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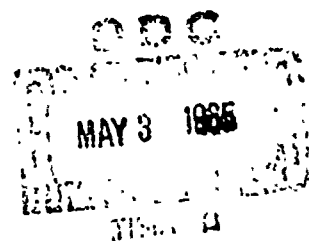
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HELIBORNE COMMAND POST (U)

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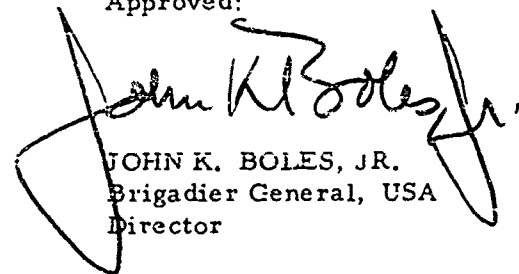
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JOINT RESEARCH AND TEST ACTIVITY
Office of the Director
APO San Francisco 96243

REPORT EVALUATION BY DIRECTOR,
JRATA

The conclusions and recommendations of the report are thoroughly substantiated by the operational documentation and are concurred in. It is significant that during the course of the evaluation the value of the Heliborne Command Post was so apparent that fifteen operational models were procured and placed in routine use in the Republic of Vietnam. The Heliborne Command Post is the single piece of new materiel which should have the most influence on improving the conduct of the war in Vietnam. It encourages the use and coordination of all supporting forces.

Approved:



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

31 March 1965

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ARMY CONCEPT TEAM IN VIETNAM
APO San Francisco 96243

FINAL REPORT

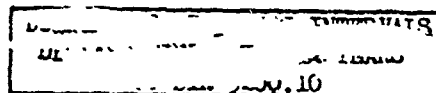
HELIBORNE COMMAND POST (U)

JRATA Project No. 1A-102.0

31 March 1965

Approved:

Hugh E. Quigley
HUGH E. QUIGLEY
Colonel, Armor
Chief



CONFIDENTIAL

AUTHORITY

Letter, AGAM-P (M) (17 Jul 64) AGSFOP, DA
31 Jul 64, subject: Army Troop Test
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CINCPAC message DTG 020134Z Jul 63.

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I. (U) PREFACE

A. ABSTRACT

The purpose for the heliborne command post (HCP) project was to determine the concepts for employing a helicopter as an aerial command post in counterinsurgency operations in the Republic of Vietnam (RVN).

The console for the HCP was designed and fabricated using a selected group of radios which was placed into a helicopter equipped with special antennas. The HCP was used by ground commanders and their staffs for command and control of combat operations. The HCP was flown on 20 documented combat operations under varying terrain, weather, and operational conditions. The function of the radios and the personnel in the HCP were observed and recorded by evaluators from the Army Concept Team in Vietnam (ACTIV). Additional data were gathered by interview and discussion with key personnel at all levels.

The HCP provides the ground commander with an effective means for controlling combat operations. The HCP command group can coordinate and control the airmobile forces, ground forces, and all support elements including artillery and Air Force fire support.

Prior to completion of the evaluation it was recommended by Commander, US Military Assistance Command, Vietnam (COMUSMACV) that the HCP be obtained and used in counterinsurgency operations in Vietnam. Fifteen consoles were requested for issue to the aviation battalions on the basis of one per Army of the Republic of Vietnam (ARVN) corps and division supported and a maintenance float of two. These consoles are now operational in all areas of the RVN.

B. OBJECTIVES AND METHODS

1. Objective 1 - Capabilities and Limitations

Determine the capabilities and limitations of the helicopter as a command post vehicle in the RVN.

To meet this objective, operations were observed and documented, and ARVN commanders, their staffs, and US advisors were debriefed following each operation.

2. Objective 2 - Configurations of Radio Console

Determine the number and types of radios required in the heliborne command post including the physical placement of the radios, the accessibility of controls, and radio net requirements.

This objective was met by fabricating, testing, and employing various console configurations in the UH-1B helicopter.

3. Objective 3 - Techniques and Procedures

Develop techniques, methods, and procedures for effective employment of the heliborne command post. Included is the use of the HCP as a joint combined command post incorporating the necessary elements to ensure adequate command and control of joint combined military operations.

To meet this objective, the HCP was used in joint combined combat operations, and discussions were held with ARVN commanders, their staffs, US advisors, Vietnamese Air Force, Vietnamese Navy, and US Army aviation unit personnel.

4. Objective 4 - Ancillary Items

Determine what ancillary items, if any, were required for the heliborne command post.

The methods used for meeting this objective were the same as those used in objective 3. Data were also collected on various items used with the HCP during combat operations.

5. Objective 5 - Heliborne Public Address System

Determine the usefulness, suitability, and effectiveness of a public address set in a helicopter command post to warn noncombatants to vacate threatened areas and to induce surrounded Viet Cong units to surrender.

During the initial phase of the project it was apparent that the speakers and power supply required to meet this objective, plus command post console and personnel, would raise the gross weight of the UH-1B helicopter beyond safe limits. Accordingly, the requirement for a public address system in the HCP was eliminated and ACTIV conducted a separate evaluation of a loudspeaker system for UH-1 helicopters. Findings were presented in the ACTIV report, "The Heliborne Public Address System for Use in Psywar and Civic Actions" (U), dated 10 February 1964.

C. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

The UH-1B heliborne command post is an effective command and control vehicle for the conduct of counterinsurgency operations in the Republic of Vietnam. The command post radio console should be capable of quick installation and removal. Each console should consist of two FM radios,

one VHF or one UHF radio, HF SSP radio, and necessary antennas. The AN/ASC-6 heliborne command post console should be issued to the aviation battalions on the basis of one for each ARVN corps and division supported. Prior to the completion of the evaluation and publication of this report, 15 consoles, AN/ASC-6, were received in the RVN. These consoles are now operationally in use.

II. (U) INTRODUCTION

A. PURPOSE

The purpose for the heliborne command post project was to determine the concepts for employing a helicopter as an aerial command post in counterinsurgency operations in the Republic of Vietnam (RVN).

B. BACKGROUND

In late 1962 and early 1963, helicopters were used with some success by the Army of the Republic of Vietnam (ARVN) for visually surveying the battlefield and directing units by radio. No serious attempt, however, was made to realize the full potential of a helicopter as an aerial command post or to evaluate the concept of command and control of ground and air operations from an aerial platform.

The Army Concept Team in Vietnam forwarded an evaluation plan for an HCP to the Commanding General, US Army Combat Developments Command on 15 April 1963. On 2 July 1963 the project was approved.

While waiting for approval, ACTIV personnel participated in operations in which three AN/PRC-10 radios were used in a helicopter to furnish communication for commanders. It was found that very high frequency (VHF), high frequency single side band (HF SSB), and frequency modulated (FM) radios were required to monitor and enter the essential nets. It also became apparent that an intercommunication system was necessary for members of the command group in the helicopter to coordinate with each other.

Since engineering design and fabrication capabilities needed to develop and HCP did not exist in Vietnam, a request was initiated for engineering assistance from the United States. The assistance was provided in August 1963 by the US Army Electronics Research and Development Laboratories, Fort Monmouth, New Jersey. Four radio consoles were fabricated by this laboratory and they arrived in the Republic of Vietnam (RVN) in December 1963. These original consoles were issued to the 145th Aviation Battalion and the Delta Aviation Battalion (Provisional) for evaluation.

C. DESCRIPTION OF MATERIEL

The command post contained two individually mounted FM AN/ARC-114 radios, one HF single side band AN/ARC-102 radio, and one VHF AN/ARC-73 radio. These radios were mounted in a desk-type console and arranged so that each person in the command group could operate all radios. The commander was provided a master control which allowed him to monitor any or all of

the radios or to over-ride any of the radios. A four-way intercommunication system was provided for communicating among members of the command group.

D. **SCCPE**

1. Definition

The project was undertaken to conceive, design, and assemble communication equipment for an HCP and to develop techniques and procedures to employ it in combat operations.

2. Setting of Project

a. **Environment**

The evaluation was conducted in the Mekong Delta region of the RVN. The terrain is flat and marshy with extensive mangrove swamps. (See annex B for a detailed description.) The HCP console AN/ASC-6 has been used in combat operations in all sections of the RVN.

b. **Military Elements**

The evaluation was conducted during combat operations that employed elements of the US 145th and Delta (Provisional) Aviation Battalions, and troops of the RVN Army, Marines, and Civilian Irregular Defense Groups. Since completion of the evaluation all US Army aviation battalions in the RVN have been issued the HCP console AN/ASC-6.

E. **EVALUATION DESIGN**

1. Methodology

a. **Data Collection Methods**

Army Concept Team in Vietnam project officers participated in all operations when the helicopter command post was used. Discussions were held with ARVN commanders, US senior advisors, Air Force liaison officers, and other participating personnel concerning all aspects of the system. The ACTIV project officer served as a crew member for the helicopter during the evaluation and flew 20 combat operations gathering information and data.

b. **Analysis Methods**

The analysis was essentially a study of the results obtained in using the heliborne command post in 20 combat operations in Vietnam. Evaluations were made of commanders' opinions, advisors' after-action

reports, and records of the project officers to determine the value and limitations of the heliborne command post.

2. Limitations and Variables

The command and control personnel using the heliborne command post rested entirely with US senior advisors and ARVN commanders and could not be controlled by ACTIV evaluators. The evaluation was made during combat operations, therefore, no controlled testing could be undertaken and data were limited to those that could be collected during these operations. No operation was conducted for the sole purpose of testing the HCP.

3. Support Requirements

Assigned project officers acted as evaluators, and TDY enlisted personnel from CONUS provided technical and administrative assistance. Technical engineering personnel not provided for in the evaluation plan were furnished from the US Army Electronics Research Development Laboratory (USAERDL), Fort Monmouth, New Jersey. Funds to support TDY personnel were provided by the US Army Combat Developments Command.

The four heliborne command post radio consoles used in the initial evaluation were obtained from USAERDL. Upon completion of the evaluation, they were laterally transferred to the CO, 118th Airfield Operating Detachment by authority of the G4, US Army Support Command, Vietnam (USASCV). The ACTIV-modified prototype HCP is currently being used in an ACTIV UH-1B helicopter.

4. Time Schedule

The evaluation plan was submitted on 15 April 1963 and preliminary work began at that time. In May 1963 engineering assistance was requested from the United States. Engineering personnel arrived in August 1963 and prepared preliminary wire diagrams and sketches of a radio console configuration. The engineers departed 10 days later to fabricate the sets at Fort Monmouth, New Jersey. In December 1963 the command console system arrived in Vietnam.

In April and May of 1964, because of the unsatisfactory performance of the original consoles, redesign and fabrication was undertaken locally by ACTIV. By the end of June 1964 a modified console had been designed, and the field evaluation began. Operational use of this console continued through November 1964. The original evaluation period of 15 December 1963 to 15 March 1964 was extended to 31 December 1964 to accommodate evaluation of the modified console. The HCP was flown throughout the year and was used in 20 combat operations.

III. (U) DISCUSSION

A. OBJECTIVE 1 - CAPABILITIES AND LIMITATIONS

The capabilities and limitations of the helicopter command post discussed in objective 1 are those pertaining to the ACTIV-modified console, since it was determined early in the evaluation that the original console was not satisfactory.

1. Radio Communication Distances

Very high frequency (AN/ARC-73) communication was used to contact and monitor other aircraft radios and the forward air controller radio. Since distances involved did not exceed 20 nautical miles, which was within the design range of VHF equipment, specific tests were not conducted to obtain information on the maximum range of the AN/ARC-73.

High frequency single side band (AN/ARC-102) was used for command and control when extended distances were involved. Communication was established with ground-based radios at distances of 132 and 398 nautical miles.

Frequency modulation (AN/ARC-44) was used extensively for command and control and was the primary means used on all but one operation. Frequency modulation transmissions were made over distances which varied from a few yards up to 28 nautical miles.

2. Communication Capabilities

Using the radios in the console, the command and control group could contact the advance staging area, fixed bases, landing zone, vector control aircraft, escort aircraft, troop transport aircraft, medical evacuation aircraft, artillery, forward air controller, and tactical support aircraft. (See figure 1.)

One FM radio was tuned to the ARVN command frequency and was used primarily by the ARVN commander to control and monitor ground or naval units involved in the operation.

The other FM radio was used on the US advisor control frequency and was operated primarily by the senior advisor for communication with US advisors in the landing zone. It was also used by the aviation element commander to control aviation unit commanders or flight leaders. In two operations the landing zone was changed after the first lift had been completed. All elements were notified of the change through the FM radio.

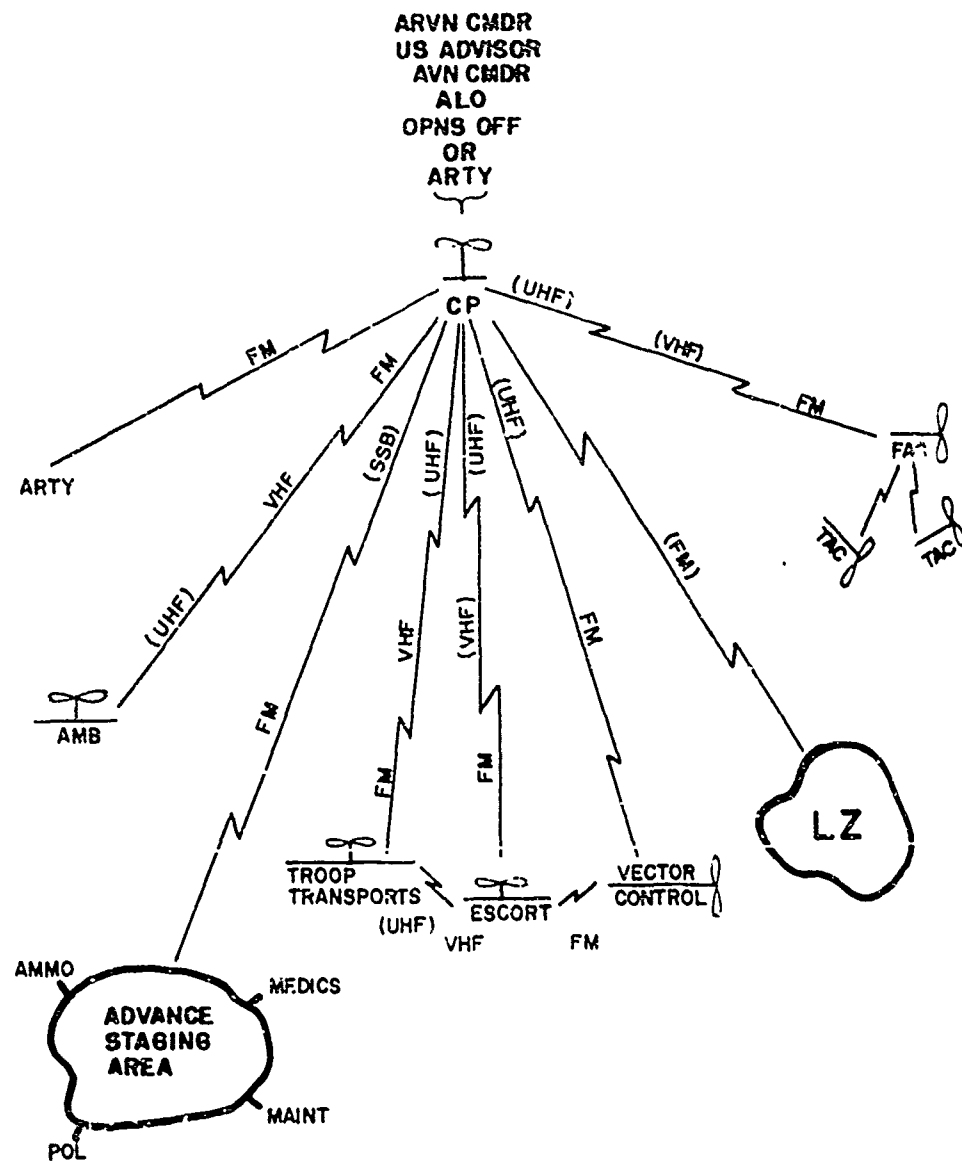


FIGURE 1. Communication Capabilities.

The VHF set was used on the tactical air control frequency to contact and monitor prestrike aircraft and to communicate with the forward air controller

The HF SSB radio was used in the corps air support operations center (ASOC) net by the air liaison officer (ALO) or Air Force advisor. ARVN commanders were reluctant to request air support not planned or allocated for an operation; therefore, additional air support was not requested during any of the operations. Satisfactory calls were made, however, from the ALO in the command and control helicopter to the Air Force representative in the ASOC to evaluate the ability of the HCP to perform this function.

3. Troop Control Capabilities

The ARVN commander was able to exercise command and control of troops in the landing zone from the HCP. He was able to advance or halt units as the tactical situation dictated. On two occasions, the command and control group changed the landing zone while enroute to an objective area. The ARVN commander landed in the landing zone to confer directly with his unit commanders in every operation but one.

4. Monitoring Capability

One capability not foreseen that became apparent during the evaluation was the use of the HCP for senior military observers. With the communications available in the console the observers were able to monitor the various radio nets and thereby better follow the operation as it developed.

5. Potential Capabilities Not Evaluated

a. Control of Quick-Reaction Forces

The Military Assistance Command, Vietnam (MACV) is presently working with the ARVN senior commanders in planning and conducting a series of exercises in the use of quick-reaction forces in counterinsurgency operations. The HCP will be used in these exercises and in subsequent quick-reaction operations. A commander, with a limited staff, can proceed to an area under attack, make decisions, and commit the required quick-reaction forces, all from the HCP. He and his staff have the capability to brief the forces enroute to the objective, coordinate with other forces in the area, and call for additional support by use of the multiple radios in the HCP.

b. Artillery Support Coordination

Artillery fire support was not used in any airmobile operation during the HCP evaluation. It is possible, however, to request and coordinate artillery fires from the HCP.

6. Time on Station

The airborne endurance of the UH-1B helicopter was a limiting factor. For the most effective employment of the HCP, it was imperative that it follow the initial armed helicopters to the landing zone and remain on station throughout the operation until required to refuel. To increase the airborne endurance of the HCP, a 50-gallon internal auxiliary fuel cell was installed (Figure 2). This enabled the HCP to remain on station approximately two hours, depending upon the distance from the landing zone to available fuel facilities. The additional fuel gave the HCP a longer airborne endurance than the armed or troop carrying helicopters.

The amount of time the HCP was actually in the air as a command and control ship in different operations varied from 45 minutes to 6 hours. Fuel consumption of the helicopter averaged 100 pounds of fuel per 12 minutes of flight time.

7. Vulnerability and Survivability

The HCP was exposed to enemy fire for a considerable time during operations. It was not as vulnerable as the transport or armed helicopters due to the fact that it was operated at greater standoff distances and higher altitudes. During 50 percent of the operations using the HCP, enemy ground fire was heard in close proximity to the helicopter. However, only one small arms round hit the helicopter. The hit was in the right skid 2-1/2 feet forward of the rear cross tube. Considering that over 30 hours of combat operations were flown, vulnerability was low.

The standard armor protection kit for the UH-1B helicopter was installed on the CP helicopter. The weight of personnel and equipment brought the aircraft to its maximum gross takeoff weight limit. Therefore installation of any armor protection for the command and control group in the passenger compartment was prohibited. However, consideration should be given to providing greater protection to the command and control group.

8. Summary

In summary, the command and control group operating from the HCP

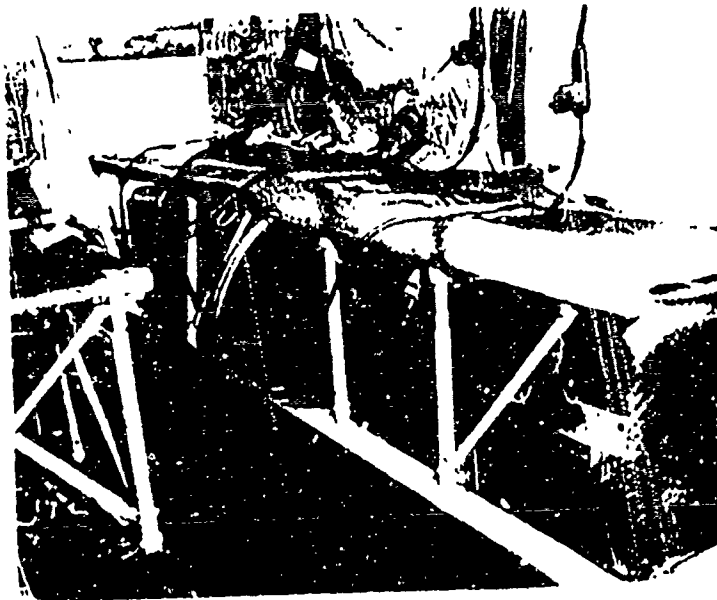


FIGURE 2. Fifty-gallon auxiliary fuel cell.

effectively coordinated and controlled ground and air operations. Two FM radios, one VHF or UHF radio and one HF SSB radio, in addition to the standard UH-1B helicopter radios, provide sufficient communication capability for command and control. The auxiliary fuel cell permitted the HCP to remain on station the required time. The vulnerability of the helicopter is considered to be low. Maximum gross weight limit of the helicopter command post precludes providing armor protection for the command and control group in the passenger compartment.

B. OBJECTIVE 2 - CONFIGURATION OF RADIO CONSOLE

The first attempt to use a helicopter as a command post was with 3 AN/PRC-10 radios lashed together in the passenger compartment of a UH-1B, and 3 FM antennas mounted at 45-degree angles on the skids. The three AN/PRC-10 radios were set upright on the cargo floor behind the co-pilot's seat. Standard antenna cord CG-106 (RG-8A/U), issued with the RC-292 antenna, was used to connect the antenna assemblies mounted on the helicopter skids. This configuration was used on several operations with some degree of success, but it afforded only an FM capability. It was apparent that VHF communication was required and that HF SSB was desired so the commander could exercise control over all elements of an operation. Two additional deficiencies appeared: the lack of a suitable intercommunication system, and the lack of a capability for all command

and control personnel to operate and monitor all radios. Neither the engineering personnel to design nor the hardware to build such a system existed in Vietnam. Accordingly, avionics assistance from COMUS was requested and provided. After studying the requirements and the capability of local facilities to provide the equipment it was decided to fabricate a console at Fort Marmouth.

1. The Original Console

The original communication equipment for the HCP consisted of two FM, one VHF, and one HF SSB radio mounted in a table-type console. The console could be bolted to existing tiedown points on the compartment floor of a UH-1B helicopter. Although this console provided adequate communications it was concluded that the console was too large and cumbersome to install and remove readily. Furthermore, in order to accommodate the console, two single seats had to be removed. The console was designed not only to package the radio equipment but also to be used as a table for maps and charts. A greater need existed for space for gunners and ammunition. Another deficiency noted was that the console partially blocked observation of personnel sitting in the rear center seats. The most serious deficiency was that the weight of the console, added to the weight of the essential personnel and equipment, exceeded maximum gross weight and forward center-of-gravity limits of the helicopter. For a more complete description of the console see annex C.

2. The ACTIV-Modified Console

To eliminate the deficiencies noted above, a new console was designed and fabricated by ACTIV personnel. This console contained the same basic components as the original but was configured to fit between the two single-place seats just aft of the pilot's compartment. The size and weight was reduced by eliminating the table and by placing the HF SSB radio in the aft cargo compartment. This arrangement permitted the two single-place seats to be reinstalled, provided unobstructed side-visibility for the passengers, and eliminated the weight and balance problem. Power cables and antenna leads were equipped with quick-disconnect units to facilitate rapid installation and removal. The entire unit was anchored in position by existing tiedown brackets and could be installed or removed by two men in five minutes. For a more detailed description see annex C.

3. Communications Console AN/ASC-6

In July 1964, briefings and demonstrations of the ACTIV-modified console were presented to COMUSMACV, senior advisors, and the CG, US Army Support Command, Vietnam. A decision was made by COMUSMACV that an operational requirement existed for a similar item of equipment for use by each ARVN corps and division. A letter stating this requirement was

forwarded to Department of the Army on 28 July 1964. (See annex D.)

The ACTIV-modified console included a VHF radio (AN/ARC-73) but had no UHF capability. During the evaluation, UHF was being installed in all combat support aircraft in the RVN. It was decided, therefore, that the new console should have a UHF radio (AN/ARC-51) installed. Complete provisions were made for the installation of a VHF radio if needed.

The Lexington Army Depot was designated to build the heliborne command post console based upon the ACTIV-modified design. Fifteen consoles were fabricated at Lexington and are now being successfully employed in all sections of the RVN. The nomenclature of the console is AN/ASC-6. For complete description of console AN/ASC-6 see annex C.

4. Summary

In summary, it was determined that standard avionics radios and antennas are better suited for installation in the HCP than ground radios and antennas. The original console was unsatisfactory for use in the UH-1B helicopter because of its size and weight. The ACTIV-modified console met the HCP requirements of size, weight and ease of installation and removal. The production console AN/ASC-6 meets the requirements for use in the RVN.

C. OBJECTIVE 3 - TECHNIQUES AND PROCEDURES

Techniques and procedures developed during this evaluation are based on the peculiar needs in the RVN. Airmobile operations in the RVN involve ARVN troops, US advisors, US Army aviation units and the Vietnam Air Force (VNAF).

1. Arrival on Station and Flight Patterns

Airmobile operations in the RVN are normally preceded by a VNAF strike on or around the landing zone (LZ). The strike usually lasts from 10 to 20 minutes. Immediately following the VNAF strike, armed UH-1B helicopters perform reconnaissance of the LZ, provide suppressive fires, and escort troop transport helicopters into the LZ. The HCP follows the armed helicopters into the LZ, flies into a position to check the LZ, and is prepared to divert or alter course of the troop lift helicopters, if necessary.

The most effective flight pattern was to circle the LZ at a 1/4-mile range, keeping the ARVN commander and senior advisor facing the LZ. This afforded good observation of the LZ at all times and kept the HCP clear of the other helicopters landing in or departing from the area. If the HCP flew too close to the LZ it was difficult for the command group to observe the overall aspects of the operation. By flying too far from the LZ, observation of movement was difficult.

2. Altitude

Heliborne command post operating altitudes ranged from 500 to 3000 feet. The most effective altitude flown was between 1500 and 2500 feet. At altitudes above 2500 feet it was easy to lose sight of much of the troop movement when the ground was covered with water or when troops were in light foliage. At altitudes below 1500 feet, other aircraft were so numerous that observation by the command group was often diverted from the LZ when the HCP evaded other aircraft. On one operation flown between 500 and 700 feet, abrupt turns were required to avoid tracer rounds crossing the path of the helicopter. The tracers probably were ricochets from armed helicopter fires. Flying the HCP at low altitudes interfered with the armed ships even when no troop helicopters were in the area. When delivering fires in support of ground units, armed helicopters must be permitted freedom of maneuver.

3. Command Post Personnel

In addition to the standard crew, consisting of the pilot, co-pilot, crew-chief (who acts as a second gunner), and gunner, the command and control group varied with commanders' and senior advisers' desires. The CP arrangement was flexible and afforded identical control panels so that personnel and seating positions could be changed. A typical HCP group is shown in figure 3. The command and control personnel seating arrangement is shown in figure 4.

The US Army aviation element commander or the aviation operations officer occupied the co-pilot position so that an additional staff officer could be included in the helicopter command group.

4. Aviation Liaison Officer - Forward Air Controller

The HCP had the capability to communicate with the forward air controller (FAC) as well as with the corps ASOC for coordination of air support. It also afforded the opportunity to give immediate recommendations to the commander and his advisor on the availability of strike aircraft and the suitability of targets and ordnance.

The HCP was found to be ineffective for use by the FAC for three reasons. First, the HCP is a tool for the commander which provides him with the best possible observation of an operation. When a FAC accompanies the commander, neither officer's exact requirements are met. Precise observation required by the FAC is not possible and when the HCP operates for the FAC's use it is not effective for the commander. An ALO to advise the commander and to handle communications with the FAC should therefore be included in the personnel aboard the HCP. Second, the endurance of a helicopter is limited by its fuel supply. When flown to



FIGURE 3. Typical heliborne command post personnel.

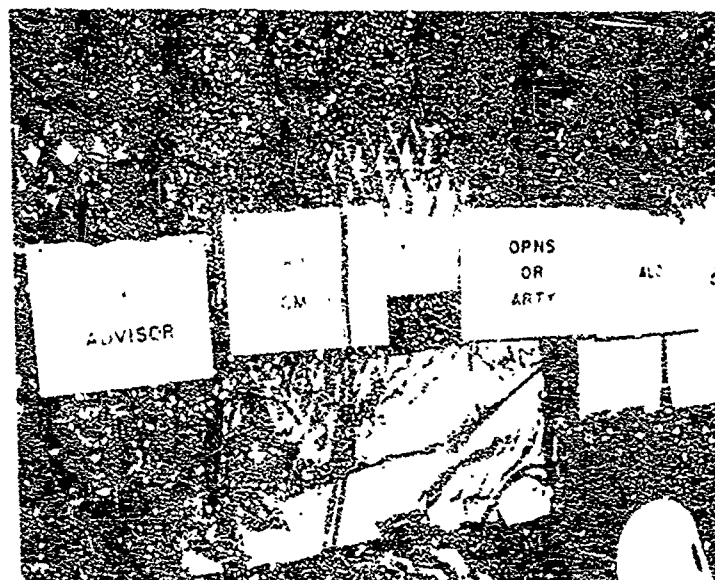


FIGURE 4. Seating arrangement in helicopter.

the operation area early enough to perform the task required of the FAC, the HCP cannot remain on station long enough to continue directing on-call strikes or controlling a normal operation. Third, because of gross weight limitations the HCP does not contain the rocket marking capability required by the FAC.

5. Radios and Frequencies

One of the two FM transceivers was used in the ARVN command net. This allowed the ARVN commander to monitor and use his command net throughout the operation unless he desired to switch to an alternate frequency or higher-headquarters net. The second FM transceiver was used in the US advisor net primarily by the senior advisor to monitor and contact US personnel with the ARVN or in the staging area. Since this was the command net (FM) for US personnel, it was also used by the aviation element commander to control helicopter flights.

The VHF was used in the strike aircraft frequency for the ALO and the aviation element commander to monitor the status and progress of strike and cover aircraft. The ALO used this radio for contacting the FAC.

The HF SSB was used in the corps ASOC net to request strike aircraft as required.

6. Briefings

The radios in the ACTIV-modified console were standard aircraft radios. They were not, however, radios with which the ARVN commander or US advisors were normally familiar. To enable HCP personnel to understand the capabilities and use of these radios, adequate time must be allotted prior to an operation to brief command and control personnel on the console.

7. Summary

Best observation for the command and control group was obtained by flying the HCP in a circular pattern around the LZ at an altitude between 1500 and 2500 feet. The typical command and control group was the ARVN commander, his senior advisor, an artillery advisor, an ALO, the US Army aviation unit commander (co-pilot) and the pilot. For the most effective use of radios by the command group, one FM set was used in the ARVN net and one in the US advisors net; the VHF set was in the "NAF" net; and the HF SSB in the corps ASOC net.

D. OBJECTIVE 4 - ANCILLARY ITEMS

In addition to the radios, there were ancillary items of equipment considered essential for HCP operations. Armor vests were needed for the

command and control group because they were exposed to hostile fire for long periods while over the LZ. A 50-gallon internal fuel cell was mounted under the rear passenger seat to provide the HCP with a longer on-station capability. Tactical ground maps which cover a large area were required in the HCP at all times. The maps were needed because on two occasions the HCP was diverted from one operation directly to another some distance away. There was no opportunity to pick up additional ground maps.

Other items carried in the HCP, but not considered ancillary since they are carried by all helicopters in the RVN, were smoke grenades and an installed UH-1B armor kit.

In summary, a 50-gallon auxiliary fuel cell, complete map coverage of large land areas, and armored vests for the command group are needed in the HCP as ancillary items.

E. OBJECTIVE 5 - HELIBORNE PUBLIC ADDRESS SYSTEM

Determine the usefulness, editability, and effectiveness of a public address set in a helicopter command post to warn noncombatants to vacate threatened areas and to induce surrounded Viet Cong units to surrender.

During the initial phase of the project it was apparent that the speakers and power supply required to meet objective 5, plus command post console and personnel, would raise the gross weight of the UH-1B helicopter beyond safe limits. Accordingly, the requirement for a public address system in the HCP was eliminated and ACTIV conducted a separate evaluation of a loudspeaker system for UH-1 helicopters. Findings were presented in the ACTIV report, "The Heliborne Public Address System for Use in Psywar and Civic Action" (U), dated 10 February 1964.

IV.(U) CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

It is concluded that:

1. The HCP provides the communication and observation required for command and control of combat operations in the RVN.
2. Standard aircraft radios and antennas are better suited for installation in the HCP than ground radios and antennas.
3. The original console was unsatisfactory, while the ACTIV-modified and the production console (AN/ASC-6) both met the requirements for an HCP in the RVN.
4. The HCP is most effectively employed when flown at altitudes between 1500 and 2500 feet above the terrain.
5. The most effective command and control group consists of the ARVN commander, his senior advisor, an ALO, an artillery advisor, the US Army aviation unit commander (co-pilot of HCP), and the pilot.
6. The HCP requires greater flight endurance than troop transport or armed helicopters.
7. Additional protection from small arms ground fire is desirable for the command and control group.
8. The HCP is not suitable for use by the FAC.

B. RECOMMENDATIONS

It is recommended that:

1. The HCP be obtained and used in counterinsurgency operations in Vietnam. (This has been accomplished.)
2. The HCP should be considered for use in conventional warfare.

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(C) ANNEX A

AFTER-ACTION REPORTS

This annex contains short summaries of some operations flown with the heliborne command post. They are not complete studies but are intended to highlight certain activities during tactical operations.

1. OPERATION IN THE DELTA REGION 29 APRIL TO 3 MAY 1963

The 21st Infantry Division stationed at Bac Lieu moved to Ca Mau to establish an operational forward command post. The division was preparing to conduct an operation involving three battalions in An Xuyen Province, northeast of Ca Mau along the coast of the Gulf of Siam. On Monday, 29 April 1963, three battalions began to move into position to start the operation the next day. A Marine battalion was located just north of Lam An, and the airborne and infantry battalions were located in Thoi Binh. Part of the Marine battalion was required to walk westward along the Kinh Bien Nhi canal while another part walked along another canal just to the south. On 30 April, the Marines were ordered to march crosscountry toward the objective area and stop at approximately 1700 hours, short of their first two objectives. On 1 May, while the Marines attacked westward, the airborne battalion was airlifted north of the objective area while the infantry battalion was airlifted into another position south of the objective area. During the heliborne lifts, the Marine battalion attacked along a wide front toward the west. Timing of the heliborne movements, relative to the Marines' attack, became very critical during this phase of the operation.

Eighteen helicopters were employed to air lift the airborne and infantry battalions. Armed escort helicopters accompanied the transport helicopters into the objective area from the troop pickup areas. The helicopters made five lifts including moving the first troops from the Ca Mau area where the reserve units were stationed. This was a difficult lift in that the 16 helicopters from Ca Mau had to rendezvous with 2 helicopters coming from Thoi Binh while approaching the objective.

During the preparation phase, prior to the attack which occurred 1 May, the HCP was used to establish radio (FM) contact with the various battalion advisors to relay coordinating instructions. In some cases, it was necessary to land when the battalion was moving to discuss subsequent operation plans. The HCP during this phase was used to radio requirements to the division advance CP. This system expedited the helicopter movement of badly needed supplies to the respective battalion locations. Frequency modulation radio communication would not have been possible between the unit advisors and the senior advisor at the division CP without the HCP because of the extended distance (22 miles).

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The HCP also had a parallel FM radio system for the ARVN counterpart to reach the division staff and unit commanders. It was not necessary in every situation for the HCP to land for the ARVN staff officer (G3) to relay instructions to the troop commander since the FM radio net always functioned. The heliborne communication facility provided the ARVN CO a quicker means of relaying logistical requirements to the advance CP than did the normal AM net (AN/CRC-9). The AM net was established between the division and subordinate units when they halted. As a result, during 29 and 30 April, the HCP contributed to the positioning of ARVN units, relayed operation plans, requested resupply missions, initiated medical evacuation and performed effectively as a communication relay station.

On 1 May during the attack phase, the HCP greatly enhanced the effectiveness and speed with which the airborne and ARVN battalions were airlifted into their respective objective areas. Precise timing of the heliborne lift and the Marine battalion attack was essential in this phase of the operation. The G3 advisor maintained constant contact with the ground advisors and troop-lifted helicopters to assure that the airlift proceeded smoothly. Radio contact was also maintained with the advisors in the objective area.

Prior to the troop airlift, the G3 advisor made plans with US advisors in Thoi Binh to land only six helicopters per flight. The pickup area was a very narrow road with just sufficient side clearance to land. During the airlift, the G3 advisor kept the advisors with the waiting troops abreast of the situation in the objective area and frequently relayed instructions pertaining to the disposition of the airlift helicopters. As a result, the helicopters shuttled the troops more rapidly and effectively into the objective areas.

During the airlift, the HCP also relayed information pertaining to the operation back to the advance CP and to the individual ground advisors. The HCP stayed over the operation continuously until relieved by another UH-1B.

During subsequent days of the operation, the HCP was used to locate leading elements of three battalions converging on the VC, report their progress to the division CP, relay logistical requirements and provide transportation for visits by the division staff and senior advisors. Prior to the introduction and employment of the HCP the division staff officers seldom made on-the-spot visits to the unit commanders because it took too long to cross the difficult terrain.

Upon conclusion of the operation the HCP made radio contact with the individual unit commanders in order to deliver orders for subsequent operations.

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This operation disclosed that:

- a) The radios in the HCP were reliable and extended the communication distance.
- b) The HCP can provide a communication relay between the ARVN unit commander and the division advance CP.
- c) The HCP allows ARVN staff officers and advisors to affect on-the-spot coordination with ground commanders while airborne or on the ground.

2. OPERATION IN THE DELTA REGION 1 JULY 1964

This operation was staged from a 2,000-foot graded surface runway with fuel tankers available for refueling. Its purpose was to lift an ARVN battalion from the staging area to a landing zone in the rice paddies 12 nautical miles away. It consisted of four lifts with nine helicopters escorted by armed helicopters. No fighter aircraft prestrikes were made on the landing zone.

The operation commenced at sunrise with a light fire team of two armed helicopters moving from the staging area to the LZ. The HCP trailed the armed helicopters to the LZ. The first troop lift was scheduled to depart from the staging area five minutes after the armed helicopters departed. The armed helicopters proceeded to the wrong area, two miles from the intended LZ. The advisor in the HCP contacted the armed ships and directed them to the correct LZ. This caused a slight delay, so while the armed ships were making their reconnaissance of the LZ, the aviation element commander contacted the troop carrying flight and had them orbit four miles south of the LZ.

After completion of the reconnaissance the troop transport helicopters were called into the area and the LZ was marked by the armed ships. Since the first lift received no ground fire, the LZ for the succeeding lifts was moved forward and marked by a smoke grenade dropped from the HCP. All lifts were landed in the LZ as planned with only one instance of ground fire being received.

The armed ships were assigned an altitude from 0 to 500 feet above the terrain, the HCP 500 to 700 feet, and the transport helicopters 1500 feet enroute between the staging area and the LZ. The HCP had to make abrupt changes in direction to avoid tracer fire in its path and to avoid coming too close to other aircraft. It is believed the fire was ricochets from the armed ships firing from a position under the HCP.

The HCP remained on station throughout the four lifts and landed in the LZ between the third and fourth lift to allow the ARVN commander to talk to his troop commanders. The HCP notified the armed helicopters

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of its intention to land in the LZ and they covered it and maintained radio contact while it was in the LZ. One gunner remained near the command group while they were moving about the LZ talking to unit leaders. Approximately five minutes were spent on the ground in the LZ.

After completion of the four lifts, the troop transport helicopters and the HCP returned to the staging area while a fire team of armed ships was left on station to render support to the ground units. The airlanded units did not contact the enemy. Thus, movement of the reserve forces was not required and the mission was terminated. After termination, the HCP was used by the ARVN regimental commander to contact and coordinate with 2 battalion commanders on an operation 25 miles away.

This operation disclosed that:

- a) The HCP carries the capability for marking an LZ when the situation requires.
- b) Aviation commanders can control airborne flights and change LZ's during the course of an operation.
- c) The CP, mounted in a helicopter, affords a commander and staff the opportunity to land in the LZ and make personal contact with unit commanders.
- d) The HCP should be flown at an altitude higher than 500 to 700 feet above the terrain in order not to be in the flight path of the armed helicopters.

3. OPERATION IN THE TAY NINH AREA 10 SEPTEMBER 1964

This operation was staged from an airfield 1700 feet long, with fuel tankers available for refueling. The original plan of the operation called for an ARVN unit to move into position by boat and take up blocking positions along a river. One company of an aviation battalion reinforced by helicopters from the airlift platoon was to airlift three strike force companies across the river to attack through a Viet Cong held area and force the enemy into the blocking force.

During the night preceding the operation the boat-transported unit came under attack as it was moving up the river and could not proceed. The morning of the operation, the HCP, the airlift platoon, a helicopter ambulance, and an armed helicopter platoon arrived at the staging area. The helicopter company scheduled to provide the main lift could not depart from their home base because of ground fog and low ceilings. The operation was delayed approximately three hours awaiting the arrival of the fog-bound airlift company.

During initial reconnaissance in the vicinity of the LZ by the HCP, a group suspected to be Viet Cong were noticed moving towards some

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houses. With the preplanned operation cancelled, a plan was quickly substituted to lift a small group of the strike forces into the area where the suspected VC were spotted.

Since the condition of the area and its population was unknown, the special forces advisors recommended against a prestrike on the area or fire support from armed helicopters or transport helicopter gunners unless fire was received.

The new plan used four helicopters from the airlift platoon, escorted by the armed platoon. It required four lifts into an LZ to be selected in flight by the command and control group in the HCP.

The armed ships departed from the staging area followed by the HCP with the troop transports ordered to follow three minutes later. The armed ships made a reconnaissance of the LZ and received no ground fire. The troop transports were cleared into the LZ. Almost immediately the air-landed troops received fire from a woodline to their right flank and were given suppressive fire support by the armed helicopters. The three remaining lifts were brought into the LZ. Since the area of operation was known to be VC infested and the force consisted of only 125 troops, the HCP remained on station approximately five hours, departing only long enough to refuel and return.

The movement of the ground unit was directed and controlled almost entirely by the HCP since there were no preplanned objectives or routes of movement. Because of the last minute change of plans, units, and commanders, the personnel designated to be in the command and control group were not thoroughly briefed in the use of the console radios prior to departure from the staging area. It took considerable time for the crew to brief the advisor while airborne and he was limited in his use of the HCP during the initial landing phases. The first time the HCP returned to the area for fuel the personnel were thoroughly briefed on the radios and they used them much more effectively in the next phase of the operation.

Since the advisor on the ground was unable to contact the armed helicopters, the HCP was used to relay requests for fires and kept the armed ships aware of the disposition of the friendly troops at all times. Two advisors' requests for ammunition were relayed by the HCP. Both requests were acted on and additional ammo was airlifted into the LZ.

As late afternoon approached the weather deteriorated and the command and control group decided to withdraw the ground force from the LZ and return it to the staging area. The four troop transports were called forward and briefed on the LZ while enroute. The ground force was halted and briefed.

After withdrawing the second lift, the advisor decided to land in the LZ and make final coordination for the withdrawal of all personnel because anyone left behind would probably fall into VC hands. The armed

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ships were notified of the intent to land the HCP in the LZ and were requested to provide cover. The HCP remained in the LZ approximately 15 minutes until the third lift had been completed. At this time loud explosions were heard and the armed ships radioed the HCP that some type of artillery was being fired into the outer edge of the LZ. The command and control group returned to the HCP and took off. The incoming rounds were believed to be 60mm mortar rounds. The armed ships found a suspected mortar position and destroyed it with rockets. The fourth and final lift was executed and the operation terminated.

This operation disclosed that:

- a) With the command and control group aboard the HCP, plans can be formulated and landing zones selected while airborne.
- b) The HCP can control and coordinate movement of a ground force.
- c) Personnel using the HCP for the first time must be thoroughly briefed and instructed in its use prior to departure from the staging area.
- d) The HCP can be landed in the LZ to afford personal contact with the unit commanders but it should not remain in the LZ for extended periods of time as it becomes a prime target. With key personnel aboard, it should not land in unsecured areas.

4. OPERATION IN THE DELTA REGION 2 SEPTEMBER 1964

This operation was staged from a graded surface runway 1700 feet long, with fuel tankers available for refueling. The operation consisted of moving ground forces into blocking positions on three sides of an area reported to contain a VC unit. An ARVN battalion was to be airlanded to the north of the position with the mission of attacking south and forcing the VC unit into the blocking forces. The ARVN unit was to be moved in three lifts by an aviation battalion using troop transport helicopters of two companies, supported by two platoons of armed helicopters. Vietnam Air Force fighter aircraft performed a prestrike on the area for 15 minutes. Immediately after the prestrike the armed helicopters, followed by the HCP, arrived on station and began their reconnaissance and suppressive fires. The landing zone was marked with smoke by the vector control aircraft which led the helicopter flights into the LZ.

An ARVN unit moving up from the south to a blocking position encountered VC estimated at platoon strength. The ALC coordinated with the FAC and had overhead cover aircraft make strikes to the south on the VC position. The aviation element deputy in the HCP notified the transport helicopters of the fighter strike and altered their flight route around the strike area.

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The ARVN commander received word from his ground unit that they were unable to contact the armed helicopters delivering suppressive fires as they were moving through the operational area. The ARVN commander and his advisor discussed this with the aviation element deputy and asked if he could ascertain the trouble. The aviation deputy contacted the armed ship flight leader and found that no aircraft in the armed flight was on the ground unit's frequency. Immediately one of the armed helicopters changed to the ground unit frequency and received requests for fires on the areas designated by the ground commander.

This operation disclosed that:

- a) Helicopter flights can be diverted or rerouted while airborne by the HCP.
- b) Coordination can be accomplished for fighter aircraft support from the HCP while airborne.
- c) Immediate coordination between command, advisor, and aviation elements can be accomplished since key personnel of each group are aboard the HCP.

5. OPERATION IN THE DELTA REGION 28 JULY 1964

This operation was staged from a sod runway 2000 feet in length with fuel trucks available for refueling. It consisted of moving an ARVN battalion with an aviation battalion from the staging area to an LZ. The HCP was not used for command and control during this operation.

The HCP carried three senior military advisors and their escort officers on the operation. The HCP helicopter arrived on station to observe a 20-minute prestrike by VNAF fighter aircraft. The prestrike was followed by armed helicopters performing reconnaissance and suppressive fires for five minutes. The lifts were made into the LZ without difficulty. Armed helicopters continually placed fire on the suspected VC position in a tree line as the ground units advanced. The HCP was initially flown at 3500 feet above the terrain. Observers were unable, however, to follow the troop movement on the ground from this height. The flight level was reduced to altitudes varying between 1500 and 2500 feet to afford better observation. The observers used the radios in the console to monitor transmissions of the different elements involved in the operation and were able to keep abreast of the situation.

After departing from the LZ area, the senior military observers were flown to the staging area to observe operations there and then to the division advance CP for a briefing on the progress of the operation.

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This operation disclosed that:

- a) The HCP is an effective vehicle for senior military personnel to monitor radio commands and observe operations.
- b) The flight level flown should be high enough to enhance survivability while circling the LZ area but low enough to afford adequate observation of the ground units without obstructing the missions of other aircraft.

6. OPERATIONS WITH AN/ASC-6 15 NOVEMBER 1964 TO 15 MARCH 1965

From 15 November 1964 to 15 March 1965 13 AN/ASC-6 heliborne command post consoles have been successfully used in all sections of the RVN from Da Nang in the north, to the central highlands between Pleiku and Qui Nhon, to the Mekong Delta in the south. Commanders state that the HCP is currently being used on approximately 90 percent of all assigned missions.

ANNEX A

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(U) ANNEX B

ENVIRONMENT

The Republic of Vietnam (RVN) occupies a crescent-shaped area of 67,000 square miles on the southeastern edge of the Indochina Peninsula.

The area may be divided into four distinct geographical regions: the highlands of the north and central portion, the coastal plains, the plateaus of the central highlands, and the Mekong Delta plain in the south. (See figure B-1.)

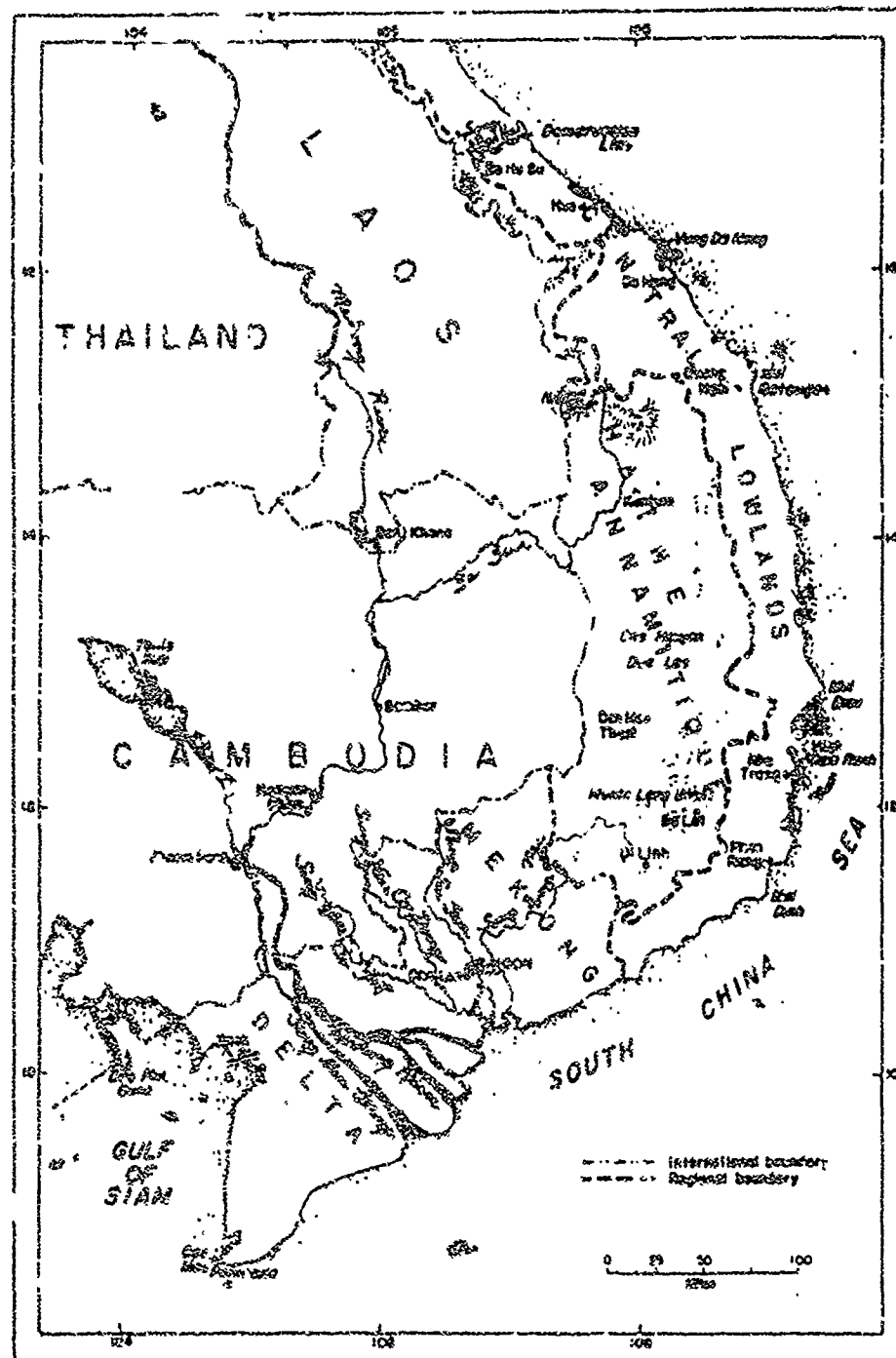
1. TERRAIN

The highlands region is dominated by a chain of broken mountains and rugged hills that terminate on the northern edge of the delta plain about 50 miles north of Saigon. These mountains are characterized by steep slopes, sharp crests, narrow valleys, and dense vegetation.

The coastal plain, varying from 10 to 25 miles in width, extends along the coast from the northern boundary to the Mekong Delta plain in the south. In general, the area is characterized by sandy beaches and dunes, backed up by rice paddy fields and marshes that extend to the mountains. Ground movement restrictions in the cultivated portions of the coastal plain are almost identical with those of the delta.

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 dense tropical forest and jungles. The southern portion is typical savannah country, with large open expanses covered by tropical grasses and open forest. Ground movement in the northern plateau is restricted to roads and trails, as the dense vegetation prevents rapid off-road movement.

The southern quarter of the country is a large plain formed by the rivers Hau Giang, Mekong, Vam Co, Saigon, and Dong Nai. The Mekong, after it splits into four branches, and the Hau Giang flow directly into the South China Sea. The Vam Co and the Dong Nai enter the Saigon before it reaches the sea. In addition to these major tributaries, the area is cut up by a great number of smaller streams and a dense network of canals. The plain is relatively flat with few spots exceeding an elevation of 20 feet above sea level. It is a very fertile and highly cultivated land. More than 9,000 square miles of delta land are under rice cultivation. Drainage is effected chiefly by tidal action which differs greatly from place to place. During the rainy season, a major portion of the entire area is inundated.



(U) FIGURE 2-1. Geographical regions, RVN.

2. WEATHER AND CLIMATE

The climate is hot and humid, subtropical in the north and tropical in the south where the monthly mean temperature is 80 degrees Fahrenheit throughout the year. The monsoons, blowing generally from the southwest in summer and from the northeast in winter, profoundly influence the climate and rainfall.

During the summer monsoon, heated air rises from the Gobi Desert and causes moist air to flow inland from the sea, depositing heavy rainfall in its wake.

The annual rainfall is heavy in all regions and torrential in many. It is heaviest at Hue which has an annual average of 128 inches. The low of 28 inches at Koi Binh results from the presence of a barrier of hills in the area. At Saigon, rainfall averages 80 inches. (See figure B-2.)

3. FLIGHT CONDITIONS

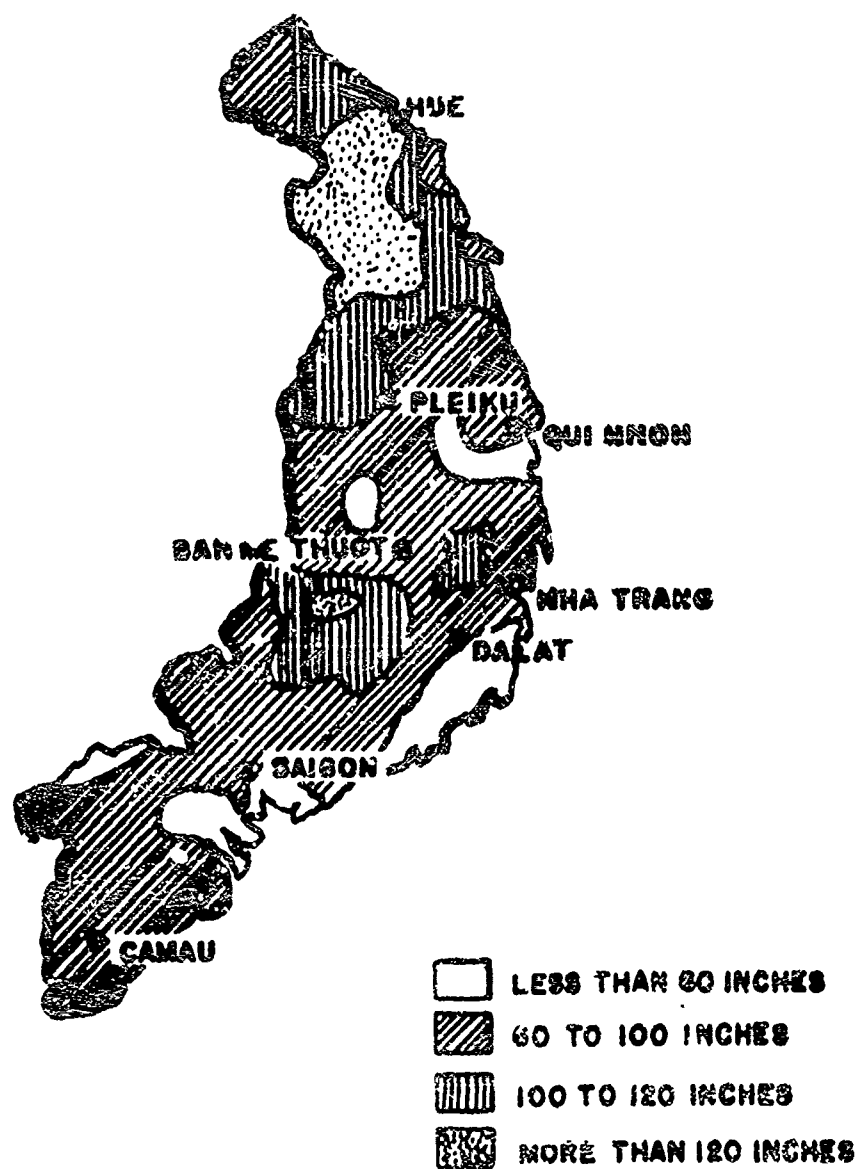
The evaluation was conducted in the delta region which is favorable for helicopter operations during most of the year. During the rainy or monsoon season, operations may be curtailed because of ground fog or low ceilings. Delays of up to three or four hours have been encountered. The rainy season brings numerous thunder-showers to the delta region. They can normally be circumnavigated unless they actually obscure the landing zone or staging areas.

4. PEOPLE

The RVN has a population of approximately 15.7 million people largely concentrated in the eastern coastal plain and the Mekong Delta. The highland region, which comprises more than half of the total area of South Vietnam, is sparsely populated.

South Vietnam has an average population density of 234 per square mile. About 10 percent of the people reside in urban areas. The other 90 percent live on the 13 percent of the land which is best suited for rice cultivation: the delta and the small river basins in the central lowlands. Portions of these regions have populations of over 2000 per square mile and compare in density to the most populous regions of the Yangtze Valley of China.

Overall, population density ranges from 2,000 persons per square mile in the Province of Quang Nam (in the north) which includes the important city of Da Nang, to 13 persons per square mile in Quang Duc Province in the plateau area of the Chaine Annamitique. The Mekong Delta area, 26,200 square miles in extent, has a population density of 522 per square mile. The delta is very densely populated along the rivers and



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

canals which crisscross it, but in many areas where the soil is less usable, it is sparsely settled.

The portion of the Chains Annamitiques lying within South Vietnam, an area of 16,000 square miles, has a population of only 584,000 people, most of them members of scattered mountain tribes who subsist on hunting, fishing, and slash farming. The extensive forest and rich soils of the area could support a much larger population, but the high prevalence of malaria has curtailed settlement.

(U) ANNEX C

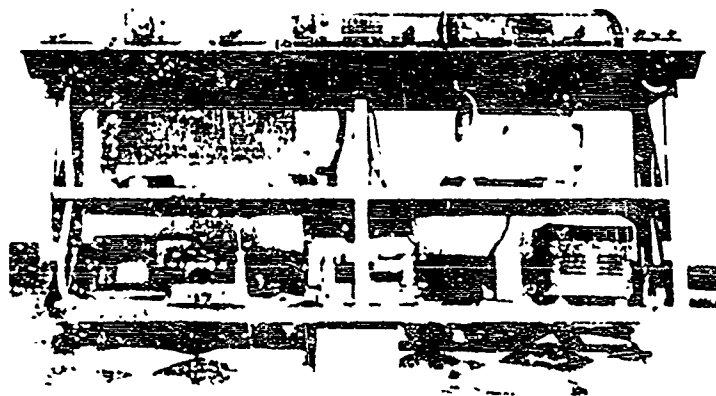
EQUIPMENT

1. THE ORIGINAL CONSOLE

The original communications equipment for the HCP consisted of two FM, one VHF, and one HF SSB radios mounted in a table-type console. Its dimensions were 70 inches long, 36 inches high, and 30 inches deep and it weighed 375 pounds. (See figure C-1.)

2. THE ACTIV-MODIFIED CONSOLE

The ACTIV-modified console contained two FM, one VHF, and one HF SSB radios with control panels, five control stations, and five headset jacks. (See figure C-2. Control station number 5 is on the pilot side of the console.) This equipment, less the HF SSB radio, was configured in a package 36 inches wide, 31 inches high and 35 inches deep. The total console weight was 163 pounds. The SSB radio (weight 91 pounds) was installed in the aft cargo compartment. Total weight of the ACTIV-modified installation was 254 pounds, a saving of 121 pounds over the original console.



(U) FIGURE C-1. Original console.

The console had a control panel facing the command group with a control station for each occupant (figure C-2). The control station allowed each occupant to monitor singly or simultaneously all four radios. Transmissions could be made on all four radios simultaneously but only one user at a time could transmit on the same radio. It incorporated an intercommunication system integrated with the intercom of the helicopter which permitted conversation with the crew or use of the private intercom system in the console. The control panels of the four radios were also accessible to the occupants for changing frequency or adjusting volume or squelch controls.

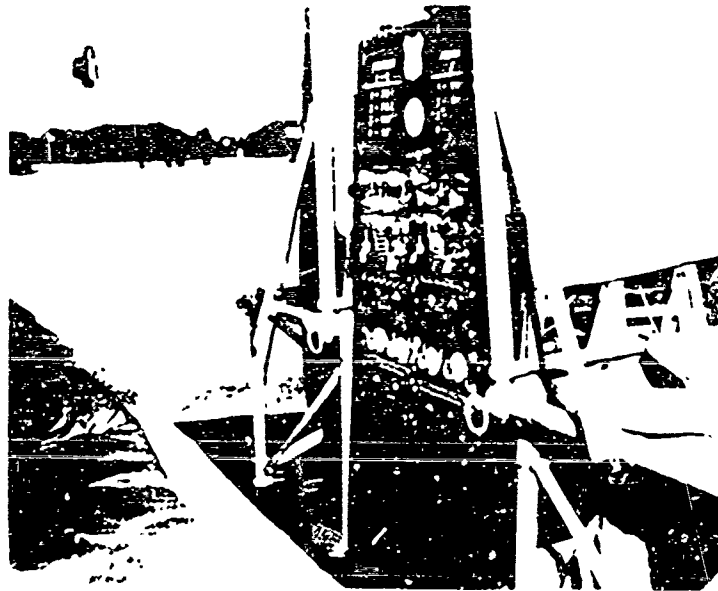
The console was installed between the single-place seats, thus providing space for two gunners. (See figure C-3.)

The console used the regular power output of the helicopter and required no additional generators. Power cables and antenna leads were equipped with quick-disconnect units to facilitate rapid installation and removal. The package was constructed to fit existing tiedown brackets and could be installed or removed by two men in five minutes.

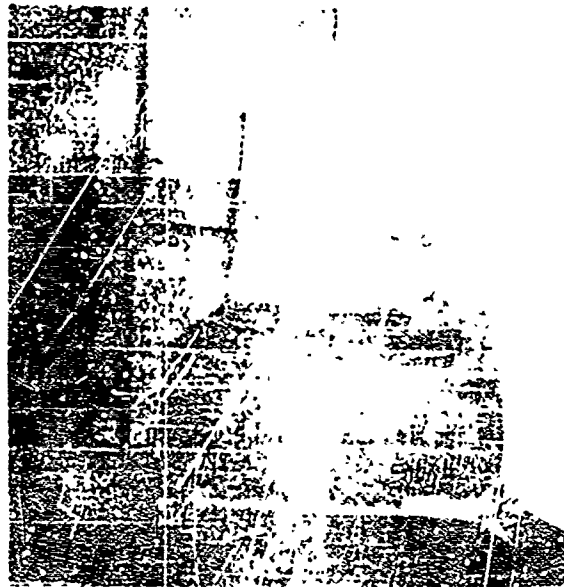
In addition to the four control stations facing the command group, one was located on the rear of the console facing toward the pilot and co-pilot. (See figure C-4.) This permitted the co-pilot, normally the aviation element commander, to use either the console or the aircraft radios.



(U) FIGURE C-2. ACTIV-modified console (front panel).



(U) FIGURE C-3. ACTIV-modified console mounted in UH-1B.



(U) FIGURE C-4. ACTIV-modified console (pilot panel).

The ACTIV-modified console used the same antenna installation as the original console. The long-wire HF SSB antenna was installed on the underside of the tail boom. (See figure C-5.)

Two FM antennas were mounted, one on the left and one on the right helicopter skid and attached to the aircraft frame just forward of the cargo doors. (See figure C-6.)

The VHF antenna for the console radio was mounted forward of the rotor mast on top of the cabin compartment when the ACTIV-modified console was used. The VHF antenna for the AN/ASC-6 was mounted on the underside of the tail boom. (See figure C-7.)

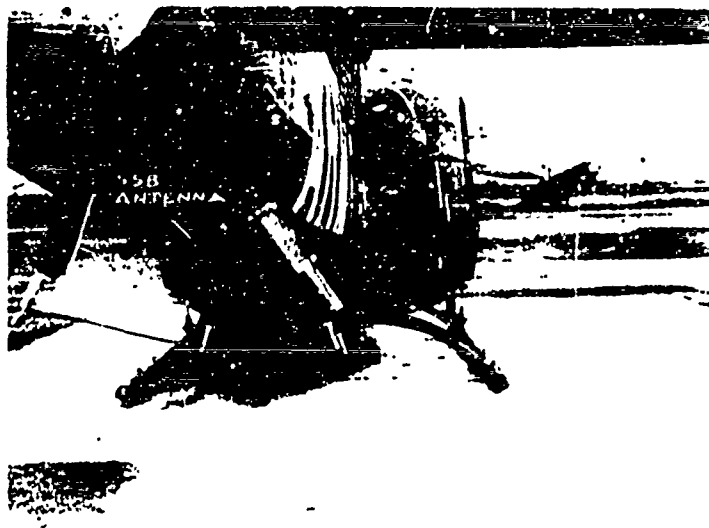
3. COMMUNICATIONS CONSOLE AN/ASC-6

The AN/ASC-6 is 32-1/2 inches in length, 17-1/2 inches in width, and 33-1/2 inches in height. It weighs approximately 180 pounds with components and 61 pounds less components. Instructions on the use of the AN/ASC-6 are published in a manual of the US Army Electronics Command, Fort Monmouth, New Jersey, title: "Instruction Manual (Installation, Operation, and Maintenance) Communications Central AN/ASC-6," dated 28 October 1964.

Mounting holes in the console and tiedown fastenings in the helicopter secure the console to the helicopter. The lower rear section of the console contains three radio sets: two AN/ARC-44's (FM-1 and FM-2) and one AN/ARC-51 (UHF-AM). The upper rear section contains two AN/ARC-44 dynamotors (DY-107/AR) and a storage compartment for the headsets H-101(*)/U and detachable cables.

The upper portion of the front panel (figure C-8) is contoured into a control panel that contains operator stations 1 (gold), 2 (red), 3 (green), and 4 (violet). Each operator station is equipped with an interphone selector (C-1611(*)/AIC and headset (H-101(*)/U) connecting cord. The H-101(*)/U connecting cords protrude from grommets located below the console control panel. Each H-101(*)/U connecting cord terminates into a U-94A/U connector plug which contains a press-to-talk switch, a spring clip with which the operator can anchor the U-94A/U to a convenient location on an article of clothing, and a receptacle into which the operator plugs the H-101(*)/U. Each spring clip has a color-coded plate that matches the color-coded plate adjacent to the applicable station number plate on the control panel. In addition, the console control panel contains the FM-1 control panel above operator station 1 and the FM-2 control panel above operator station 2. The lower front portion of the console contains the intercommunication junction box which is covered with a removable access cover.

The top of the console has a control panel that slopes toward the front of the console. This sloping control panel contains the controls



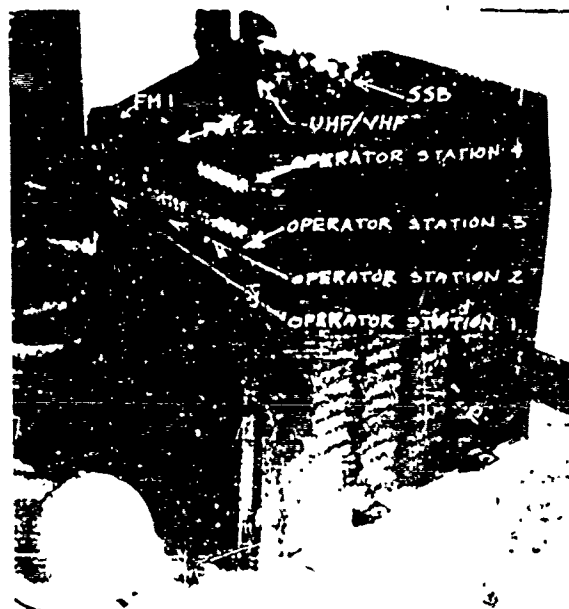
(U) FIGURE C-5. Long-wire HF SSB antenna.



(U) FIGURE C-6. FM antenna.



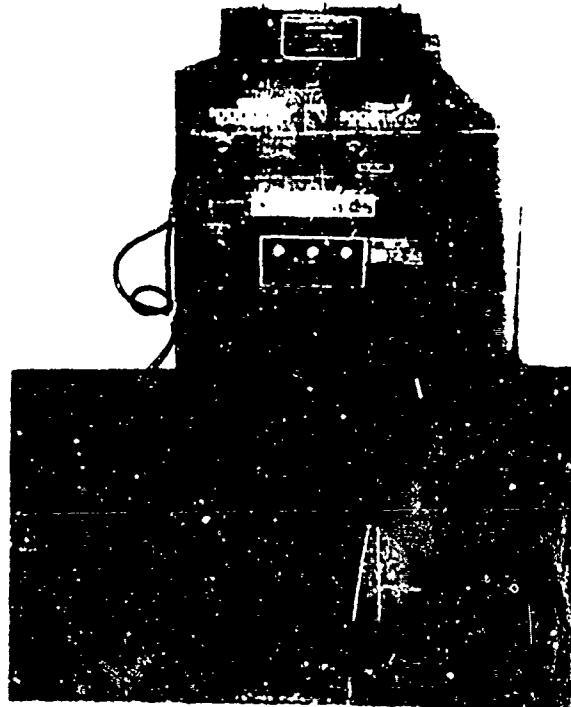
(U) FIGURE C-7. VHF antenna.



(U) FIGURE C-8. AN/ASC-6 console (top and front panel view).

for the AN/ARC-51 (UHF), AN/ARC-73A (VHF), an 8-day clock, and space for installing the AN/ARC-102 control panel. When the console is installed in a helicopter that contains radio set AN/ARC-102, the AN/ARC-102 control panel (control radio set C-3940/ARC-94) is removed from its normal location on the helicopter control pedestal and is installed in place on the top sloping control panel of the console.

The upper portion of the pilot panel (figure C-9) of the console contains two C-1611(*)/AIC's for operator stations 5 (blue) and 6 (copper). The power light is located between the two C-1611(*)/AIC's. Two H-101(*)/U connecting cords (terminated with connector plugs U-94A/U) protrude from grommets located adjacent to the C-1611(*)/AIC's. These H-101(*)/U connecting cords also have spring clips with color-coded plates that identify the applicable operator station. Directly below the two C-1611(*)/AIC's is the main switch and four circuit breakers. Below the circuit breakers are three antenna connectors and the ARC-102 connector. The radio junction panel is located on the lower portion of the rear panel and is covered with a removable access cover.



(U) FIGURE C-9. AN/ASC-6 console (pilot panel view).

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(C) ANNEX D

OPERATIONAL REQUIREMENT AND REQUEST FOR FABRICATION

This annex contains a copy of a letter dispatched by Commander, US Military Assistance Command, Vietnam on 28 July 1964 stating an operational requirement for and requesting fabrication of consoles for heliborne command posts for use by the ARVN corps and division commanders.

HEADQUARTERS
UNITED STATES MILITARY ASSISTANCE COMMAND, VIETNAM
APO San Francisco 96243

MACJOD

28 July 1964

SUBJECT: Requirement for Materiel Applicable to Counterinsurgency and Remote Area Conflict (Heliborne Command Post)

TO: Assistant Chief of Staff for Force Development
Department of the Army
The Pentagon
Washington, D.C. 20310

1. Reference: Letter AGAM-P (M) FOR, Headquarters, Department of the Army, subject: Quick-Reaction Procedures to Improve Meeting Requirements for Materiel Applicable to Counterinsurgency and Remote Area Conflict, dated 14 June 1963.

2. In operations it is necessary for the commanders and advisors to have a capability to communicate with each other and their organizations from a single heliborne CP. This communication capability must provide for air-to-ground and air-to-air for ARVN, VNAF, US Army Aviation, USAF, and US Advisory personnel. The requested heliborne command post communication console will provide a capability of controlling and coordinating ground forces, tactical air, Army aviation, artillery, and support activities.

3. The urgency of this requirement precluded a long-range design and development program. Immediate design and fabrication using standard items of equipment is required. A console has been designed and tested by the Army Concept Team in Vietnam. The ACTIV design will require engineering verification but should permit almost immediate fabrication.

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4. This requirement meets the criteria for modified processing as established by letter referenced in paragraph 1. Inclosure 1 details the general and specific requirements for the command post console. Inclosure 2 contains background data on technical feasibility of the console. The soundness of the operational concept and the technical feasibility of meeting this requirement have already been demonstrated.

5. Request that your office take appropriate action to process this requirement as a matter of urgency.

1 Incl
as

s/W. C. Westmoreland
t/W. C. WESTMORELAND
Lieutenant General, USA
Commanding

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MATERIEL REQUIREMENTS FOR HELIBORNE COMMAND POST Part 1 - General Requirements

1. This requirement for materiel is applicable to counterinsurgency and remote area conflict.

2. Description of the required materiel. A small, durable, light weight console package of airborne communication radios for installation in UH-1B type helicopters. Its primary role is for communications of a commander, staff, advisor, and air liaison officer in controlling air and ground elements against insurgents. The console should fit easily into the cargo compartment of the helicopter with no change to the aircraft configuration except for antenna installation. With the console installed in the helicopter the aircraft must remain within Center of Gravity limitations and under the aircraft maximum gross weight limits with a total of eight personnel aboard. There should be additional fuel in the aircraft to allow the control ship to arrive on station prior to troop transportation in airmobile operations, remain to control ground movement, and depart after succeeding flights of troop carrying helicopters. The radios and antennas used in conjunction with the console should be standard military equipment for ease in repair and or replacement. The console needs to be a small enough package so as not to obstruct the view of the personnel seated in the rear of the cargo compartment.

3. Recommended Priority

This is an urgent and immediate operational requirement for control of ground and air elements and as a decision making command post for use in controlling quick-reaction forces. This requirement should be considered for a 1-A priority.

4. Basis for Requirement

The command and control of combined forces operations. It is required to give adequate communication capabilities during operations for the Vietnamese commanders, the US advisors, air liaison officer, artillery or operations personnel, and the troop carrying aviation commander.

5. Organization Which Will Employ the Heliborne Command Post

The heliborne command post will be used in aircraft supporting the Vietnamese II, III, and IV Corps, and each Vietnamese division. Proposed allocation is one HCP per division and corps headquarters. The CP aircraft will normally operate in support of air and ground operations within their respective division or corps tactical areas.

Incl 1

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6. a. The requirement is for 15 consoles with radios, wiring antennas and installation kits. 15 additional sets of antennas (less the AN/ARC-102 antenna) and installation kits are required for installation on alternate helicopters.

b. Delivery of the consoles is required as soon as possible and no later than 120 days.

Part II - Specific Requirements

1. Size

a. The maximum acceptable size is 35" x 31" x 26".

b. The console should be able to be placed between the attendants' seats with the seats in the helicopter.

c. It should be small enough in size as not to restrict view.

2. Weight

The console should not exceed 165 lbs. with the AN/ARC-102 radio installed separately in the helicopter aft compartments.

3. Capabilities

a. The console should contain two AN/ARC-102 FM radios, one AN/ARC-51 UHF radio, control and wiring to one AN/ARC-102 SSB radio separately installed in the aft compartments of the helicopters.

b. There should be an intercommunications system for the personnel connected into the console for their use and for contact with the aircraft crew.

c. There should be the capability of monitoring all radios or only specific radios as desired.

d. The console should have five control positions and connection points for standard headset-microphones for Army aircraft. Four of the control positions accessible to personnel sitting on the rear seat in the cargo compartment and one accessible to the co-pilot position in the cockpit.

e. All five positions should have selective control of the two FM, one UHF, and one SSB radio(s).

4. Characteristics

a. The console should be easily installed or removed in not to exceed five minutes with a two man crew.

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b. The wiring and connections should be of standard military issue for ease of maintenance and capable of withstanding abuse and vibrations associated with the UH-1B helicopters.

c. Selective switches should be guarded to prevent accidental movement.

d. The console should be designed so that a 50-gallon auxiliary fuel cell can be installed under the rear seat in the cargo compartment or for external skid mounted auxiliary drop tanks.

5. Aircraft Avionics

The minimum essential aircraft communication and navigation equipment needed in addition to those radios installed in the console, follows:

- a. AN/ARC-44 (FM) Radio Set
- b. AN/ARC-51 or 55 (UHF) Radio Set
- c. T-366A/ARC (VHF) Receiver
- d. AN/ARC 30D (VHF) Transmitter
- e. AN/ARN 59 (1) Radio Compass
- f. LD448 Radio Compass Indicator
- g. MA-1 Gyromagnetic Compass
- h. SB-329/AR (2 ea Intercom)

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(U) ANNEX E

EQUIPMENT FAULTS

1. DEFICIENCIES

a. None

2. SHORTCOMINGS

b. None

3. CORRECTED DEFICIENCIES

<u>Deficiency</u>	<u>Corrective Action</u>	<u>Remarks</u>
a. The original console was too large and too heavy.	ACTIV modified the console by eliminating the map board and table and placing the SSB radio in the aft luggage compartment, thus reducing the weight to 163 pounds and the size to 35" x 31" x 26".	This reduced-size console allowed for the replacement of the single-place seats normally occupied by the two gunners.
b. Positioning of the original console placed the aircraft in a forward center of gravity condition.	The ACTIV-modified console was designed to fit between the single-place seats. The reduce weight and the placement of the SSB radio in the aft luggage compartment placed the aircraft within center of gravity limits.	The size and weight of the ACTIV-modified console and the use of quick disconnect units on power lines and antennas leads provided a quick change console capability.

4. PREVIOUS DEFICIENCIES

Not applicable.

(U) ANNEX F

REFERENCES

1. Manual, Department of the Army, September 1963, title: "US Army Area Handbook for Vietnam."

2. Letter, MACJ2II Ser 01403, Headquarters, United States Military Assistance Command, Vietnam, 18 December 63, subject: Evaluation of a Heliborne Command Post.

3. Letter, JRATA, Ser 0601, Headquarters, United States Military Assistance Command, Vietnam, 1 June 1964, subject: Evaluation of a Heliborne Command Post (U).

4. Letter, ACTIV-LC, US Army Concept Team in Vietnam, 15 April 1963, subject: Proposed Test Plan - Heliborne Command Post (U) with 1st and 2d indorsements.

5. Letter, ACTIV-LC, US Army Concept Team in Vietnam, (To: ACTIV LnO, ACSFCR), 27 May 1963, subject: Heliborne CP .

6. Message, CINCPAC, DTG 02034Z July 63.

7. Message, DA 930054 from ACSFCR/DOT DOI, 091477Z July 1963.

8. Memorandum, ACTIV-LC, Army Concept Team in Vietnam, (To: JRATA), 29 April 1964.

9. Report, Army Concept Team in Vietnam, 10 February 1964, titled: "The Heliborne Public Address System for Use in Psywar and Civic Action (U), (16 May 1964 to 1 January 1,64)."

(U) ANNEX G

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11. SUPPLEMENTARY NOTES None		12. SPONSORING MILITARY ACTIVITY US Army Combat Developments Command Fort Belvoir, Virginia	
13. ABSTRACT The purpose for the heliborne command post (HCP) project was to determine the concepts for employing a helicopter as an aerial command post in counterinsurgency operations in the Republic of Vietnam (RVN). (U) The console for the HCP was designed and fabricated using a selected group of radios which was placed into a helicopter equipped with special antennas. The HCP was used by ground commanders and their staffs for command and control of combat operations. The HCP was flown on 20 documented combat operations under varying terrain, weather, and operational conditions. The function of the radios and the personnel in the HCP were observed and recorded by evaluators from ACTIV. Additional data were gathered by interview and discussion with key personnel at all levels. (U) The HCP provides the ground commander with an effective means for controlling combat operations. The HCP command group can coordinate and control the airmobile forces, ground forces, and all support elements including artillery and Air Force fire support. (U) Prior to completion of the evaluation it was recommended by Commander, US Military Command, Vietnam that the HCP be obtained and used in counterinsurgency operations in Vietnam. Fifteen consoles were requested for issue to the aviation battalions on the basis of one per Army of the Republic of Vietnam corps and division supported and a maintenance float of two. These consoles are now operational in all areas of the RVN. (U)			

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