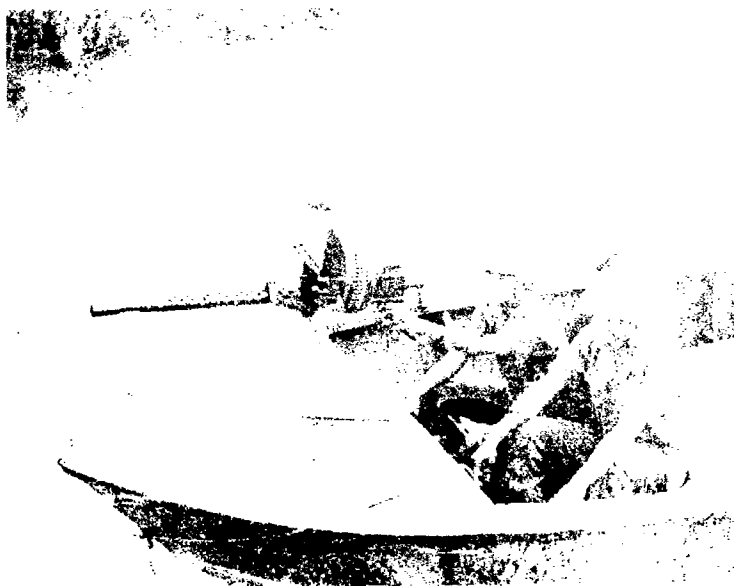
Only one unit actually employed a machinegun against the VC during the phase I evaluation. This action was at night when the airboat was part of an ambush force. Two VC boats approached the ambush and, when challenged, attempted to flee under the cover of darkness. The Aircat pursued and immediately the VC withdrew into a small tributary and fired at the airboat. Fire was returned from a range of approximately 150 yards. It was estimated that the enemy force was two motorized sampans full of VC. The ARVN commander decided not to pursue further and the engagement was broken off. The US advisor accompanying the operation reported that friendly fire appeared to be on target and effective in suppressing the fire of the VC.

For operations during 1965 it was decided that a pintle mount that was attached to the boat hull and set 6 inches to the rear of the bow decking would give the machinegunner the capability of 180-degree traverse. The original two mounts did not allow for sufficient traverse.

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(U) FIGURE 1. Caliber .30 machinegun mounted on the Aircat.



(U) FIGURE 2. Caliber .30 machinegun mounted on the Skimmer.

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(U) FIGURE 3. Caliber .30 machinegun mount (adjustable).

A capability for vertical height adjustment was also incorporated in the machinegun mount. (See figure 3.)

It was determined after a score of combat engagements that the adjustable pintle mount used in 1965 was the most suitable for the airboat.

2. 57mm Recoilless Rifle

A study of weapon characteristics and fire control equipment revealed that it was not practical to mount 57mm recoilless rifles on either of the airboats. The backblast of the weapon is such that the direction of fire would be limited to an 85 or 90 degree firing position to the left or right of the boat. The configuration of the sights and trigger mechanism of the weapon would require that the gunner be positioned on the left side of the pintle-mounted weapon, a factor which would generally limit fire to the left side of the boat. No further consideration was given to mounting a 57mm recoilless rifle in the airboats. The excitement of combat would make this weapon extremely dangerous to fire from the shoulder position because of the likelihood of violating safety requirements.

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3. 3.5-Inch Rocket Launcher

The 3.5-inch rocket launcher was not fired from airboats. The restrictions stated for the 57mm recoilless rifle apply also to this weapon.

4. Findings

a. The caliber .30 machinegun was mounted and effectively employed on the airboats.

b. The adjustable pintle mount used in 1965 was found to be the most suitable for the caliber .30 machinegun.

c. Recoilless rifles and rocket launchers would not be safe for firing from airboats.

D. OBJECTIVE 4 - EMPLOYMENT

The airboats were employed 10 times by the ARVN divisions and the Regional Force company during the 1964 portion of the evaluation. (See Annex G for missions performed.) Seven of the ten operations included patrolling established waterways and achieved no conclusive results. Three operations were confined exclusively to inundated areas and resulted in the capture of VC suspects. One minor fire fight was experienced during these operations. By the time confidence in the airboats had been established sufficiently to allow cross-country operations, the water in the operational areas had fallen to a level which prohibited their employment.

1. 1965

In 1965, combat operations resumed as training progressed and as the water level rose. Combat reconnaissance sweeps were conducted on a limited basis by the LLDB in the An Phu area in late July. From 1 August through 6 December 1965, combat operations were held almost daily. Frequently, operations were conducted in conjunction with training or administrative missions. In addition to routine daily administrative use and a show of force, there was a total of 103 combat missions conducted over a 128-day period. (See figures 4 and 5.)

In each instance it was clear that in planning effective operations by airboats, it is necessary to take into consideration the effects of their high noise level, high speed, mobility, small carrying capacity, light armament, absence of armor protection, and psychological impact.

Viet Cong activity in the An Phu area dropped off sharply by late August as the monsoon season developed. In mid-September, five airboats were shifted to the Cai Cai canal in Kien Phong Province in

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	No. of Operations	Average No. of Airboats	Ops in Undated Area	Ops in Established Waterway	No. of Ops in which VC were Contacted	No. of Ops in which VC were Engaged	No. of VC KIA Per Type of Mission	No. of VC WIA Per Type of Mission	VC Suspects or POW Per Type of Mission	VC Boats Destroyed Per Type of Mission	Misc VC Losses Per Type of Mission
Reconnaissance Patrol	4	3	4		4	1	0	0	6	0	0
Escort	1	3		1	0	0	0	0	0	0	0
Admin Movement	1	3		1	0	0	0	0	0	0	0
Flank Scty	3	3	3		1	1	UNK	UNK	0	UNK	UNK
Ambush	1	3		1	1	1	UNK	UNK	0	UNK	UNK
Total	10		7	3	6	3	UNK	UNK	6	UNK	UNK

a. VC Contact: Includes any contact of any nature during an operation.

b. VC Engaged: Includes engagement under arms in which casualties were sustained, prisoners taken, and material or supplies were captured or destroyed.

(C) FIGURE 4. Summary of Airboat operational employment, 1964.

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Mission	Number of Ops	Average No. of Airboats	Ops in Inundated Area	Ops in Established Waterway	No. of Ops in which VC were Contacted	No. of Ops in which VC were Engaged	No. of VC KIA Per Type of Mission	No. of VC Suspects or POW Per Type of Mission	VC Boats Destroyed Per Type of Mission	Misc Losses Per Type of Mission
Recon Patrol	89	2	89	—	71	1	0	5	0	1
Flank Scty-Raid	12	3	11	1	10	7	3	42	19	4
Pursuit-Attack	3	4	3	—	3	3	0	39	2	3
Total	104	9	103	1	84	11	3	86	21	8

a. VC Contact: Includes any contact of any nature during an operation.

b. VC Engaged: Includes engagement under arms in which casualties were sustained, prisoners taken, and material or supplies were captured or destroyed.

c. Miscellaneous losses included weapons and explosives captured; buildings, training sites, printing presses, propaganda material, etc. destroyed.

— (C) FIGURE 5. Summary of Airboat operational employment, 1965.

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response to US Special Forces advice. In early November the six remaining airboats at An Phu were transferred to the Tuyen Nhon US Special Forces camp in Kien Tuong province. Viet Cong activity in this portion of the Plain of Reeds was frequent and intense. Following an accelerated 2-week training period at each camp, combat operations were started. These consisted mainly of 2-boat combat reconnaissance patrols out to approximately 10 kilometers from the camp.

An outstanding example of a successful employment of airboats in a coordinated offensive operation against a known VC position in the Cai Cai area of Kien Phong province occurred in October 1965. (See annex G.) On this operation airboats were employed in a light combat reconnaissance role to screen and protect a flank. Total surprise was achieved by the force commander through the judicious use of timing when he committed the airboats. They were held at a rear attack position until after the main force established contact, at which time they were ordered into action. This operation clearly demonstrated that the singularly outstanding advantage of the airboat as a tactical weapon was its high speed and mobility across inundated areas. It was also shown that the psychological effect of the high noise level of the airboat upon the enemy was damaging. Viet Cong reaction to the attack was to freeze in place. As a result of this, and under the combined effects of the commander's coordinated plan which was carried out swiftly and decisively, small groups of the VC were quickly defeated in place.

Other operations were conducted effectively using the airboats in a light combat reconnaissance supporting role which exploited their mobility over inundated areas.

A classic instance of successful employment of an airboat unit in pursuing and destroying VC forces occurred in the Tuyen Nhon area of Kien Tuong province in November 1965. On this operation three Aircats supported by one USAF O-1 observation aircraft comprised the striking force. Three hours earlier a squad-size CIDG patrol from the Tuyen Nhon US Special Forces camp had been ambushed by a VC platoon while the camp's main force was conducting operations in another area. The aerial observer located and guided the airboats in a cross-country move to intercept the VC force. The airboat commander launched an immediate frontal attack by running through the sampan fleet at high speed and firing his machineguns. He then circled back, crisscrossed the area, and used similar tactics for approximately the next 3 hours until all VC were killed and all sampans were destroyed. Approximately half of the casualties and damages were inflicted upon the enemy by ramming their sampans with the airboats.

Airboats daily provided the local RVN military commanders with a demonstration of force and operated in the sectors almost with impunity. The operations drew only sniper fire and caused the VC to introduce a light marine-type mine mounted on a bamboo pole for use as an anti-airboat

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obstacle. Airboats were also high prestige items for the RVN military commander to possess. They caused him to gain the confidence of the local inhabitants and permitted him to demonstrate his superiority over the VC by allowing operations at will anywhere in the area.

Early in the 1965 evaluation period it became standard to regard the airboat as a light tactical vehicle for offensive use and not as a personnel carrier. Although the requirement never developed, the force commander held the airboat in all operations as an emergency alternate means of shifting reserves, re-supplying critical items, and relocating light crew-served weapons.

2. Findings

a. Airboats were employed successfully in the pursuit, interception, and destruction of Viet Cong boats when operating off established waterways in the delta during the monsoon season.

b. Airboats were employed successfully in a light reconnaissance role to screen and protect a flank during a coordinated offensive operation in an inundated area.

c. Airboats were employed successfully on more combat operations by the US Special Forces and the LLDB in 1965 than by the ARVN 5th, 9th and 21st Divisions and the 875th Regional Force Company in 1964.

d. Airboats could be used to sweep and search inundated areas more rapidly than any other surface vehicle presently available to the RVN armed forces.

e. The airboats provided the ARVN commander with an effective show of force.

f. The airboat provided the ARVN commander with an effective means to provide combat service support for use in emergencies.

E. OBJECTIVE 5 - TACTICS AND TECHNIQUES

During the 1964 evaluation insufficient data were collected upon which recommendations for suitable tactics and techniques of operations could be based.

1. 1965

In 1965 during the training program the US Special Forces adopted and refined the tactics and techniques recommended by ACTIV for airboat employment. The tactics and techniques were published in English and Vietnamese and distributed prior to the 1965 portion of the evaluation. (See Annex F.)

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Tactics for airboat operations generally coincided with those for light reconnaissance units. The particular techniques used in airboat operations were determined by their mobility modified by the nature of the local terrain, weather, enemy, and backgrounds of the Vietnamese operators and crewmen.

Formation maneuvers for the airboats were highly stressed during the training program. Line, column, column of twos, vees, and echelons right and left were taught. The Vietnamese learned the techniques of formation movement with about 3 weeks practice. Hand and arm signals were used initially as the primary means to control the formation and later red flags were also used by the boat formation leader as the most effective visual signal means for control purpose in daylight. Prearranged flash-light signals augmented by pyrotechniques were used for night operations.

Effective control of eight boats was possible although at times this became an unwieldy number. When deployed in any of the prescribed formations, the linear distances involved, restricted visibility caused by marshland conditions, and the high speeds of maneuvering, rendered control of more than six airboats difficult.

Radio communication with the base camp, with supporting helicopters and US Army fixed wing aircraft, and with other boat elements was effective except for one minor technical difficulty. The airboat had to slow to idle speed in order to receive a radio signal. The high noise level of the airboat at operating rpm completely obliterated the audible portion of any incoming radio traffic. Transmissions from the airboats were always received "loud and clear" by any other stations in the net except other airboats underway. The use of padded headset receivers of the type used by aircraft crews produced satisfactory results to overcome this problem.

Combat assault training emphasized the attack in-line and in-column formations. The boats would advance to the target in a column, make a flanking movement, and attack on line. The attack was especially effective when assault fire from an M79 grenade launcher was employed from each boat.

Combat reconnaissance patrols were conducted with the airboats in the various formations sweeping inundated areas. Searches were made of suspected areas and sampans that were capable of transporting VC and contraband. One boat would conduct the search under cover of the other boats. Because of the high speed and mobility these operations could be conducted in a minimum of time. Suspected boats rarely attempted to outmaneuver the airboats in order to evade an inspection. These operations were enhanced considerably with the employment of US Army observation aircraft overhead providing support.

Ambushes were conducted using airboats. An operation would be planned at dusk as a ruse for deployment of the ambush force. As the

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airboat formation returned to camp, individually designated boats equipped with infrared weapon sights would drop out of the formation to occupy preselected ambush positions.

Viet Cong forces were rarely engaged on reconnaissance patrol or an ambush but, on almost every airboat mission, sniper fire was received.

Small airboat patrols kept constant watch for infiltration by VC elements into the RVN from Cambodia. The opportunity to intercept or close with and destroy the enemy in these situations seldom developed. Early detection and swift pursuit to the international boundary, however, invariably caused the VC to withdraw immediately into Cambodia. In most instances dispersion of VC personnel was accomplished by the mere presence of airboats under way in the area.

In coordinated offensive actions, the airboats were most valuable combat support for the force commander. Flank screening and protection were performed with ease and in an aggressive manner. Opportunities to employ the airboats to shift reserves or crew-served weapons to assist in emergency re-supply or evacuate wounded never developed. The freedom of action and the initiative enjoyed by the commander during these operations, however, clearly indicated that these tasks could easily be accomplished.

Defensive tactics by airboats were never used in an actual operation. In the planned defense of the base camp, for example, the airboat mission consisted of offensive employment as the commander's maneuver element. This was coordinated with standard static defense tactics and was successfully employed in November 1965 when the Cai Cai Special Forces camp was attacked by about two companies of VC. The defense of the airboats themselves rested primarily with their high speed and mobility. Similar to light reconnaissance elements, it was axiomatic that the airboats avoid becoming decisively engaged but instead that they retain the initiative through proper use of their mobility.

High noise level of the airboat engine/propeller became an advantage as well as a disadvantage. When two or more boats were operating in an area it was found that it was nearly impossible to determine the number or the direction the boats were moving unless they could actually be seen. This was usually not possible because of the reduced visibility in flat marshlands and the low silhouette and high speed of the boats themselves, and it created an adverse psychological effect upon the VC. At the other end of the scale, the element of surprise was easily lost. It was learned, however, that if one or the other of several techniques was carefully planned for in a mission, the noise disadvantage could be overcome. In order to achieve surprise, the noise made by other airboats or helicopters could be used to deceive the enemy as to the location of the operational boats. Under the umbrella of noise created, it was possible to maneuver airboats relatively undetected. Employment of multiple maneuver elements of two or three craft each was a commonly accepted

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tactic. Infiltration of airboats to forward locations by towing, drifting with the current, and hand or outboard motor propulsion was also found to be an effective means to close the gap upon the enemy before he was alerted to boat presence. Maximum exploitation of airboat speed and mobility afforded the commander a third and highly effective tactic for conducting a coordinated offensive operation. The slower moving combat elements would proceed toward the objective ahead of the airboats and, upon contact by the combat elements, the airboats would be committed. Because of their superior speed the boats were able to join the main action very quickly and then proceed to execute their assigned mission.

2. Findings

a. Airboat units were maneuvered successfully in tactical formations of up to six craft each.

b. Successful control of airboat platoons was exercised by simple arm and hand signals supplemented with flags during daylight. Flashlights and pyrotechniques were used during darkness.

c. Present radio transmitter-receiver equipment was adequate for communication among airboats, with home base, other ground maneuver units, and US Army aircraft.

d. Search operations were effectively conducted using airboat formations.

e. During the course of the evaluation airboats performed a variety of tactical maneuvers in support of coordinated offensive operations, including screening, flank security, pursuit, interception and destruction of small independent enemy elements, reconnaissance patrols, ruses, and blocking operations.

f. The high noise level of airboats disclosed their presence.

g. Tactics as set forth in Annex F to minimize the disadvantage of the airboat high noise level were found to be effective.

h. Airboat deployments were found to be effectively concealed by the combined effects of high noise level, mobility, and low silhouette.

F. OBJECTIVE 6 - MAINTENANCE

It was evident throughout the course of the evaluation that airboat preventive maintenance was essentially a command and supervisory problem. Standard methods of preventive maintenance were taught the Vietnamese officers and noncommissioned officers concerned and manufacturer's recommended maintenance adjustments, care, and servicing were taught to the operators. The fact that the airboat engines, and in the case of the

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Susquehanna Skimmers, the hulls, deteriorated considerably indicated that greater command emphasis was needed on maintenance. In addition, the general corrosive effect of the Southeast Asia tropical climate on machinery and instruments hastened the wear and tear of many components. Recommendations to modify the airboats to improve their durability and performance characteristics are contained in annex I.

A maintenance program for the airboats was established in the initial phase of training in October 1964. This maintenance program was limited to preventive maintenance and did not include adjustment or repair of the airboat engines.

Maintenance was supervised by evaluators and US advisors and was integrated with each mission. The time devoted to maintenance was the same for both types of airboats and averaged 15 minutes for a pre-operation check and 30 minutes for an after-operation check. This maintenance sufficed until approximately 31 December 1964, at which time the airboat engines required tune-up and minor repair. No capability existed among available Vietnamese to accomplish the work. Aviation mechanics from ACTIV were called upon to repair the airboats located at Nha Be. The airboats located at the Special Forces C-4 detachment, Can Tho, and the Special Forces B-42 detachment, Long Xuyen, were repaired and maintained by US Special Forces personnel. Maintenance difficulties later arose at Can Tho and Long Xuyen which were beyond the capabilities of the Special Forces detachments. Three boats were deadlined for failure of the engine electrical system and one boat was deadlined for extensive engine repairs.

1. 1965

The two Vietnamese non-commissioned officers from CDTC-V who were trained by the US maintenance specialist during his 120-day TDY tour developed the capability of performing all unit and organizational maintenance and repair on the airboats. Later, during the training program, they proved to be excellent instructors.

Maintenance required on the airboat hulls was minimal and repair capability for the boat hulls existed in Vietnam. The use of other fiberglass boats by the ARVN resulted in the creation of a fiberglass repair capability at unit level and a fiberglass rebuild capability at the ARVN 40th Engineer Base Depot, Saigon. Hull repairs were easily made and extensive modifications to the Aircat hulls were performed (See annex I.)

The drive mechanism for the electric starter was the highest mortality item on the airboats. The starter drive gears, drive shaft, helix, and starter mount all failed. A 60-day period occurred in June and July when 8 of the 10 boats were deadlined due to starter failure and phase II training was delayed as a result.

The entire electrical system--generator, starter motor, voltage

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regulator, starter relay, instruments, switches, battery, and wiring — was of commercial automotive grade components. Since the airboats were constantly exposed to the weather, the electrical components deteriorated rapidly and failed. The heat of constant exposure to sunlight caused seals to dry and insulation to rot. Water entered the components and caused malfunctions. Corrosion was a problem, particularly when the boats were used at Nha Be which was close to the sea and where the water had a high salt content.

The exhaust system on the Skimmers was poorly designed and made of low quality material. Many of the Skimmer exhaust systems failed due to vibration. A modified exhaust manifold made of stainless steel that was installed late in the evaluation proved highly reliable.

Three propellers failed when dry rot weakened the wooden blades and the bronze propeller tips separated due to centrifugal force.

Three cylinders failed when engines were operated too long at full throttle. This caused the cylinders to become red hot and melt adjacent to the exhaust valve seat. Two cylinders were scored when an engine was operated with low oil level. Three engines threw piston rods and were permanently damaged. In each instance there was sufficient oil level, but the oil cooling systems were not functioning properly (a probable result of poor maintenance discipline) and operating temperatures frequently reached and were held at critical peaks. The consensus of US Army aviation maintenance specialists was that overheating caused the low life of component parts.

The gasoline tanks on the Aircat boats developed leaks from vibration ruptures and also from ruptures caused by crew members sitting on the tanks. A fiberglass covering on the tanks eliminated this problem. (See annex H for a listing of equipment faults.)

On 2 November 1965 one Skimmer struck a moderate-size (5 feet high) earth obstacle at high speed. The hull was severely damaged and three crewmen were injured. For reasons of tactical expediency it was necessary to destroy the derelict hull by demolitions. The Susquehanna Skimmers sustained considerable damage when operated cross-country and could not jump dikes that separated rice paddies.

At the end of the 1965 evaluation period, a complete technical inspection of the 10 remaining airboats was conducted by a US Army aviation maintenance specialist. His inspection included both engines and hulls. Of the original six Aircat airboats, one was lost because of an accident. Of the remaining five, all were operational but required general overhaul. Engines all needed complete replacement of seals, spark plugs, and magneto points. Four boat frames required repair of cracks in the vicinity of engine mounts and oil coolers on two boats required service to free thermostatic valves.

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Of the original six Skimmers, one was lost during an operation. Of the remaining five boats, two were deadlined with thrown piston rods and three were operational but required general overhaul. All engines needed complete replacement of seals, spark plugs, and magneto points. All hulls had deteriorated badly and required major repairs. The plywood base of the Skimmers did not withstand the tropical environment or operational conditions existing in the RVN satisfactorily.

2. Findings

a. The Vietnamese learned the skills required to perform maintenance and repair on the airboats but did not always apply them.

b. During the course of the evaluation it was found that until September 1965, there was insufficient command emphasis on airboat equipment maintenance.

c. The molded fiberglass hull of the Aircat was durable and performed well in cross-country operations.

d. The fiberglass-covered plywood hull of the Skimmer deteriorated badly because of weather effects and operational conditions in the delta.

e. The airboat engines and engine accessories were vulnerable to damage from exposure to the weather.

f. Additional maintenance problems were caused by excessive operation of engines at full speed.

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IV. (C) CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

It is concluded that:

1. The best organization for tactical employment of airboats is a platoon consisting of six airboats.
2. Commanders, crews, and maintenance personnel should all come from the same tactical organization.
3. The best size airboat crew is five men, including the commander-operator.
4. The caliber .30 machinegun can be mounted on the bow of the airboat and fired with reasonable accuracy without adversely affecting the boat's performance.
5. Crew-served recoilless weapons are not suitable for use on airboats.
6. The airboat platoons provide the capability for performing the following missions:
 - a) Pursuing, intercepting, and destroying VC operating in light-weight boats
 - b) Screening the flanks of a larger unit
 - c) Providing the maneuver element in small unit actions
 - d) Conducting small scale raids, feints, ruses, and ambushes
 - e) Providing limited combat service support
7. The molded fiberglass hull of the Hurricane Aircat is more durable and performed better in swamp-country operations than the fiberglass covered plywood of the Susquehanna Skimmer.
8. Certain components and accessories of the engine and the electrical system were not sufficiently rugged for continuous operations in the RVN Mekong Delta region.
9. More command emphasis on equipment maintenance is required in order

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to maintain airboat engines and hulls to military standards.

B. RECOMMENDATIONS

It is recommended that:

1. The Hurricane Aircat model of the airboat, when modified in accordance with annex I, be considered for introduction into the Military Assistance Program for issue to elements of ARVN and LIDB operating in the Delta.
2. The Hurricane Aircat model of the airboat, when modified in accordance with annex I, be considered by the Commanding Officer, US Army 5th Special Forces Group (Abn) for introduction into the US Special Forces.
3. If airboats are introduced into ARVN:
 - a. An initial quantity of airboats be procured in sufficient time to insure delivery to the ARVN prior to the beginning of the next monsoon season in mid-June 1966.
 - b. Annex C be considered as a basis for the organization of separate airboat platoons for the Vietnamese Special Forces and airboat companies for the Infantry divisions.
 - c. A training program be conducted by technically qualified US personnel to teach the operation and maintenance of the airboat to Vietnamese operators and maintenance personnel concurrent with the introduction of any airboats into the ARVN.
4. The 10 airboats presently on temporary memorandum receipt from ACTIV to the Vietnamese Special Forces for purposes of field evaluation be transferred permanently to the US 5th Special Forces group.

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(U) ANNEX A

SETTING OF THE EVALUATION

1. ENVIRONMENT

The Republic of Vietnam (RVN) occupies a crescent-shaped area of about 67,000 square miles on the southeastern edge of the Indochina Peninsula. Although only 45 miles wide at the 17th parallel, its demilitarized northern border with the Democratic Republic of Vietnam (North Vietnam), it has a seacoast of 1,500 miles on the South China Sea and Gulf of Siam, and western borders with Laos and Cambodia of about 900 miles. The land borders are poorly defined and drawn through difficult and inaccessible terrain.

a. Terrain

There are four distinct geographical regions: The highlands located in the north and central portion, the plateaus of the central highlands, the coastal plain, and the Mekong Delta in the south. See figure A-1.

The northern two-thirds of the RVN is dominated by a chain of broken mountains and rugged hills extending in a northwest-southeast direction and terminating on the northern edge of the delta plain about 50 miles north of Saigon, the capital. The area is characterized by steep slopes, sharp crests, narrow valleys, and dense vegetation. It is sparsely populated, mainly by primitive and nomadic tribes, and it contains few roads or trails.

The central highlands adjacent to the Laos-Cambodia border contain extensive plateau areas. Here, the mountains give way to more gently rolling terrain. The northern plateau is covered by almost impenetrable tropical forests and jungles, which often have two dense overhead layers of foliage at heights of about 40 and 125 feet. The southern portion is typical savannah country, with large open expanses covered by tropical grasses and open forests. This region is more heavily populated than the northern highlands and has more roads and trails.

The coastal plain, varying from 10 to 25 miles in width, extends from the 17th parallel to the Mekong Delta. At several places mountain spurs jut out to the sea, cutting the plain into a series of compartments roughly at Mui Dinh, Mui Ke Ga, Quang Ngai, Da Nang, and Hue, north of which the spurs become more frequent. The area is characterized by sandy beaches and dunes, backed up by rice fields, fertile areas, and marshes extending to the mountains. It contains many small cities.



(U) FIGURE A-1. Geographical regions, RVN.

ANNEX A

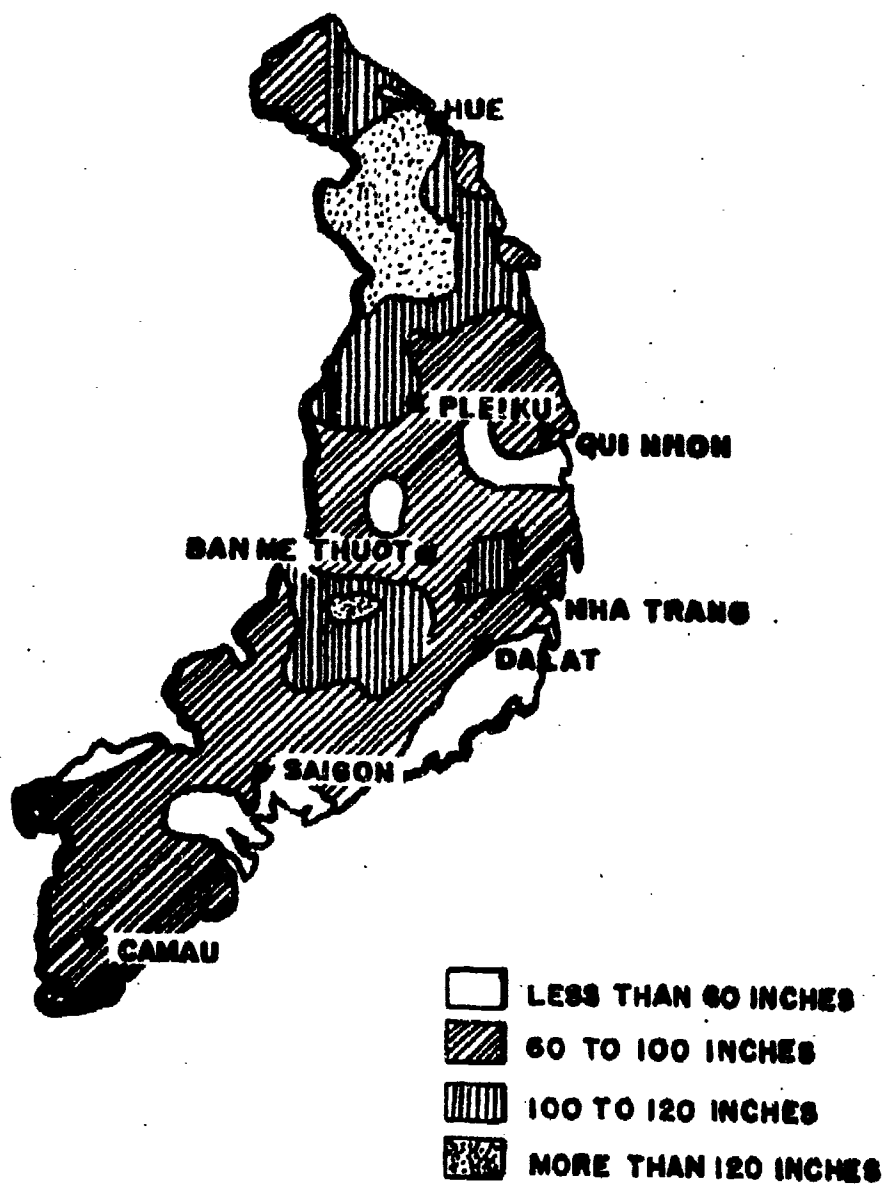
A-2

The southern third of the country is part of the large delta plain formed by the rivers Hau Giang, Mekong, Vam Co, Saigon, and Dong Nai. The Hau Giang flows directly to the South China Sea. The huge Mekong splits into four branches, and the Vam Co and Dong Nai enter the Saigon before reaching the sea. In addition to these major tributaries, the area is cut by a number of smaller streams and a dense network of canals. The plain is relatively flat with few points exceeding an elevation of 20 feet above sea level. It is a very fertile area with more than 9,000 square miles under rice cultivation. Drainage is effected chiefly by tidal action, with the difference between ebb and flood as much as ten feet in some areas. The southernmost tip of the delta, known as the Ca Mau Peninsula, is covered with dense jungles, and mangrove swamps stand at the shoreline and on river estuaries. The eastern portion of the delta plain is heavily forested. The Plain of Reeds, a large marshy area covered with tall reeds and scrub trees, is located in the center of the delta region adjacent to the Cambodian border. During the rainy season, a major portion of the entire area is completely inundated.

b. Climate and Weather

The climate is hot and humid, subtropical in the north and tropical in the south where the monthly mean temperature is about 80 degrees Fahrenheit. The annual rainfall is heavy in most regions and torrential in many. It is heaviest at Hue which has an annual average of 128 inches. The low of 28 inches at Mui Dinh, a small cape on the eastern coast some 62 miles south of Nha Trang, results from the presence of hills in the area. At Saigon, rainfall averages 80 inches annually. See figure A-2.

Seasonal alternation of monsoon winds profoundly influences the weather throughout the year, although geographical features alter patterns locally. The winter monsoon blows generally from the northeast from early November to mid-March and often brings floods to the northern portion of the RVN. This is the period of the dry season in the delta, which usually lasts from December through March. The winds begin to shift in March, and with the exception of the coastal plain, high temperature and humidity prevails in all of the RVN from April to mid-June. The summer monsoon blows generally from the southwest from mid-June to late August or early September, bringing to the delta region heavy and frequent rains, high humidity, tropical temperatures, and maximum cloudiness. Mountains cause clouds to pile up and deposit moisture before the clouds reach the coastal plain or the northern highlands, which areas are dry during this period. In September the winds begin to shift again, and the coastal plain receives its maximum amount of rain and cloud cover, including severe tropical storms and typhoons.



(U) FIGURE A-2. Annual precipitation, RVN.

c. Communications

Roads throughout the RVN are few in number, poorly cared for, and narrow. Road travel to major areas in the north is often stopped completely when bridges and narrow places are destroyed, either by natural causes or the Viet Cong (VC). In the delta region, 2,500 miles of navigable inland waterways ease somewhat the communication burden placed on the 1,200 miles of primary and secondary roads in the region.

A single-track, narrow gauge railroad connects Saigon with the northern provinces by way of the coastal plain. The system and equipment is old and frequently damaged by the VC.

There is no wire telephone communication among the major centers of population. What radio telephone service is available is at the mercy of the often unstable atmospheric conditions over the RVN. Telephone equipment used in major cities is antiquated or makeshift.

In effect, rural areas are virtually isolated. It is not unusual for a VC act of terrorism or sabotage to take place in an outlying delta area and be reported in Saigon a week or more later. Most incidents accounted for take at least two or three days to get into the situation reports to Saigon.

d. Population

The RVN has a population of approximately 15.7 million, with an average density of 234 per square mile. The highland region is generally the least settled of the geographic areas of the RVN, and the coastal plain contains the most people. About 90 percent of the people live on the 13 percent of the land best suited for rice cultivation: the delta and the small river basins of the coastal plain.

Racially, the population is composed of 85 percent ethnic Vietnamese, 6 percent Chinese (who have established a great influence on the economy of the RVN), 5 percent Montagnard (the nomadic aboriginal tribe people living in the highlands), 3 percent Khmer-Cham (of Cambodian descent), and 1 percent European, Indian, and other small groups.

Religiously, about 80 percent profess Buddhism, about 10 percent profess Catholicism, and the rest profess Muhammedanism, Hinduism, Protestantism, Cao Daism, or Hoa Haoism (two local sects).

Socially, there is an upper class composed of old mandarin families, landed gentry, government officials, professional men, intellectuals, clergy, and wealthy businessmen; an urban middle class of civil servants, teachers, and small businessmen; and a lower class, mainly composed of farmers, but with a growing group of urban workers. Mobility upward within the structure is possible but difficult, especially up from the lowest.

Vietnamese culture is based on traditional Chinese customs and has been profoundly influenced, especially among the upper class living in the cities, by the French. Most rural Vietnamese continue to follow the traditional way of life. The great divergence in racial, religious, social, and cultural structures has produced continued strife and tension among the people who belong to the various groups. There seem to be no evidence of a permanent stabilizing force available within the Vietnamese society to control conflicting elements.

The Vietnamese have a deep and traditional belief in destiny and man's inability to change the natural order of events. This concept, reinforced by religious beliefs, results in a high valuation of the virtues of stoicism, patience, and endurance. The Vietnamese are proud of their ethnic traditions and hold themselves superior to ethnic minorities in the RVN and to the peoples of neighboring countries.

Most of the people living in the countryside, who make up 90 percent of the population and who provide the main targets for the VC, care neither for the government in Saigon nor for the VC. They want to be left alone to grow their crops, raise their families, have a tranquil old age, and die traditionally.

2. MILITARY ELEMENTS

a. Friendly

(1) Units

Units which were chosen to employ airboats were selected primarily because of their proximity to areas that become inundated during the rainy season.

During phase I it was anticipated that the boats would be used primarily with ARVN Infantry Divisions. Boats were assigned to the 21st Engineer Battalion (combat), 21st Infantry Division, stationed at Bac Lieu; the 9th Engineer Battalion (combat), 9th Infantry Division, stationed at Vinh Long; the 5th Engineer Battalion (combat), 5th Infantry Division, stationed at Thu Dau Mot; and the 875th Regional Force Company, Nha Be. The 5th Infantry Division boats were transferred on 21 November 1964 to the 25th Engineer Battalion (combat), 25th Infantry Division, stationed at Duc Hoa due to receding water levels in the 5th Division area. Operators from the 25th Infantry Division were trained at Nha Be prior to deployment of the boats to Duc Hoa.

Based on the limited operations conducted during phase I it was felt the boats would have a better chance of combat employment with the Special Forces in the Plain of Reeds area of the Mekong Delta. The boats were transferred to the control of the US Special Forces (USSF) C-4 Detachment, 5th Special Forces Group, Can Tho, during late December 1964.

and January 1968. The boats were further assigned to the USSF B-42 Detachment at Long Xuyen. The boats were subsequently placed under the control of the Vietnamese Special Forces (LLDB) C detachment at Can Tho. The LLDB then assigned the boats to the LLDB "A" Detachment at An Phu and Cai Cai where training and operations took place. Personnel of the LLDB detachment at Vinh Gia, An Long, and Cai Cai were trained in combat operations and maintenance. The training of personnel from the four corps provided the capability of shifting the airboats a great distance along the Cambodian border in the Plain of Reeds/Mekong River area to meet the shifting tactical situation. The LLDB detachments were advised and assisted by the following USSF detachments: B-42, Long Xuyen and Chau Doc; A-424, An Phu; A-422, Vinh Gia, A-425, An Long; A-412, Cai Cai Canal, and A-415, Tuyen Nhon. (See figure A-3.)

(2) Missions

The majority of the data collected during the evaluation were developed during combat operations with the LLDB and USSF "A" detachments. The primary mission of the "A" detachments is the conduct of a counterinsurgency program which clears, secures and develops the area of responsibility. Secondary missions involve patrolling of the Vietnamese-Cambodian border and advising the Popular Forces of the applicable district.

b. ~~Example~~

It is a well-documented fact that the Communist apparatus in the RVN is an extension of the Communist party of North Vietnam, and that direction and materiel and personnel support is received from the North. Supreme authority in the VC political and military organization in the RVN is the Central Office South Vietnam located in Tay Ninh Province near the Cambodian border. Subordinate thereto are four military regions and one special zone (corresponding roughly to the capital area), each of which has a subordinate series of provincial, district, and village-commune committees.

(1) Units

The VC military forces can be divided into 3 operational categories: main force, local force (together about 35,000 troops), and militia units (60,000 to 80,000). The main force consists of full-time units controlled by the military region. Local force units are controlled by province and district committees. They are well-organized, and the personnel are well-trained and well-equipped. Militia units are full- and part-time local armed groups responsible to district, village, and hamlet authorities. Personnel of these units are used frequently as intelligence gatherers, porters, or as reinforcements for main and local force units. They may replace losses in the local force.

A VC battalion is planned for 400 to 500 men, but in reality may consist of as few as 200. A company averages 100 men, and

a platoon about 30. Personnel may be acquired voluntarily, by kidnapping, or by impressment using blackmail or threats of violence. There is evidence that large numbers (a total of about 45,000 in four years since 1960) of native-born North Vietnamese have infiltrated from North Vietnam through Laos into the RVN.

Viet Cong forces are in general lightly equipped and have a commensurate degree of cross-country mobility. In addition to individual weapons, they have a large number of automatic weapons, and light crew-served weapons. The larger units are equipped with mortars and recoilless rifles. Supplies are obtained through capture, local procurement, taxation, and infiltration. Food staples such as fish, rice, and manioc are readily available.

(2) Capabilities

Because of support rendered by the country-people, familiarity with the area, lack of responsibility for life and property, and the nature of guerrilla organization, equipment, and tactics, the VC are able to move virtually at will throughout much of RVN. They are able to exploit as necessary the differences in race, religion, class, economic condition, and cultural background of their targets. They have a well-developed intelligence system, good discipline, and a usually effective security system.

Viet Cong military operations have the advantages of speed, surprise, deception, and infiltration. Training, accomplished in small, local areas by well-indoctrinated cadre, probably emphasizes selection of the most vulnerable targets, night operations, movement as small units until concentration is required, terrorism and propaganda, use of weapons, employment of terrain and weather, and infiltration. The VC objective is not, at the present stage of their insurgency to hold terrain, but rather to inflict losses on government forces, to capture weapons and materiel, and to convince the people that the government in Saigon cannot protect them and will eventually be defeated.

(3) Limitations

Viet Cong limitations stem from their need for strong security and the largely clandestine nature of their activities. Although the people among whom they live afford them a high degree of protection, active and passive, force must often be used, and support based on threats and fear endures only as long as pressure is brought to bear. Primitive living conditions add to the strain of avoiding government troops until the right moment. The VC are vulnerable to air and artillery attack, and less so to armor attack. Limited logistical capability, lack of communications, and insufficient medicine are other weaknesses.

(U) ANNEX B

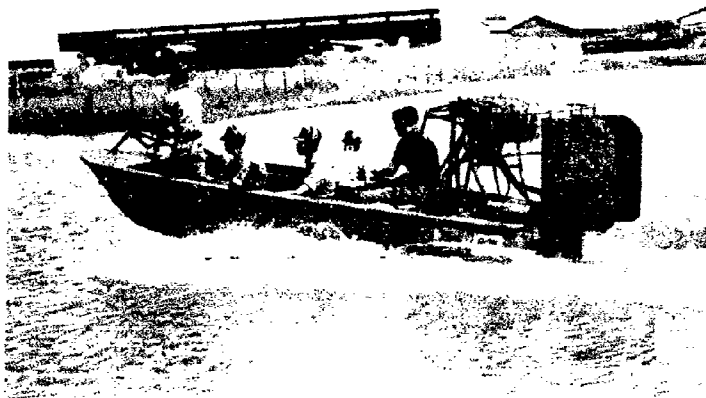
DESCRIPTION OF THE SUSQUEHANNA SKIMMER AND THE HURRICANE AIRCAT

The two airboats used during this evaluation were the Susquehanna Skimmer manufactured at the Danville Airport, Danville, Pennsylvania and the Hurricane Aircat manufactured by the Hurricane Fiberglass Products Company, Auburndale, Florida. See figures B-1, B-2, and B-3.

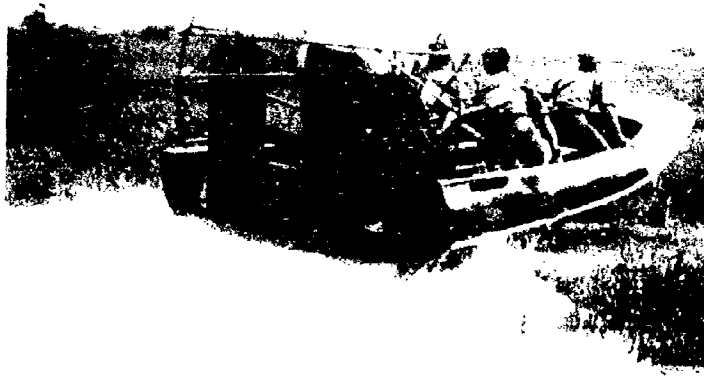
	<u>Skimmer</u>	<u>Aircat</u>
Length	17 feet	17 feet
Beam	6 feet 6 inches	7 feet 3 inches
Weight (approx)	1200 pounds	1150 pounds
Composition of Hull	2 layers fiberglass over 3/8-inch plywood	5 layers molded fiberglass
Shape of Hull	semi-V bottom	semi-catamaran, fore, flat bottom, aft
Controls	twin-rudder, steering wheel	twin-rudder, stick
Motor	O-360 Lycoming, 180 HP	O-360 Lycoming 180 HP

Evaluators and US advisors of the units using the boats rate them as indicated below:

	<u>Skimmer</u>	<u>Aircat</u>
Speed on waterways carrying approximately 300 pounds	42 mph	38 mph
Steering at high speed	Excellent	Excellent
Maneuverability at high speed	Satisfactory	Excellent
Steering at low speed	Difficult	Difficult
Maximum load at which airboat will plane	1200 pounds (6 soldiers)	1000 pounds (5 soldiers)



(U) FIGURE B-1. Susquehanna Skimmer.



(U) FIGURE B-2. Hurricane Aircat.



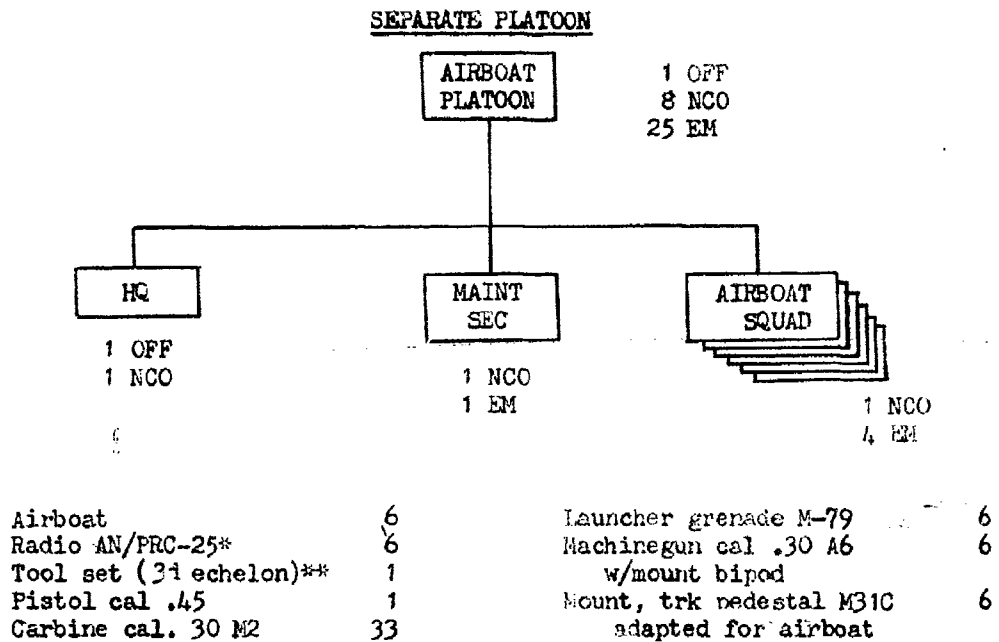
(U) FIGURE B-3. Modified Hurricane Aircat.

	<u>Skimmer</u>	<u>Aircat</u>
Minimum depth of water required with 1000-pound load	3 to 5 inches	1 to 2 inches
Obstacle crossing	Mud flats	2-foot dikes at approx 20 mph
Ease of operation	Satisfactory	Excellent

The Skimmer outperformed the Aircat in deep water. However, the Skimmer could not pass areas that generated rice paddies. The Aircat jumped dikes up to approximately 24 inches high at speeds up to 20 mph without apparent damage to the boat. The Skimmer sustained considerable hull damage when operated cross-country.

(U) ANNEX C

PROPOSED SPECIAL FORCES ORGANIZATION

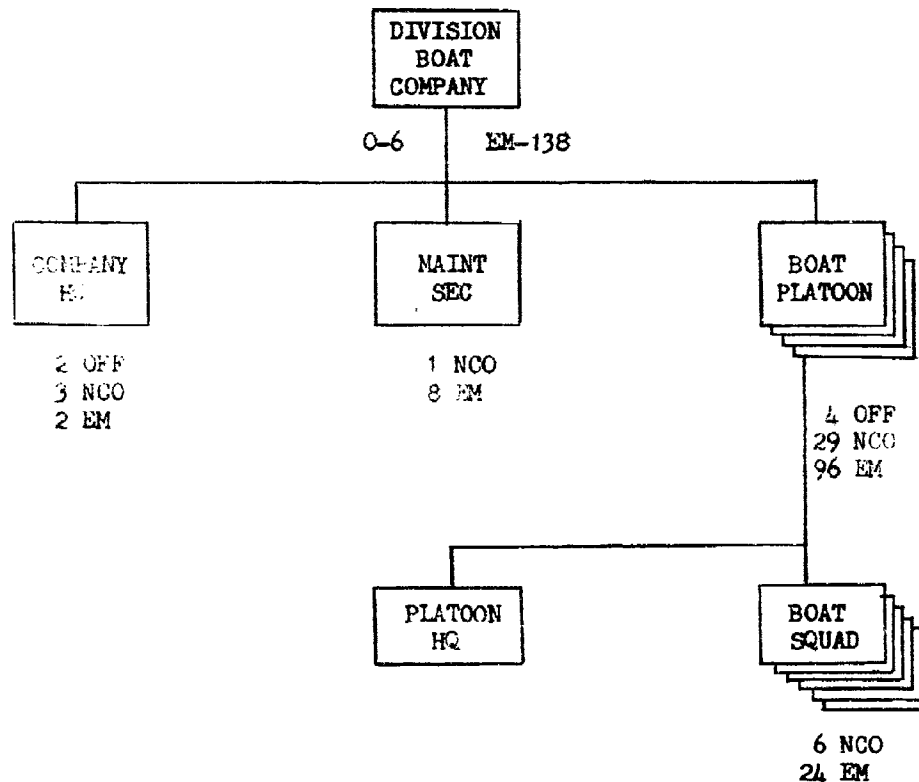


*Cmplt w/vehicle mount and aircraft type receiver-transmitter headset

**One per four platoons

NOTE: The formation of airboat companies to facilitate administration, training, and logistical support of airboat platoons is considered to be consistent with the Special Forces Group structure.

DIVISION AIRBOAT COMPANY



Airboat	24	Machinegun cal .30 A6	26
Radio AN/VRC-12	6	w/mount bipod	
Radio AN/PRC-25		Mount, trk pedestal M31C	24
Tool set (3d echelon)	24*	adapted for airboat	
Pistol cal .45	1	Truck 1/2 ton utility	1
Carbine cal .30 (M2)	6	Truck 3/4 ton cargo	5
Launcher, grenade M79	138	Truck 2 1/2 ton (maint)	1

*Complete with vehicle mount and aircraft type receiver-transmitter headset.

(U) ANNEX D

TRAINING PROGRAM FOR AIRBOAT PLATOON (1964)

1. PURPOSE AND SCOPE

This training program is a guide for the preparation of training programs and schedules, and for conducting individual and unit training of airboat platoons.

2. METHODS OF INSTRUCTION

Emphasis will be placed on practical work rather than theoretical instruction. Lectures and conferences will be used only when practical training is infeasible, and then only to bring out points to be demonstrated and applied.

The hours of instruction prescribed herein are the minimum required. Individual and unit proficiency can be attained only by additional application of individual and crew training exercises. Every opportunity should be used to conduct concurrent training for all boat crew members not tactically engaged in the principal subject scheduled: for example, maintenance, weapons training, and other similar training.

3. SUPERVISION AND RETRAINING

Training deficiencies and areas requiring additional emphasis will be uncovered during the latter stages of the training and during operations. The commanders should be on the alert to determine these areas and conduct retraining as needed.

4. INDIVIDUAL TRAINING PHASE

<u>Instruction Presented</u>	<u>Hours</u>	<u>Skills to be Taught</u>	<u>Subjects Appropriate for Integrated and Concurrent Training</u>
Orientation on airboats	1	To familiarize personnel with the characteristics and capabilities of the airboats, before- and after-operation maintenance, and starting and stopping the engine.	

<u>Instruction Presented</u>	<u>Hours</u>	<u>Skills to be Taught</u>	<u>Subjects Appropriate for Integrated and Concurrent Training</u>
Basic operator training	1	Starting, stopping at low-speed, operations in deep water.	Before- and after-operation maintenance.
Basic operator training	2	Low speed to maximum speed operations; maneuvering airboats at all speeds.	Before- and after-operation maintenance, familiarization rides for crew, zone observation, dry firing, embarking and debarking, stowage of equipment, communications.
Cross-country demonstration	1	Explanation and demonstration of airboat capabilities and limitations, correct procedures.	
Basic operator training	3	Crossing simple obstacles and operating in shallow water to develop skill and confidence. Progress to areas airboat cannot negotiate with ease.	Observation, dry firing, stowage, position of body during dike crossings, airboat recovery, communications, maintenance.
Advanced operator training	3	Platoon formations for open water and cross-country operations and field expedients.	Observation, dry firing, stowage, position of body during dike crossings, airboat recovery, communications, maintenance.
Live firing exercises	2	Live fire of individual and crew-served weapons under varying conditions and boat speed.	
Commander's time	1	See paragraph 1, as required.	

5. UNIT TRAINING PHASE

<u>Instruction Presented</u>	<u>Hours</u>	<u>Skills to be Taught</u>	<u>Subjects Appropriate for Integrated and Concurrent Training</u>
Scouting & patrolling	2	Combat & reconnaissance patrolling	Platoon formations, communication, observation, dry firing, and reporting
Security exercises	2	Principles & techniques employed by individual boats & the platoon in security mission.	Selection of routes, formation driving, communication, fields of fire, reporting.
Pursuit operations	2	Review of organization, equipment, & capabilities of airboats. Conduct of pursuit, use of control measures, fires and actions when overtaking enemy boats.	Selection of routes, reporting, duties of individual crewmen.
Transport operations	1	Moving casualties, crew-served weapons, transportation of reserves.	Loading, first aid.
Commander's time	2	See paragraph 4.	Loading, first aid.

(U) ANNEX E

AIRBOAT TRAINING (1965)

1. PHASE I

A 23 hour course following the program of instruction contained in Training Program for Airboat Platoon (1964), Annex D.

2. PHASE II

a. Orientation

One hour outline of course, advantages of airboats, characteristics of airboats, TOE of airboat platoon.

b. Safety Measures

One Hour (1) Propeller

(2) Seating positions

(3) Loading of boats

(4) Life jackets, if available

(5) Handling of weapons

c. Combat Formations and Hand and Arm Signals

6 Hours (1) File

(2) Column

(3) Echelon Left and Right

(4) Assault Formation

(5) Individual Seating Positions

d. Scouting and Patrolling

3 Hours (1) Speed of boats

(2) What to look for

(3) Conduct of boats during on-shore reconnaissance

e. Pursuit Operations

- 4 Hours (1) Pursuit of sampans
- (2) Search of sampans
- (3) Pursuit of individuals
- (4) On-shore search operations

f. Other Operations

- 1 Hour (1) Sleeper
- (2) Ambush
- (3) Innovations

g. Immediate Action

- 8 Hours (1) Ambush
- (2) Sniper

h. Practical Exercise with Live Force

4 Hours

i. Preventive Maintenance

4 Hours

3. PHASE III

Combat operations increasing with crew skill. To be conducted under the surveillance of USSF personnel.

(U) ANNEX F

PROPOSED MISSIONS AND TACTICS

1. OFFENSIVE OPERATIONS

The load-carrying capability, maneuverability, ability to operate through aquatic grasses off established waterways, and speed of the airboats give important advantages over units moving on foot, in boats without motors, or in boats with conventional motors.

Airboats may be used for the following tasks, particularly in areas containing heavy aquatic grasses:

- a) Patrolling flanks of the attacking units or patrolling in conjunction with blocking forces
- b) Pursuing, intercepting, and if necessary, destroying VC boats
- c) Providing flank security for conventional boat operations
- d) Positioning blocking forces
- e) Performing reconnaissance missions similar to vehicle-mounted scout platoons
- f) Aiding in displacing crew-served weapons
- g) Performing resupply and medical evacuation
- h) Transporting reserves
- i) Serving as a command utility vehicle

Occasionally airboats may be used to move attacking troops. It is preferable that the assault elements be debarked and deployed before approaching close to known enemy positions. A more thorough search of the area is assured, and in the event of contact, friendly fire and maneuver will be faster and more effective.

While airboats make it much easier to move crew-served weapons and equipment of assault units through areas containing heavy aquatic grasses, commanders must avoid carrying more in the airboats than can be manpacked when the operations continue on foot. Transforming these combat boats into logistical or administrative vehicles, especially on open waterways, must be avoided.

When a large conventional boat force moves, it adopts a normal march formation. Advance, flank, and rear guards are deployed in adjacent waterways or off of established waterways to the extent permitted by terrain. These security elements should be supplemented by foot elements as needed.

2. RECONNAISSANCE PATROLS

Reconnaissance patrols should use at least two boats to provide for mutual support. They can move by successive bounds, alternating bounds, or continuous movement. The tactics are similar to those of motorized patrols.

a. Successive Bounds

Moving by successive bounds, the boats in the patrol keep their relative places in the column. The two leading boats work as a team in moving from one point to another along the stream. The first boat takes a concealed position and troops debark, if necessary, to cover the movement of the second boat to the next observation point. When it is determined that all is clear, the leader of the first airboat signals the second airboat forward. Personnel in the first airboat observe carefully, select their next stopping point, and move forward to that point. The process is repeated until the mission is accomplished. (The lead airboat and personnel may be rotated frequently.) Other craft in the patrol move by bounds from one concealed position to another behind the first two airboats. Sight contact is maintained but boats avoid closing on the craft in front of them.

b. Alternate Bounds

Moving by alternate bounds, the two leading airboats alternate as the lead craft on each bound. This method is more rapid than successive bounds, but it does not allow men in the second airboat to observe carefully before they pass the halted lead craft.

c. Continuous Movement

In continuous movement, all boats move at moderate speed, maintaining security by careful observation. Leading boats stop to reconnoiter areas that require investigation. This is the fastest but least secure method of movement.

Security is maintained by continual observation and by frequent halts to observe the surrounding terrain. Men and weapons are debarked to observe and to furnish fire support if required. Some members of the patrol are designated to protect the airboats when the patrol debarks. Specific zones of responsibility for observation are assigned to men in the airboats. Visual contact is maintained among airboats.

... (the distribution of men and equipment of larger patrols) should be provided with a minimum of possibilities.

It is desirable to distribute men, weapons, and equipment among the boats in such a way that the patrol will remain effective even if one airboat and its equipment is lost.

One member of the patrol should be designated to observe and record the condition of the waterway and tanks.

The techniques described above also apply to airboat elements performing march security (advance guard, flank guard, and rear guard) for a larger force.

3. AMBUSHES

Airboats can be used to position an ambush force and to conduct rapid pursuit or withdrawal through areas containing heavy aquatic grasses. Airboat-transported forces are not limited to leaving waterway ambushes; they can operate in any area reasonably accessible to water.

Stealth in movement to final position can be achieved by using paddles or poles to propel the boats instead of motors. Boats can drift to position with the current or tidal flow. Small ambush parties can be left behind when patrols stop and dismount to observe or reconnoiter. This technique is useful only if boat forces commonly operate with frequent halts and debarkations, and if the stay-behind ambush party is small in comparison to the total force.

Whether the ambush is laid to cover a road, trail, or waterway, the riflemen normally disembark and take up concealed positions. Airboat crewmen remain in or near their craft, which are carefully concealed. The ambush security team leader is made responsible for security of the airboats. Both crewmen are under his control during occupation of the ambush site.

Because several hours of waiting are usually required at the ambush site a change in level and direction of stream flow often occurs because of tidal action. The ambush commander must anticipate these changes and plan his ambush accordingly. Changes in the level of water because of tides may require relaying weapons in a waterway ambush. The direction of approach of enemy boats may be based on the direction of current flow. These factors must all be considered in choosing the location, timing, and method of ambush.

4. RAIDS

Airboats may be used by raiding parties in the same way as they are used to support other offensive operations in areas containing

heavy aquatic grasses. Airboats provide a means for rapid withdrawal after the raid.

Airboat-borne raiding parties may debark some distance from the objective in order to approach stealthily on foot. When the objective is close to shore, the assault force may use airboats to storm directly into the objective area. Amphibious assault tactics are used. The storming tactics should be used only when surprise can be achieved and when the waterway is large enough to permit some evasive action by the assaulting boats.

Artillery fires and smoke should be planned to cover withdrawal of the raiding force.

5. MEDICAL EVACUATION

Airboats provide a relatively fast means of evacuating casualties from any form of operation (boat-borne, foot, etc). When evacuation by airboat is planned, air stations are located for convenient access from the waterway net. A landing site is prepared, if necessary, to facilitate prompt and gentle unloading of wounded persons from the airboats.

6. MOVEMENT OF SUPPLIES

Airboats can assist in all forms of logistical movement, such as ammunition resupply, fuel transport, and other general supply and service functions particularly in areas containing heavy aquatic growth. Diverting them to this use on open water where conventional boats are more effective, must be avoided. Security personnel accompany the airboats as required. Boats are loaded carefully so that the operator's field of vision is not obscured.

Airboat forces may be used for water convoy protection, escorting other small craft or large sampans, and for hauling freight. Such operations are usually limited to smaller waterways where Navy river escort groups cannot operate. Occasionally airboat escorts operate in conjunction with larger escort craft, usually in an advance party or in the scouting role.

Airboat units should not be routinely used for supply or escort missions; they should normally be engaged in combat operations. Combat operations may, however, include evacuation and combat resupply tasks for the airboats.

7. COMMAND VEHICLE

The load-carrying capability of the airboat may make it desirable, under some circumstances, for use as a command vehicle. There is, however, no electrical system for radio power.

8. AIRBOAT AMBUSHES

Because of their distinctive noise and appearance, airboats can be used effectively to conduct demonstrations, feints, and ruses. The airboat force can be used to divert the attention of the enemy from other courses or areas.

9. CONTROL OF WATERWAYS

The speed of airboats allows them to overtake all river craft normally used in commerce or employed by the insurgents. Thus the airboats can perform well in policing the waterways and searching suspect craft as part of the resources control campaign. Airboats can cruise the waterways or tie up and await passing craft at critical points.

10. ADMINISTRATIVE MOVES

From time to time airboats may be used for routine administrative transportation tasks when other means are not available. Airboats must not be diverted from combat-support missions for administrative use.

11. AIRBOAT ENGINE-PROPELLER NOISE

The high level engine/propeller noise associated with airboats may be compensated for or minimized in several ways in order to achieve surprise over an enemy. The techniques of this are described below and may be used singly or in any combination to best accomplish the mission.

(a) Stealth in movement to an attack position can be achieved by infiltration as described under Ambushes, paragraph 3 above.

(b) One or more airboats may maneuver freely without specific detection by operating under a noise cover staged by other airboats or overhead aircraft.

(c) The high speed and surface mobility of airboats may be exploited to compensate for the warning effect of their noise and subsequent lack of surprise. This may be accomplished by holding the airboats out of action temporarily to the rear or far flanks until enemy contact has been established by the assault troops. The airboats can then be committed into action by the force commander. Because of their superior mobility and high speed they can, without appreciable delay, quickly close the distance to join the operation and carry out their own specific mission.

(U) ANNEX G

MISSIONS PERFORMED

Annex G records the missions performed during both phases of the evaluation.

1. PHASE I 1964

<u>Mission</u>	<u>Number & Type of Airboat</u>	<u>Remarks</u>
a. Reconnaissance Patrol	Three Aircats	Airboats patrolled and stopped and searched all boats in remote areas. Three VC suspects detained.
b. Escort	Three Aircats	Armed escort and transportation for province chief and payroll to remote posts.
c. Administrative Movement	Three Skimmers	Airboats moved on waterways from training area to operational area. Two armed UH-1B's provided escort.
d. Reconnaissance Patrol	Three Aircats	Airboats patrolled waterways and stopped and searched boats in remote areas. One VC suspect detained.
e. Flank security	Two Aircats Two Skimmers	Screened left bank of river to provide security for LCVP carrying troops.
f. Reconnaissance Patrol	One Aircat One Skimmer	Operation conducted in edge of Plain of Reeds. Hull of Skimmer broken on underwater obstacle. Aircat performance rated outstanding. Engaged unknown number of VC. No friendly casualties. Two VC suspects captured.

<u>Mission</u>	<u>Number & Type of Airboat</u>	<u>Remarks</u>
g. Ambush	Three Aircats	Airboats were in pursuit force of larger elements of conventional boat force in night ambush. One motorized sampan attempted to escape, was pursued, and entered small tributary. Shots were exchanged with unknown results. ARVN did not pursue beyond mouth of tributary.
h. Reconnaissance Patrol	Three Aircats	Cross country patrol over inundated area. One airboat struck an unknown object at 20 mph and bounced off with no damage. Area covered in 2½ hours normally takes 1 to 2 days on foot or sampan.
i. Flank Security	One Aircat	Provided flank security for ground force. Transported reaction force to point of contact with VC. Engaged VC with machinegun. Results unknown.
j. Flank Security	Three Aircats	Airboats supported foot patrol by securing its flanks in inundated area. L-19 aircraft used for observer support. Air to boat communications were very satisfactory.
2. PHASE II 1965		
a. Reconnaissance Patrol	Three Aircats Four Skimmers	No VC engagement but considerable sniper fire was received.
b. Reconnaissance Patrol	One Aircat Four Skimmers	Airboats moved from An Phu through An Long to Cai Cai using a cross-country sweep

<u>Mission</u>	<u>Number & Type of Airboat</u>	<u>Remarks</u>
		supported by US Army aircraft. Searched all civilian boats in a remote area of the Plain of Reeds. No VC engagement but some sniper fire was received.
c. Flank Security	Five Aircats	This was a reaction force mission using airboats. Airboats moved 20 kilometers to operational site 30 minutes after alert. No VC contact but moderate sniper fire was received.
d. Flank Security	Five Aircats	Operation was conducted to trap VC elements located along the RVN side of the Cambodian border. Considerable sniper fire was received; 5 VC suspects detained.
e. Flank Security	Three Skimmers	This was a coordinated operation to attack a known VC position on the RVN side of the Cambodian border. Airboats were committed after enemy contact was established. Results: 28 VC KIA; 3 VC WIA and considerable documents and materiel seized.
f. Flank Security Raid	Two Skimmers	A coordinated operation to attack a known VC position. Airboats were committed after enemy contact was established. Results: 4 VC KIA and an unknown number of VC dispersed.
g. Flank Security Raid	Five Aircats	A coordinated operation to clear a border village of VC. Results: The enemy

<u>Mission</u>	<u>Number & Type of Airboat</u>	<u>Remarks</u>
		concentration was dispersed and pursued by airboats to the Cambodian border. Considerable sniper fire was received.
h. Flank Security	Four Skimmers	A coordinated operation to attack a suspected VC position. Airboats were committed after objective was reached. Results: 11 VC suspects were detained; moderate sniper fire was received.
i. Flank Security Raid	Four Skimmers	A coordinated operation to attack a known VC position. Airboats conducted a diversionary attack on a secondary objective while a motorized plastic assault boat force maneuvered into position for an attack on the primary objective. Airboats joined the assault force in time to provide direct support. Results: 2 VC KIA.
j. Reconnaissance Patrol	Two Skimmers	Cross country reconnaissance over an area that was heavily infiltrated with VC. While traveling at approximately 35 mph, one airboat struck a huge tropical ant hill in a thicket of tall grass. The hull was completely destroyed and three crew members received moderate injuries. The earth object was approximately 5 feet in height.
k. Flank Security	Four Skimmers	A coordinated operation to attack a known VC position

<u>Mission</u>	<u>Number & Type of Airboat</u>	<u>Remarks</u>
		along the RVN side of the Cambodian border. Airboats conducted a diversionary attack on a secondary objective while a motorized plastic assault boat force maneuvered into position for . . . on the primary objective. Airboats joined the attack in time to provide direct support. Results: 9 VC structures including a tax collection office destroyed and 3 VC suspects detained.
l. Counter Attack Pursuit	One Aircat Three Skimmers	A USSF camp was under night attack by VC forces. At first light airboats were committed against enemy flank. VC broke contact but were pursued by airboats. Results: 15 VC KIA and a quantity of weapons captured.
m. Pursuit Attack	Four Aircats	A squad-size CIDG force was ambushed by VC. Airboats were committed as a reaction force to pursue and destroy the VC force. Results: 15 VC KIA, 1 VC POW, 23 VC sampans destroyed.
n. Flank Security	Three Aircats	A coordinated operation to attack a known VC platoon base. Airboats attacked on a converging axis. Results: a quantity of equipment and supplies were destroyed.
o. Flank Security	Three Aircats	A coordinated operation to attack a known VC training and administrative base. Airboats attacked through

<u>Mission</u>	<u>Number & Type of Airboat</u>	<u>Remarks</u>
		heavy marsh growth on a converging axis. Results: 7 VC KIA, 20 buildings destroyed, and a considerable number of highly classified enemy documents captured.
p. Flank Security	Three Aircats	A coordinated operation to attack a known VC base area. Airboats attacked on a converging axis. Results: 3 printing presses, 20 tons of paper, and 12 buildings were destroyed.
q. Pursuit Attack	One Aircat	Airboats were committed to pursue and destroy a squad-size VC reconnaissance patrol. Results: 9 VC KIA, 1 VC POW, 3 sampans destroyed.
r. Reconnaissance Patrol	One Aircat Three Skimmers	Airboats were conducting a sweep. One Skimmer was following a previously made track through the marsh growth and struck a VC mine made from a concussion grenade. Results: The boat sank in 2 feet of water. It was recovered and repaired the same day. Only very minor injuries were sustained by crew members.
s. Reconnaissance Patrol	One Aircat Three Skimmers	This airboat patrol intercepted and pursued a squad-size VC force in sampans. Results: 5 VC KIA and several weapons captured.
t. Flank Security Raid	Four Aircats	A coordinated operation to attack a known VC company-size unit positioned close to the Cambodian border.

<u>Mission</u>	<u>Number & Type of Airboat</u>	<u>Remarks</u>
		Airboats were committed from a rearward attack position after the main force established contact. Results: One VC KIA and the unit dispersed into Cambodia. A temporary engine failure and longer approach routes required because of receding water levels impeded the general effectiveness of airboats in this operation.
u. Reconnaissance Patrol (84 routing missions)	Two Airboats (Average)	Of 89 reconnaissance patrols, 84 were routine actions which were included for evaluation data. Sniper fire was received on 67 of these patrols. In no instances did enemy engagement develop.

<u>Deficiency/ Shortcoming</u>	<u>Corrective Action</u>	<u>Remarks</u>
f. Tendency for the Aircat to swamp when carrying 11 combat laden Vietnamese Soldiers.	The number of persons aboard were limited to five at one time.	Without splash shields, water was easily shipped aboard fore and aft during tight high speed maneuvers in the deep water of established waterways. One Aircat swamped while underway upstream & sank. Five persons of the 11 aboard drowned & the boat was never recovered.
g. The boat operator on both the Skimmer and Aircat is seated too low for effective visibility.	Adjustable operators seats were installed on two Aircats.	While operating over inundated areas, the high aquatic grasses obstruct free visibility.
h. The boat operator's foot throttle was not positioned to accommodate coordinated actions while underway.	Hand throttles were installed on all Aircats.	The modified hand throttle performed very satisfactorily.
i. Towing and mooring cleats were not provided originally.	Towing cleats were installed on all Aircats.	This is a self-evident requirement. Tactical recovery of stalled boats make this an absolute necessity.
j. Hull damage	Fiberglass was used to repair damaged hulls.	The fiberglass covered plywood of the Skimmer did not stand up well. It was easily damaged by the type of underwater obstacles commonly found in the inundated areas of the Mekong Delta. In comparison,

Deficiency/
Shortcoming

Corrective
Action

Remarks

the Aircat molded fiberglass hull sustained very little damage while operating under identical conditions. When repairs were required, this type of hull was considerably easier to work with under field conditions in a remote area.

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(U) ANNEX I

MODIFICATIONS

A program of modifying the Aircat boats was undertaken to increase their utility and capability. The following modifications were accomplished locally at the 40th Engineer Base Depot, ARVN:

- 1) Styrofoam plastic was installed at gunwhales and to form the moulding around the bow shields. The bulky configuration created enough wind resistance to decrease speed by approximately 5 mph.
- 2) Propeller guard height was reduced.
- 3) Gasoline tanks were covered with fiberglass.
- 4) Adjustable operators seats were installed on two boats.
- 5) Machinegun pintle mounts were installed on two boats.

The following modifications to the six Aircats were accomplished by parts supplied from CONUS:

- 1) Rubber extensions
- 2) Propellers, 66x144
- 3) Self-sealing fuel tanks and boxes to inclose the fuel tanks
- 4) Stainless steel exhaust systems
- 5) New gauges
- 6) Hand throttles
- 7) Towing cleats

Required modifications to the Hurricane Aircat for military employment in the RVN are as listed below. Maximum use of lightweight materials is essential in order to maintain performance capabilities:

- 1) Redesign the starter drive system and employ stronger materials.
- 2) Redesign the electrical system using military grade electrical components that are installed in protective inclosures.

- 3) Install an all-metal propeller to avoid dry rot conditions that occur in the Southeast Asia area.
- 4) Install governing mechanism to prevent damage from excessive high speed during operator training. Governor should be capable of being removed.
- 5) Cover gasoline tanks with fiberglass to prevent rupture from vibration and enable crew or passengers to sit on tank without causing damage.
- 6) Install stainless steel exhaust manifolds with high durability, strength and maximum silencing capability.
- 7) Install self-sealing gasoline tanks for protection against enemy small arms fire.
- 8) Fill closed spaces below deck with styrofoam plastic and construct internal water-tight cells to prevent boat from sinking.
- 9) Install operator's seat that can be adjusted vertically a minimum of 1 foot.
- 10) Install hand throttles in lieu of foot throttles.
- 11) Install towing and mooring cleats as standard equipment.
- 12) Install a pintle mount in the bow section for the caliber .30 machinegun.
- 13) Install an aircraft-type floating compass to facilitate both navigation and tactical control.
- 14) Install radio mount for the AN/PRC-25 FM radio.