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TACTICAL AIRLIFT IN SEA

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PROJECT CHECO
Contemporary Historical Examination of Current Operations
REPORT

TACTICAL AIRLIFT IN SEA

15 FEB 72

HQ PACAF

Directorate of Operations Analysis
CHECO/CORONA HARVEST DIVISION

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Prepared by:

MAJ RONALD D. MERRELL

Project CHECO 7th AF, DOAC

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14. ABSTRACT

Project CHECO was established in 1962 to document and analyze air operations in Southeast Asia. Over the years the meaning of the acronym changed several times to reflect the escalation of operations: Current Historical Evaluation of Counterinsurgency Operations, Contemporary Historical Evaluation of Combat Operations and Contemporary Historical Examination of Current Operations. Project CHECO and other U. S. Air Force Historical study programs provided the Air Force with timely and lasting corporate insights into operational, conceptual and doctrinal lessons from the war in SEA.

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PROJECT CHECO REPORTS

The counterinsurgency and unconventional warfare environment of Southeast Asia has resulted in the employment of USAF airpower to meet a multitude of requirements. The varied applications of airpower have involved the full spectrum of USAF aerospace vehicles, support equipment, and manpower. As a result, there has been an accumulation of operational data and experiences that, as a priority, must be collected, documented, and analyzed as to current and future impact upon USAF policies, concepts, and doctrine.

Fortunately, the value of collecting and documenting our SEA experiences was recognized at an early date. In 1962, Hq USAF directed CINCPACAF to establish an activity that would be primarily responsive to Air Staff requirements and direction, and would provide timely and analytical studies of USAF combat operations in SEA.

Project CHECO, an acronym for Contemporary Historical Examination of Current Operations, was established to meet this Air Staff requirement. Managed by Hq PACAF, with elements at Hq 7AF and 7AF/13AF, Project CHECO provides a scholarly, "on-going" historical examination, documentation, and reporting on USAF policies, concepts, and doctrine in PACOM. This CHECO report is part of the overall documentation and examination which is being accomplished. It is an authentic source for an assessment of the effectiveness of USAF airpower in PACOM when used in proper context. The reader must view the study in relation to the events and circumstances at the time of its preparation--recognizing that it was prepared on a contemporary basis which restricted perspective and that the author's research was limited to records available within his local headquarters area.

ERNEST C. HARDIN, JR., Major General, USAF
Chief of Staff

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ABOUT THE AUTHOR

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FOREWORD

Tactical airlift supported ground forces which operated in a land where jungles, flooded rice fields, mountains, poor roads, monsoon climate, and enemy activity made other means of supply difficult or impossible. Although such conditions and topography restricted conventional mobility, airlift made the difference and provided the greatest mobility in the history of warfare. Rapid repositioning of forces, rather than retaining large reserves, characterized the tactics employed. Virtually every type of ground unit had been moved into combat and supported logistically by air. General Abrams, Commander of U.S. forces, considered a unit not in contact with the enemy as a potential reserve force--it could be moved by air where needed in minimum time.

Tactical Airlift in SEA is the final of a series of CHECO reports concerning tactical airlift operations in Southeast Asia. The first report, Assault Airlift Operations, February 1967, traced the development of tactical airlift capability from its inception through June 1966 (growth, equipment, support, facilities, and personnel). Tactical Airlift Operations, June 1969, discussed the background of the organization, command and control, materiel problems, and aerial port operations in SEA. The tactical airlift role was further delineated in Forward Airfields for Tactical Airlift in SEA, June 1970; USAF Aerial Port Operations in RVN, August 1970; The Siege of Ben Het, August 1969;

The Battle for Dak To, June 1968; The Defense of Dak Seang, February 1971; Commando Vault, October 1970; The Cambodian Campaign, 29 April - 30 June 1970, September 1970; Lam Son 719, 30 January - 24 March 1971, March 1971; and other CHECO reports--all published by Headquarters PACAF. Of course virtually every operation or campaign involved some aspect of tactical airlift.

This final report describes the vital but declining role of tactical airlift in the Southeast Asian war from 1969 through November 1971, a decline attributed to the withdrawal of U.S. forces. On 1 December 1971 the airlift organization, an air division, became a staff directorate of Headquarters 7th Air Force (HQ 7AF).

Chapter I summarizes the organizational and control structure which evolved from 1954 through 1968. Chapter II examines the organization and control structure from 1969 through 1971. Chapter III describes the multi-faceted role of airlift. An entire chapter is devoted to Lam Son 719 since it so well typified airlift operations. The training of VNAF airlift personnel is also treated separately because rapid Vietnamization of the war later became a major objective of U.S. policy in SEA. Chapter VI draws some conclusions concerning the past and future role of tactical airlift.

CHAPTER I

INTRODUCTION

The United States Air Force (USAF) began tactical airlift in Vietnam to support the French against the Viet Minh. In the eight months preceeding the French defeat at Dien Bien Phu in 1954, aircraft from the 315th Air Division (AD) carried 21,000 tons of cargo and 14,000 passengers. In one operation, 502 wounded French soldiers were evacuated to France. The 315th AD also provided maintenance support and training for French C-119 crews. Airlift of personnel and cargo to elements of the Pacific Command (PACOM) and the United Nations Command continued during the ensuing period to the early Sixties.[1/]

By 1961 hostilities in Southeast Asia (SEA) were increasing. Consequently, the USAF conducted a series of airlift exercises designed to ensure a capability of flexible and rapid transport of combat forces and supplies in SEA. Weather penetrations, primitive staging facilities, sustained airdrop operations, and rudimentary maintenance and logistical support were factors in the test of USAF capability.[2/]

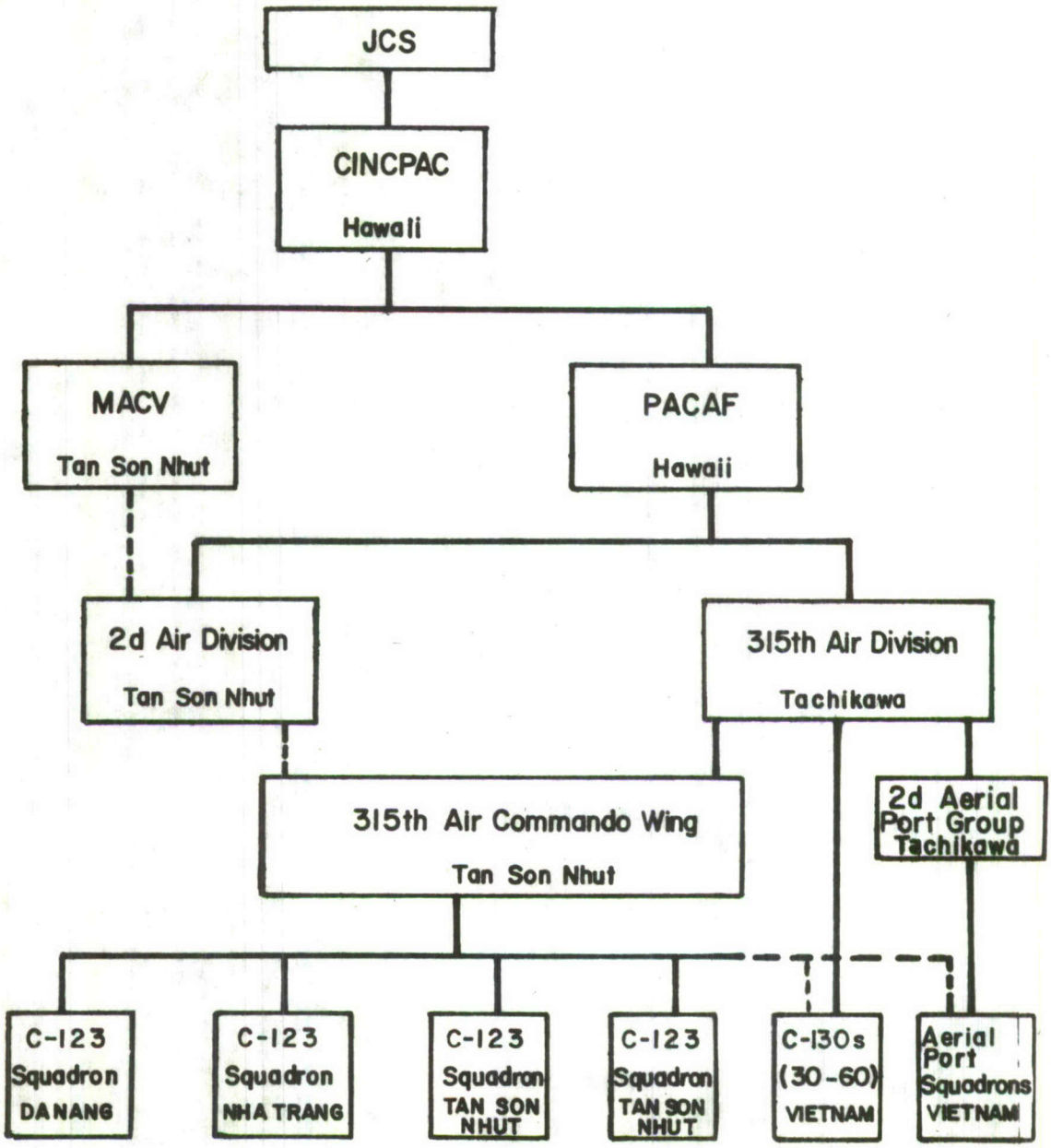
On 7 December 1961, President Diem of the Republic of Vietnam requested aid from President Kennedy. The U.S. responded quickly and during January 1962 the 315th AD deployed C-123 aircraft on temporary duty (TDY) to several locations in Vietnam. By 1966 this contingent had grown to an air division--the 834th.[3/]

Until the last half of 1966 the airlift organization in Vietnam remained a temporary structure. The 315th AD, based in Japan, exercised command of airlift resources through the 315th Air Commando Wing at Tan Son Nhut Air Base, Saigon, Vietnam.[4/] However, the Military Assistance Command (MACV) controlled airlift through the air force component of the joint staff, the 2d Air Division.* This dual structure of command and control was complex and cumbersome. (See Figure 1)[5/] The problems inherent in allocation of airlift, rotation of C-130 aircraft, coordination of Vietnamese Air Force (VNAF) and United States Army (USA) airlift capability, maintenance support, and aerial port activities illustrated the complexity of operations.[6/]

The 315th Air Commando Wing was composed of four C-123 squadrons but was augmented by C-130s on TDY from the 315th AD. Two C-123 squadrons were located at Tan Son Nhut, one at Nha Trang, and one at Da Nang.** C-130s were placed at the C-123 locations, Cam Ranh Bay, and at Don Muang and Ubon in Thailand. The size of the augmentation varied from 30-60 aircraft, depending on airlift requirements. The C-130s operated within the airlift system for 10-16 days before returning to their permanent stations.[7/] (See Figure 2)

* In April 1966, 7AF became the air force component as the 2d Air Division was inactivated.

** All units were located in South Vietnam unless indicated otherwise.



----Operational Control.
————Command Control

Figure 1 The Dual Structure of Airlift Command and Control

Source: CHECO Report Assault Airlift Operations, Headquarters PACAF, 23 February 1967.

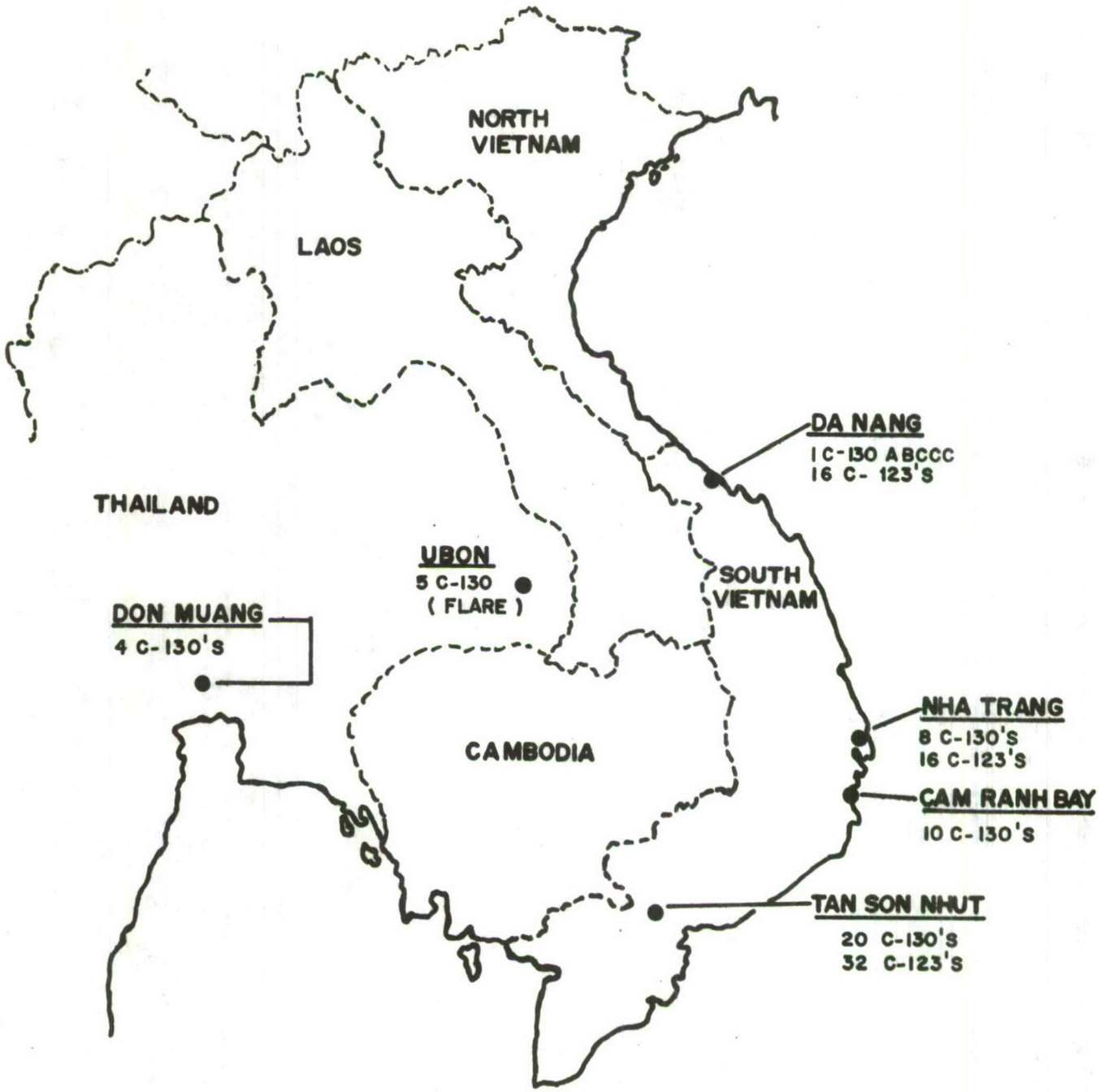


Figure 2 C-123 and C-130 Aircraft Locations in Vietnam and Thailand, as of 30 June 1966

Source : CHECO Report Tactical Airlift Operations, Headquarters PACAF, 30 June 1969.

Maintenance support varied for each aircraft. C-130s which could not be combat ready within 24 hours returned to permanent bases and were replaced by other C-130s. However, C-123s received major repairs in South Vietnam, and at least 71 percent were operationally ready at all times.[8]

The U.S. Army (USA) had 98 CV-2 aircraft (USAF designation: C-7) at nine locations: Da Nang, Pleiku, Qui Nhon, Nha Trang, Dong Ba Thin, Tan Son Nhut, Vung Tau, Can Tho, and Soc Trang. Army corps and division commanders deployed these aircraft as the tactical situation required.[9]

The South Vietnamese Air Force (VNAF) airlift capability was limited to 32 C-47 aircraft, located at Tan Son Nhut. The VNAF allocated airlift in support of the Army of the Republic of Vietnam (ARVN) forces based on requirements reported to the Joint General Staff. The USAF provided airlift for ARVN requirements which exceeded VNAF capability.[10]

Airlift requirements increased as U.S. involvement intensified in the Republic of Vietnam (RVN) in 1965 and 1966. By mid-1966 the Army was complaining of insufficient and unresponsive airlift, and it became apparent that a larger and more permanent organization was needed. The 834th Air Division was established in October 1966 at Tan Son Nhut to meet this increased demand.[11]

This organizational change had two important features. First, the 315th Air Commando Wing became a unit of 7AF. Second, the 2d Aerial Port Group moved from Tachikawa to Tan Son Nhut and became a unit of the

834AD. (See Figure 3)[12]

Another important change was the USA-USAF agreement to transfer Army CV-2s to the Air Force in 1967. These aircraft were transferred to the 483d Troop Carrier Wing at Cam Ranh Bay. Shortages of pilots and engineers, maintenance difficulties, inadequate facilities, poor corrosion control, incomplete Army records, nonstandard aircraft configurations, and an insufficient inventory of spare parts were problems which were resolved by the end of 1968. Since the USAF improved the maintenance, utilization, and overall management of the C-7 (CV-2), the tactical airlift capacity increased when the Air Force assumed control of the aircraft.[13]

At the time of the C-7 reorganization it was suggested that the 315th AD be deactivated and C-130s realigned as a Wing at Cam Ranh Bay under the 834th AD. Other resources were to be distributed throughout PACAF. Proponents argued that TDY of maintenance and aircrew personnel led to instability and divided loyalties. Opponents said permanent stationing was undesirable because of manpower ceilings in Vietnam, the effect of the Vietnamese economy associated with more U.S. personnel in-country, and greater C-130 vulnerability to rocket and mortar attacks. After study at the highest Air Force levels, the 315th AD was inactivated in 1969 and its resources distributed within PACAF; TDY utilization of C-130s continued. The C-130s were distributed to the 5th Air Force in Japan and the 13th Air Force in the Philippines and Taiwan.[14]

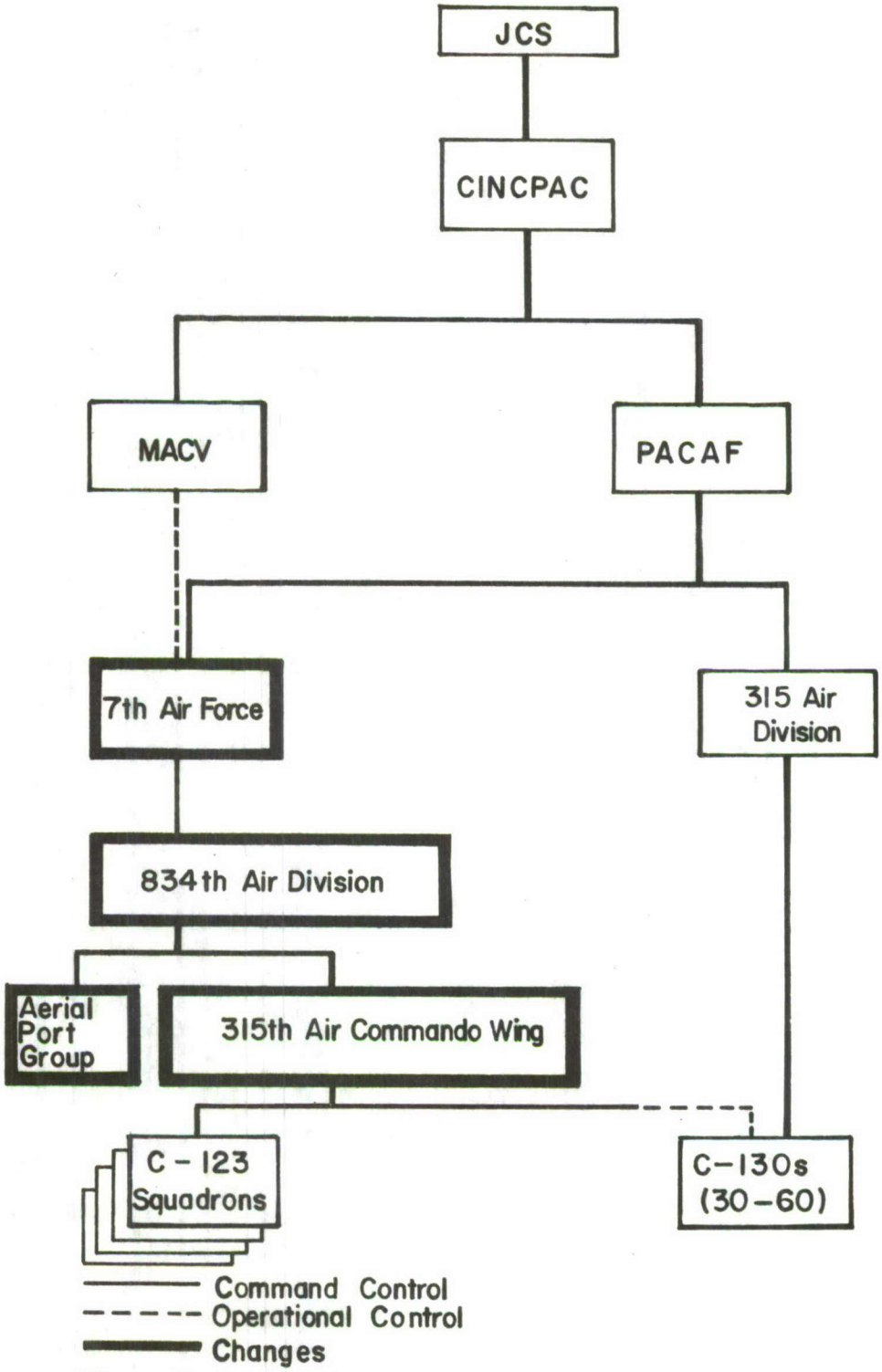


Figure 3 The Dual Structure of Airlift Command and Control

Source: CHECO Report Tactical Airlift Operations, Headquarters PACAF, 30 June 1969.

In 1971 Major General Herring commented on the TDY utilization of the C-130 force:[15]

> *. . . the decision to employ the C-130 force in-country on a TDY basis resulted from a combination of political, administrative, and operational considerations. Generally it has worked quite well. In such situations where there are divided responsibilities--in one case command and in another operational control--you are placing individuals in the position of working for two bosses. With very few exceptions, however, the arrangement has gotten the job done. I think this is due mainly to the motivation and professional competence of all the individuals involved. As is true throughout the airlift organization here, the men know they have an active and meaningful mission assignment and their response has been one of the most gratifying observations of my assignment. In terms of specific problem areas the mix of partial permanent party 834th Air Division personnel, aircrew rotation on a two to three week schedule, and ground maintenance crews rotating at about five week intervals, does of course present unique problems not inherent in other areas of our operations. Another item which comes to mind is that the in-country forces are authorized 100 per cent manning, whereas the parent units of the TDY contingents are not. When they attempt to come up to 100 percent manning for their TDY obligation in-country, this places a heavy strain on the remainder of the units. To the extent possible PACAF has attempted to minimize these problems but they are still of sufficient consequence to be considered when decisions are made regarding future tactical airlift requirements.*

Summary

USAF tactical airlift in Southeast Asia began with a series of temporary measures to satisfy short-term airlift requirements, using resources of the 315th Air Division. A large part of the airlift was

provided by C-130s operating in SEA on TDY. As the war continued beyond original expectations and airlift requirements increased, a larger and less transient organization was needed. Thus, the 834th Air Division was created, again using resources of the 315th Air Division. Finally, the 315th Air Division was inactivated and its resources distributed to other PACAF units. C-130 aircraft continued to be utilized in SEA on TDY.

CHAPTER II

ORGANIZATION AND CONTROL

Introduction

This chapter examines the organization and control structure which existed from 1969 through 1971. The units included in this discussion are those under the command or operational control of the 834th AD. The explanation of the control system includes the airlift network, airlift system, elements of control, and the Airlift Management System (ALMS).

Organization

In 1969 the 834th AD was composed of the 2nd Aerial Port Group, the 315th Tactical Airlift Wing (TAW) (C-123s), the 483rd TAW (C-7s), two detachments of C-130 aircraft (TDY from off-shore wings), and a Royal Australian Air Force Squadron (C-7). Generally, this organizational structure remained intact until inactivation of the division, 1 December 1971. (On 1 December the 834th AD became the Directorate of Airlift, 7AF). However, several division units were inactivated in consonance with the phase down of U.S. forces. (See Figure 4.)

The 2d Aerial Port Group was composed of three squadrons: the 8th at Tan Son Nhut, the 14th at Cam Ranh Bay, and the 15th at Da Nang Air Base. Detachments were located at various points where airlift activity warranted continuous but less extensive aerial port services. Aerial port personnel loaded, unloaded, and stored cargo and processed passengers at each location. Mobility teams augmented aerial port personnel when

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traffic was heavy--during unit activations, inactivations, and special operations such as Lam Son 719. Combat control teams provided aerial port and air traffic control services (navigational aids such as communications, airfield lighting, and marker equipment) at forward locations in support of special operations.[16/]

Aerial port resources decreased as U.S. forces withdrew. Of the 42 aerial port detachments and operating locations (OL) existing in 1969, only 17 remained under U.S. control by the end of 1971. The VNAF had assumed control of 15; the other 10 were inactivated. USAF aerial port personnel strength declined from more than 3000 to just over 2000 personnel.

In mid-1971, the 315th TAW at Phan Rang Air Base consisted of two C-123 airlift squadrons and a Consolidated Aircraft Maintenance Squadron (CAMRON). The UC-123 squadron (used for insecticide and herbicide missions) and two C-123 airlift squadrons had been inactivated.[17/]

By December 1971, the 483rd TAW at Cam Ranh AB consisted of three C-7 squadrons and a Consolidated Aircraft Maintenance Squadron. One squadron had been inactivated in 1970; two in 1971. Fourteen C-7s staged at Bien Hoa and four aircraft staged at Can Tho to ensure responsiveness to army requirements.

Royal Australian Air Force (RAAF) Number 35 Squadron was located at Vung Tau. The squadron started CY 71 with seven A-4 Wallaby aircraft (C-7). By May 71 this was reduced to four. These four aircraft normally

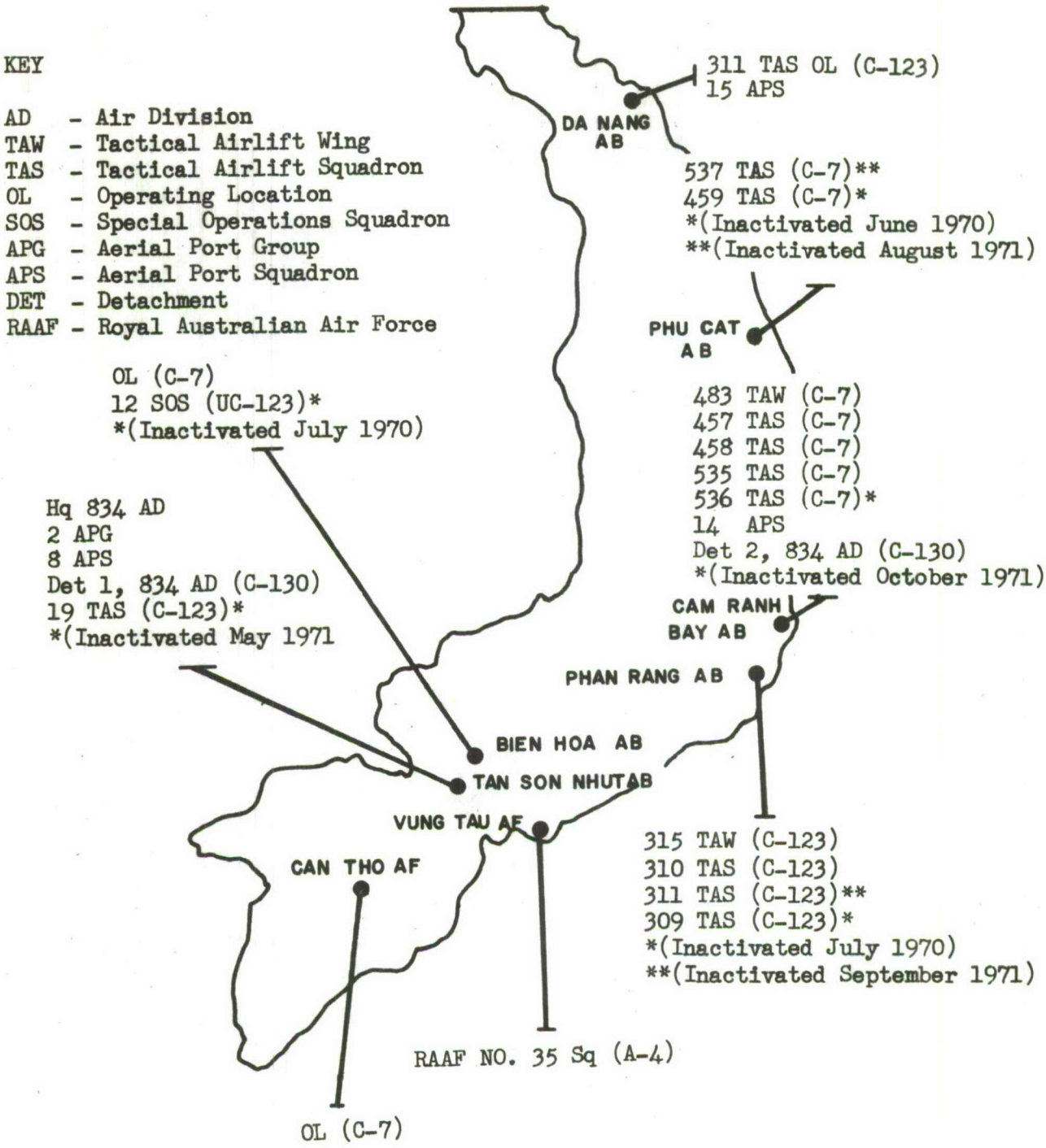


Figure 4 Location of 834th AD Units in South Vietnam, 30 November 1971

Source : Talking Paper, Inactivation of 834th AD for General Lavelle

flew two missions per day; one Common Service Airlift System (CSAS) mission under the operational control of 834th AD and one dedicated to the Australian support. 834th AD exercised direct control of the CSAS missions.

C-130 A, B, and E model aircraft were utilized by the 834th AD. In December 1970 the A models were phased out of the Vietnam airlift system and returned to the CONUS. The total number of C-130s continued to vary in accordance with airlift requirements but generally, the number declined as U.S. forces decreased. Off-shore wings adjusted the number of aircraft in RVN in 24 hours or less.

Occasionally the requirements for C-130 aircraft exceeded the number which could be made available. For example, during Lam Son 719 all C-130 aircraft were engaged in airlifting combat essential cargo. (See Appendix I for explanation of the priority system.) Aerial ports became saturated with lower priority cargo and a backlog of passengers. The Military Airlift Command (MAC) rectified this situation by flying a limited number of in-country shuttles with C-141 aircraft.

C-130s remained in-country an average of 21 days while air crews stayed an average of 15 days before returning to off-shore bases as before. C-130 aircraft received minor maintenance repair from a small number of maintenance personnel assigned to RVN on a permanent basis. Major repair was conducted at off-shore bases. C-123s and C-7s received major maintenance repair in-country.

Of the aircraft employed in the tactical airlift system--C-130s, C-123s, and C-7s--each was suited for a particular role. C-130s were faster, carried more cargo, and had a greater range. However, the limited number of airfields which could accommodate the C-130 restricted its usefulness. The C-7s and C-123s could operate out of shorter and more austere airstrips and therefore service more locations. Because of the short distance between supply points range was not a limiting factor. Thus C-123 aircraft could meet most bulk cargo requirements. The C-7 provided the quick response needed in a tactical environment.

Control

Airlift Network

The airlift system which evolved over the years spanned the entire country of South Vietnam. This enabled U.S. forces to exploit the inherent flexibility of airlift and ensure rapid response to priority and emergency requirements.

The system was tailored to the in-country logistics patterns. Basically, Vietnam comprised four logistics "islands", with shipping lanes and MAC airlift channels connecting them to the CONUS or Western Pacific supply sources. The islands were centered around the four logistics complexes of Da Nang, Qui Nhon, Cam Ranh Bay, and Saigon. Generally, movement within the islands radiated from the port complex and consisted of distribution routes inland to the deployed forces in the

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immediate area. Truck routes connected the complexes and provided lateral movement of supplies and travel of passengers. The 834th AD deployed elements at key traffic originating and terminating points within this network.

From the Air Force point of view the key to responsive airlift was the centralized command and control structure which unified the various control elements into an airlift system. Objectives were positive control, continuous customer liaison, deployed turn-around capability, and real time monitoring of aircraft and cargo movements. A centralized control structure permitted the airlift commander to be in immediate contact with all flying units, operating locations, customer representatives, and aircraft in flight. The commander could redirect the airlift effort as required and thus respond to tactical demands.

Airlift System

All C-130s and C-123s were assigned to the Common Service Airlift System. CSAS missions included SEA missions scheduled quarterly, and missions operating daily to move cargo designated as Special Mission Airlift Requests (SMARs). Only a few of the C-7s were allocated to CSAS: most were dedicated to specific U.S. Army units in accordance with allocations made by MACV. The Army unit controlled the mission and determined routing, cargo, and passengers to be moved.

In June 1969, 45 of the 50 daily C-7 missions were dedicated to specific users, while five were reserved for CSAS. In late 1969 it was apparent that C-7s were being used inefficiently by operating into airfields not requiring short take off and landing (STOL). Also, C-123s and C-130s often flew parallel routes. Consequently, MACV allocated more C-7s to CSAS. As U.S. troop withdrawal continued, additional dedicated airlift was allocated to CSAS. In the spring of 1971 C-7s flew an average of 21 dedicated and 24 CSAS missions daily.

"CSAS versus the dedicated system" typified the familiar controversy of centralized versus decentralized control. The USAF preferred CSAS because it facilitated planning and anticipation of airlift requirements and problems.[18/] The army, however, preferred decentralized control--dedicated service--in which aircraft were available to respond immediately to the tactical situation.

Each system had advantages. By getting advance notice of airlift requirements from Tactical Airlift Liaison Officers (TALOs), and planning and anticipating airlift requirements through CSAS and SEA scheduled missions, the USAF could respond within the time limits of established priorities. Moreover, the system was more efficient since aircraft could be utilized more fully. However, aircraft dedicated to specific Army units could respond more quickly to the changing tactical situation. Although dedicated aircraft might not be fully utilized, responsiveness was more important than efficiency where survival was a factor. The USAF and USA

achieved a workable system by using CSAS and dedicated service, thus combining the best aspects of centralized and decentralized control.[19/]

Elements of Control

The elements of centralized tactical airlift control were the Airlift Control Center (ALCC), Airlift Control Elements (ALCEs), Tactical Airlift Liaison Officers (TALOs), Combat Control Teams (CCTs), Mission Commanders, and Transportable Airlift Control Elements (TALCEs).

ALCC

The Commander, 834th AD, managed the tactical airlift fleet through the ALCC. ALCC functions included planning, fragging, flight monitoring, controlling airlift missions, and close coordination with the MACV Traffic Management Agency and airlift customers in the field.

ALCEs

ALCEs provided a country-wide command/control complex to supervise flight operations. Located on airfields in each of the four military regions, ALCEs coordinated loading operations and movement of critical airlift. Most ALCEs were collocated with aerial port functions.

In late 1967 ALCEs were equipped with outdated airborne VHF/UHF* transceivers. New equipment was installed at the ALCEs from October

*Very high frequency/Ultra high frequency.

1970 through January 1971. Six received CRT-18/R-1250 VHF equipment, one received R-361/T-282 UHF (with remote capability) and the remaining ALCEs received both. The new equipment was easier to tune, required less maintenance, and made communications between agencies more reliable.

CCTs and Mission Commanders

CCTs operated at forward locations as extensions of ALCEs. They provided air traffic control and HF long range radio communications support. CCTs were supervised by a mission commander who acted as an on-the-scene representative of 834th AD Commander. Usually, mission commanders and CCTs were utilized during unit moves or operations such as Lam Son 719 which involved large scale airlifts of supplies and equipment.

TALOs

TALOs were assigned to ground commanders at field force and brigade levels. As representatives of the 834th AD Commander, they advised field commanders on effective use of airlift, methods of preparation, the type of cargo suitable for airlift, and the amount of airlift available. TALOs also notified the ALCC of impending airlift requests. Frequently, this advance warning permitted optimum scheduling adjustments and the positioning of aircraft in minimum time.

Air Force doctrine regarded the TALO as a member of the Tactical Air Control Party and thus responsible to the Air Liaison Officer (ALO) in

that area. However, the ALO was concerned with tactical air operations such as delivery of ordnance and close air support. He worked closely with G-3, the General Staff, Operations. On the other hand, the TALO worked closely with the army logistics and transportation staff. Consequently, the TALOs and ALOs had little in common and in many instances were not collocated. Thus, the utilization of TALOs in Vietnam was considered inconsistent with Air Force doctrine.

TALCEs

The TALCE was a three-part unit consisting of command, sanitary, and dormitory modules, plus auxilliary and power equipment: the command module contained radio equipment; the sanitary module had showers, chemical toilets, and laundry facilities; the dormitory module accommodated 18 people. A trenching machine was included in each TALCE package for digging drainage ditches, burying cables, and filling sandbags. These machines were popular with U.S. Army personnel and helped Air Force personnel in establishing rapport.

The TALCEs were susceptible to dust, dirt, and extreme temperatures. Plumbing problems were common. Also, the leveling jacks on the modules were frequently damaged during transportation since they were mounted externally. Despite these problems the TALCEs were functional and provided a living and working environment superior to that usually found in forward areas.

Airlift Management System (ALMS)

As the war in Southeast Asia intensified the commitment of U.S. forces increased. The size and complexity of the organizational and control structure grew in relation to increased U.S. involvement. USAF project SEEK DATA II (SD II) was initiated to provide data automation support for 7th Air Force Command and control functions. The project consisted of two computer systems--one designed to assist in the management of strike forces; the other designed to integrate all the critical decision variables relevant to the management of airlift forces. The latter system was called ALMS. It was to be used to enhance mission planning, fragging, and flight following.[20/] (See Appendix II for a brief description of system hardware and software.)

Implementation

The Control Data Corporation (CDC) was awarded the contract to develop, test, and install the system. On 1 July 1970, 7AF began operation of the SEEK DATA II project in SEA. CDC assigned nine programmers to the ALMS project and continued to test and implement programs in the following year. Hardware and software problems required extensive analysis before other operations could be accomplished. After considerable program testing and modification, the first parallel frag (manual and automatic) was gererated on 22 August 1970. Numerous problems were encountered which were not evident in previous tests and the product was operationally unusable. The analysis that was performed did result in improvements to the marual system.

Thorough testing and extensive analysis revealed that automatic scheduling was not feasible utilizing the program as written. Too many of the scheduled missions were not flyable and resulted in unmoved cargo. Programmers modified the system to permit entry of a manual frag (an itinerary) into the computer. This generated a flyable frag. Program revision continued and C-7 automatic frags were produced on 26 December 1970; in mid-January 1971, C-123 frags were produced. These frags were disseminated with manual frags.

Evaluation

ALMS had limited operational use because the automatic schedule was satisfactory. Automatic scheduling was successful in scheduling port cargo when large volumes were available. The number of empty legs was about the same as the manual system; however, the length of the empty legs was often excessive since the automatic schedule made no checks for cargo at intermediate stops. (This was due to the operational priorities loaded in the computer and lack of effective identification of intermediate stops.) The manual schedule resulted in movement of more cargo in less flying time; thus, airlift controlled by the manual system was more responsive to user needs. The primary operational usefulness of ALMS was dissemination of the manual frag.

The capability of ALMS to reduce the backlog of cargo at the port and thus the amount of old age cargo was questionable since the manual frag

resulted in movement of more cargo with fewer airplanes. However, this aspect was not tested adequately because port levels were decreasing as a result of U.S. force withdrawal. Also, such a test required that airlift missions adhere to the automatic schedule. This was not feasible because the schedules were unacceptable.

The ALMS monthly SEA schedule analysis programs were never completed. However, operational requirements dictated that many agencies be notified prior to changing the SEA schedule; therefore, a real time adjustment was disallowed.

The capability for rescheduling a mission in flight was minimal or nonexistent. This task would have necessitated that all requirements for unmoved cargo be reentered into the data base and the scheduling function reinitiated. This was not always possible since the next day's schedule was being prepared and could not be interrupted without destroying the schedule. The point at which to enter requirements was indeterminable since the time required to produce a rescheduled frag order varied. Also ALMS had no conflict resolution and schedule changes would tend to build up a backlog.

The mission following function could receive current information on aircraft arrival and departure and rapidly notify other agencies. However, other necessary flight following information such as type of delays, maintenance status, aircraft configuration, equipment on hand, and current

and subsequent load values was not included in the system. The lack of load values was due to some degree in deficiencies of Aerial Port's reporting.

Preparation time of the frag order was twice that of the manual system due to the operational parameters established. However, dissemination required less time.

The ALMS system did not reduce the number of frag challenges or changes. True automatic scheduling should have reduced the number of frag changes.

ALMS dissemination of the frag order was selective and thus eliminated the receipt of frag orders by disinterested agencies. Frag messages disseminated by computer contained fewer errors and were more detailed than those dispatched under the manual system.

Some scheduling aids were provided to the manual schedulers. Refueling checks indicated where additional refueling sorties had to be added to complete the mission. Landing and takeoff gross weight were also checked and those exceeding allowable limits were identified.

Lessons Learned

Because of the size and complexity of the airlift system in Vietnam, management required automated assistance. ALMS, though still unperfected, represented progress in that direction. The concept was valid and several lessons were learned concerning the future use of an ALMS system.

One lesson concerned use of the program language COBOL. COBOL was oriented to everyday business operations and lacked the sophistication for use in the complex ALMS system. JOVIAL (Air Force official command and control language) or some other high order language such as FORTRAN would have been more functional.

Programmers did not solve the airlift routing and scheduling problem. Too many constraints were written into the program. This strangled any ability for good route selection and efficient ton miles. Modification of the constraints was required.

A better program might have evolved if the same contractor had provided hardware and software. IBM* equipment problems were minimal; however, the associated operating systems provided by the Control Data Corporation (CDC) were never perfected. Although the USAF Systems Program Office monitored the software actions, Air Force programmers and systems analysts were needed daily at the worker level to insure that CDC programmers received appropriate information and advice. Any future purchase of a complex system such as ALMS should provide for assignment of Air Force programmers and systems analysts at the contractor facility. These personnel should be transferred with the system to initial operating locations to insure the orderly transition and installation of programs.

*International Business Machines Corporation.

The turnover of commanders and operations personnel in the 834th AD also adversely effected the development effort.

The use of standard formats, data elements and codes in all phases and areas of airlift operations was essential to permit full, uninhibited interfacing with other USAF/Joint Systems. The U.S. Army modified its airlift designators, thereby complicating operations and system interface. These things affected basic system design and computer programming, accounted for a large portion of automation cost, and violated objectives of eliminating redundant, error-free reporting systems.

Summary

Generally, the organization of the 834th AD remained intact from 1969 through 1971. On 1 December 1971 the structure was changed from an Air Division to a directorate of airlift within the Hq 7AF staff. During this period seven squadrons were inactivated and 15 aerial port operating locations were transferred to the VNAF.

C-123s, C-7s, and C-130s were still the transports in the tactical airlift system. C-123s were being transferred to the VNAF and C-7s were to be turned over as VNAF crews became qualified. C-130s continued to be used on TDY. The number in-country varied with airlift requirements but declined as U.S. forces decreased.

The airlift system spanned the entire country of South Vietnam and was tailored to its logistic patterns. The actual control of airlift was a mix of centralized and decentralized control. C-130s and C-123s were utilized in the CSAS. This was compatible with the Air Force concept of centralized control. C-7s were dedicated to specific Army units. This was compatible with the Army concept of decentralized control.

The Air Force control elements consisted of the ALCC, ALCEs, TALOs, CCTs, Mission Commanders, and TALCEs. These elements were essential features of the centralized control of airlift forces.

The ALMS was an attempt to integrate all the decision variables relevant to the management of airlift forces. Although it was not a proven success in this first operational test, the ALMS concept had merit.

CHAPTER III

TACTICAL AIRLIFT

Introduction

This chapter examines the various missions and activities of tactical airlift. The airlift of personnel and cargo is described in general terms. The specific problems, environment, and daily operations are treated in a separate chapter, Lam Son 719, because the operation was so illustrative of tactical airlift activities. The training of VNAF airlift crews also deserves separate treatment since improvement and modernization of the VNAF had become a major objective of U.S. policy in South Vietnam.

The 834th Air Division--the largest tactical airlift force in the world--was capable of performing a variety of missions. In addition to airlift of cargo and personnel and VNAF training, its missions and activities included aero-medical evacuation, defoliation and insecticide spraying, psychological leaflet distribution, helicopter landing zone preparation, airfield survey, and the aerial ports.[21/]

Declining Role of Airlift

The USAF role in tactical airlift was correlated with U.S. involvement in SEA. It began modestly with the airlift of 53 thousand tons of cargo to French forces in 1954 and by 1961 had increased the 173 thousand tons annually. Tactical airlift reached a peak in the mid-sixties as the cargo

carried exceeded 926,000 tons. (See Figures 5 and 6). Cargo tonnage declined after FY 68 while the number of passengers carried decreased after FY 69, as US force withdrawal continued.* (See Figure 7 for monthly totals, FY 71).

Airlift Highlights

In 1969, 834th aircraft flew 1200 to 1400 sorties each day. The number of daily sorties declined to 640 by June 1971 and to 350 by November 1971.[22] C-7s averaged 10 sorties per mission, C-123s--eight and C-130s--six. Average sortie length increased for all aircraft by 10 to 20 percent because of variations in activity level and relocation of US Army units during the phase down.[23]

Daily airlift included large quantities of fuel and ammunition, general cargo, army units, and other passengers. The percentage of effort devoted to each category varied, changing considerably from 1969 - 1971. In 1969, 30 to 90 troop units of various sizes were moved each month. In 1971 this number was 15 to 20. Petroleum, oil, and lubricants (POL), which constituted more than 20 percent of the total movement, dropped to less than 10 percent. Ammunition movement was down as activity levels remained low. Only passenger movement remained comparatively high because transport of people over any appreciable distance was by air.

*See TAPA reports for detailed statistical data relating to Tactical Airlift in Southeast Asia. The complete reference is listed in footnote 21.

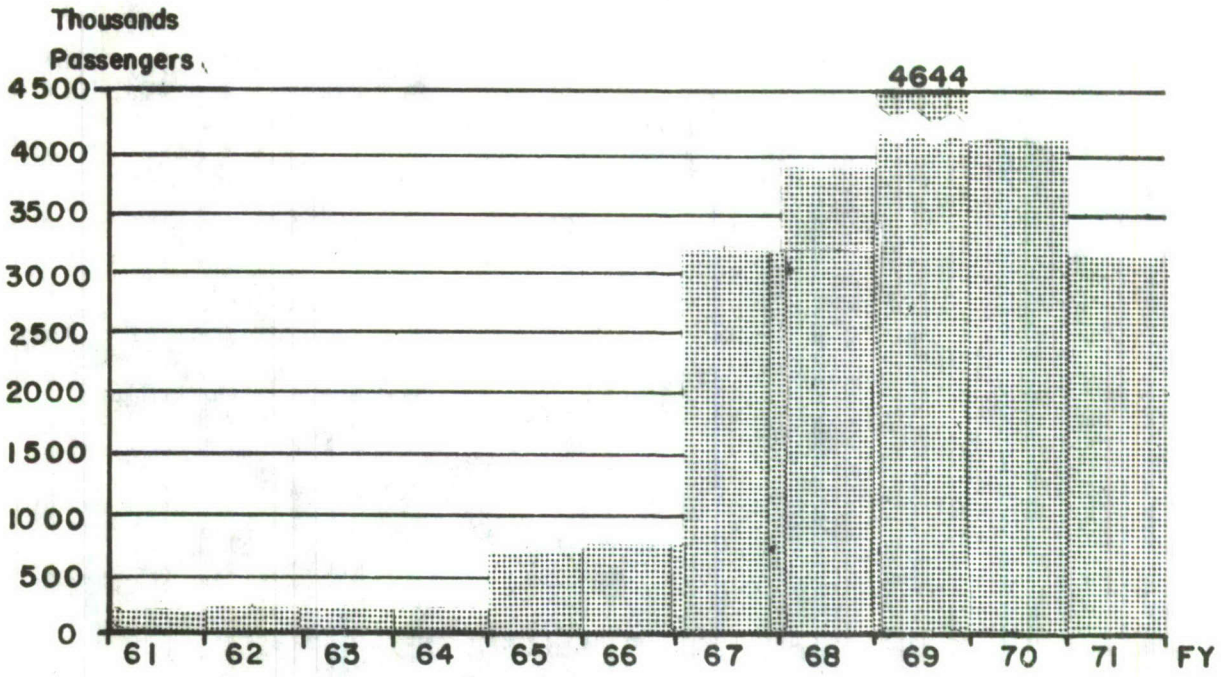


Figure 5 Passengers Airlifted FY 61 Through FY 71

Source: Tactical Airlift Performance and Accomplishments Southeast Asia, RCS: 7 AF - U9 (TAPA-SEA), 1960-1971

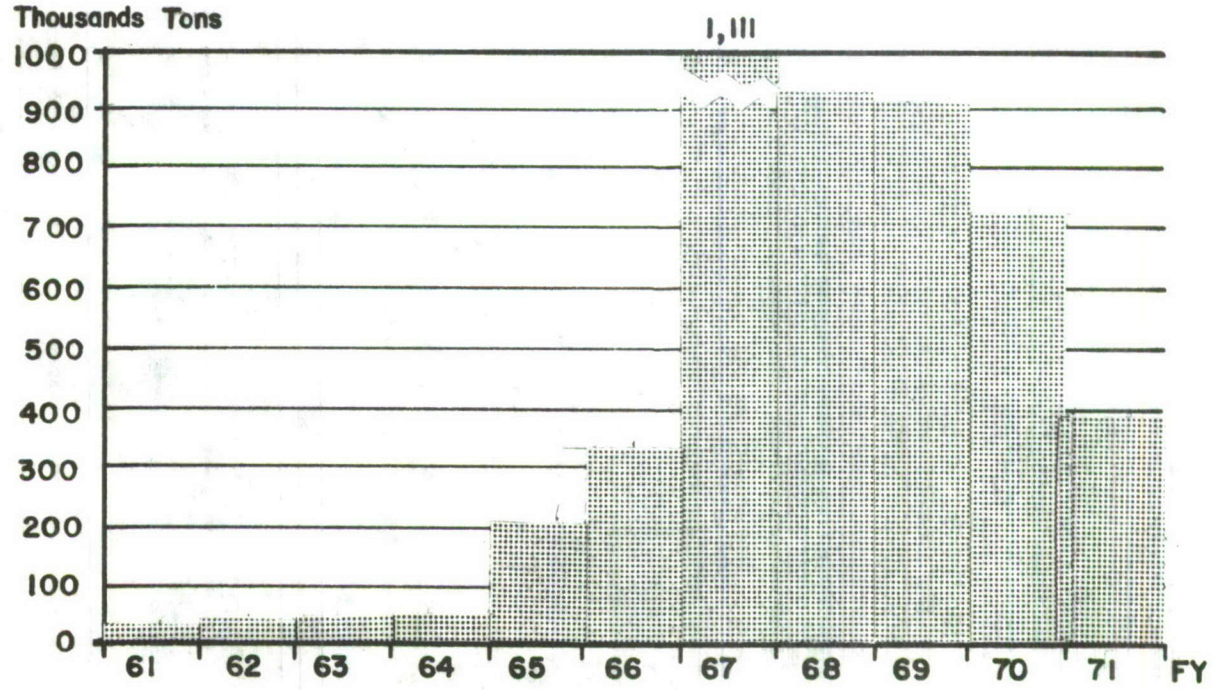
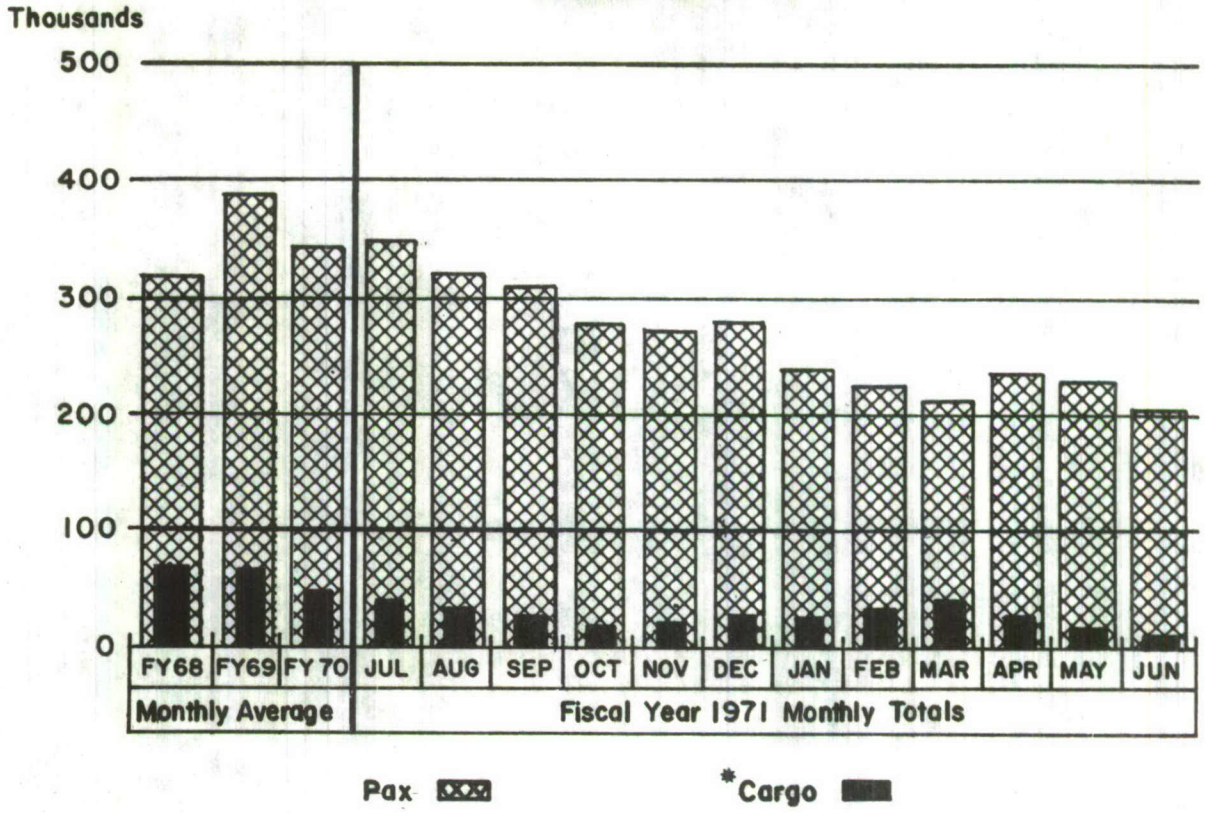


Figure 6 Tons Airlifted FY 61 Through FY 71

Source: TAPA - SEA

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	Annual Airlift Summary	
	Total Passenger	Total Cargo
FY 68	3,897,857	928,118
FY 69	4,644,367	911,419
FY 70	4,125,893	719,598
FY 71	3,175,102	397,323

Figure 7 Tactical Airlift in South Vietnam
Airlift Accomplishments

Source: TAPA SEA
As of 30 June 1971

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Airlift operations in support of major ground battles and special movements accounted for a large portion of airlift during this period. A brief description of several of these operations follows:

Thai Rotation

Approximately 11 thousand Thai troops were airlifted to Thailand every six months. The rotation involved more than 160 sorties between Bangkok and Long Thanh North, near Saigon.

Civilian Organization for Rural Development Support (CORDS)

The 834th AD airlifted Vietnamese civilians to relocation centers throughout South Vietnam under the auspices of the CORDS program. More than 30,000 civilians were transported from October 1969 through December 1970.

Cambodia

The Cambodian campaign was an incursion into Cambodia by United States and South Vietnamese armed forces in May and June 1970. The objective was to destroy facilities and supplies stored by the North Vietnamese within Cambodia, which the US had previously regarded as a sanctuary. The operation was supported heavily by tactical air strike and airlift forces. All three types of airlift aircraft were employed, operating into 24 airfields along the South Vietnam-Cambodian border, and airlifting more than 52,000 tons of supplies and equipment and 98,000 troops and passengers. C-130s airdropped ammunition and supplies to fire

base personnel and Cambodian troops, and during the last week of June, C-7s and C-123s evacuated more than 3,000 Cambodian refugees from the Cambodian airstrips of Bung Lung and Ba Kev.*

Kham Duc

During August 1970 the Air Division supported US and ARVN troops as they conducted major ground operations in the vicinity of Kham Duc near the Laotian border. All three types of aircraft were employed to fly more than 640 sorties and airlift 4,907 passengers and 3,253 tons of cargo.

Air Drop

The airdrop of cargo or troops was a technique employed when enemy activity or terrain caused the supply point to be inaccessible to even the usual means of airlift. Airdrops resupplied beleaguered special forces and civilian irregular defense groups at Ben Het and Dak To (1969), and Dak Seang, Dak Pek, and Ha Tan (1970). These were classic examples of the contribution of tactical airlift to survival of isolated forces.

Ben Het

During June 1969, ammunition, rations, and POL were dropped to besieged special forces at Ben Het by C-7s while FAC and fighter bomber aircraft flew protective support. Resupply by other means was virtually impossible. C-7s flew 87 sorties to deliver more than 200 tons of cargo.

*For a complete account of the Cambodian campaign, including the tactical airlift role, see CHECO Report The Cambodian Campaign (29 April to 1 July 1970), Headquarters, PACAF, 1 September 1970.

Five of the aircraft were hit by ground fire but none of the aircraft or crew were lost.*

Dak Seang and Dak Pek

In April 1970 the Dak Seang and Dak Pek military camps in the central highlands of Vietnam were besieged by the enemy. The airdrop of supplies saved the camps from being overrun. At Dak Seang C-7s flew 123 sorties, dropping 236 tons of supplies into an area 500 feet square.

The resupply at Dak Seang proved costly. During the first week of the airlift, 24 of the first 50 aircraft that dropped supplies were hit by ground fire; three were destroyed and nine crew members were lost. These losses occurred despite concentrated attacks by fighter aircraft.

Night drops were instituted to reduce further losses. An AC-119 gunship circled the area, providing drop zone illumination. With the beam directed at the camp the approaching aircraft had a good visual target. This also afforded the cover of darkness until the aircraft was over the drop zone. Night missions reduced the hazard from ground fire and also increased the accuracy of the drop.**

The siege at Dak Pek was of shorter duration and did not involve the loss of airlift resources. C-123s flew 31 sorties, dropping 128 tons of supplies.

*For further information see CHECO Report The Siege of Ben Het, published by Headquarters, PACAF, 1 October 1969.

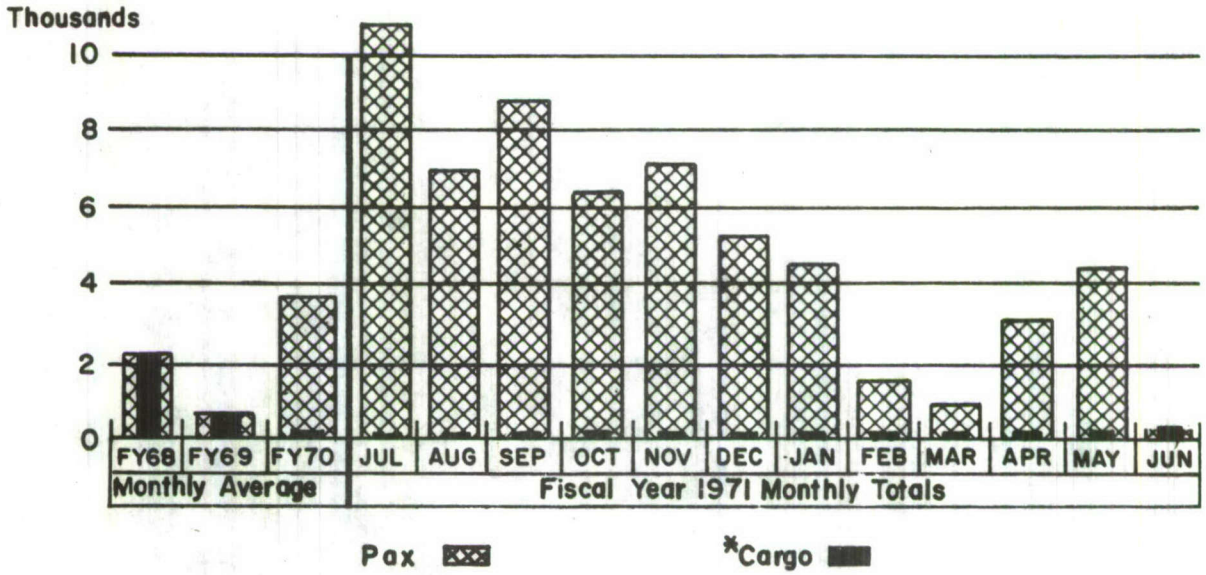
**For further information see CHECO Report The Defense of Dak Seang, published by Headquarters, PACAF, 15 February 1971.

Airdrop Accomplishments

Although airdrops were vital in specific instances, there was a general decline in such activity. Airdrop of cargo declined significantly in 1969 and remained at a low level of activity, while the number of troop drops varied with ARVN operations from 1969 through 1971. (See Figure 8).

Aerial Delivery Systems

The container delivery system (CDS), the 1528 low altitude parachute extraction system (LAPES), and the ground radar aerial delivery system (GRADS) were effective airdrop methods during the 1969 - 1971 period. The Army was the agency authorized to acquire aerial delivery equipment which was dropped from aircraft. It argued against development of duplicative aerial delivery systems because of the expense involved in maintaining extra equipment. The Army did not approve LAPES because of its belief that the load survivability was low and the load was too heavy and bulky to permit easy clearance of the drop zone or collection and return to the Air Force. The Air Force had acquired 100 LAPES sets out of its own funds and argued for adoption of the system. It believed that adoption of the LAPES would expand aerial delivery options in a tactical environment and thereby increase the survivability of its aircraft. The lack of US Army support for the LAPES, shortage of Air Force funds, and the training required for Air Force and Army crews were factors which resulted in its discontinuance by 1971. For a more thorough discussion of CDS and



* Tons

Annual Airdrop Summary

	Troops	Cargo	Sorties
FY 68	27,198	27,128	4,715
FY 69	7,759	8,849	2,247
FY 70	46,466	3,231	1,859
FY 71	61,026	723	1,506

Figure 8 Airdrop Accomplishments As of 30 Jun 71

Source: TAPA - SEA

LAPES and Army and Air Force views concerning LAPES, see CHECO report chapter II, Tactical Airlift Operations, published by Headquarters PACAF, 30 June 1969, and End of Tour Report by General Herring (see Footnote 21).

Ground Radar Aerial Delivery System (GRADS)

The 834th AD and the 101st Airborne Division (Airmobile) evaluated GRADS from 8 January to 23 February 1970. Personnel were trained in rigging, drop, and recovery techniques. The objective was to determine if GRADS was effective in resupply of patrol size elements during Instrument Flight Rules (IFR) conditions. Of the 33 drops the average circular error (CEA) was 196 yards with 7 drops 300 yards off target. The largest error was 500 yards.[24/]

During October 1970 and January 1971 the 834th used GRADS to resupply isolated elements of the 101st Airborne during inclement weather. The average CEA was 200 yards in the October drops; all bundles were recovered. In January the average CEA was 400 yards; 50 percent of the bundles were recovered.

Further exploitation and refinement of GRADS was recommended. GRADS was designed to deliver 1,000 to 2,000 pound bundles, using time delay parachute disreefing devices. In most instances the bundles could not be used, secured, or transported adequately by six to eight-man patrols. Even though some parachutes did not deploy, items such as ratios and ammunition were often usable. It was considered probably that 68 inch parachutes would provide the same rate of fall for 250 to 350 pound bundles

as the reefed 22 foot parachute with the larger load. These smaller loads would be more functional for the patrols. Also the use of more sophisticated disreefing devices might permit drops from higher altitude and thus expand the flexibility of GRADS.[25/]

Aeromedical Evacuation

Tactical Airlift was instrumental in saving thousands of lives annually through the evacuation of sick and wounded. Army helicopters carried patients from the battlefield to forward operating locations. Tactical airlift aircraft then transported them to hospitals. Aeromedical aircraft were also used to transfer patients from one dispensary or hospital to another in South Vietnam. Occasionally out-country transportation was provided.

The number of patients airlifted and sorties flown was highly correlated with major ground fighting or campaigns such as the Tet Offensive in 1968, the Cambodian Campaign in 1970, and Lam Son 719 in 1971. Although aeromedical activity increased in these instances the general trend was downward as the number of US forces continued to decline. (See Table 1).

TABLE I

AEROMEDICAL EVACUATION

January - June, 1969 and 1971

	Sorties	Patients Evacuated
Jan - June 1969	4,203	40,219
Jan - June 1971	2,245	17,358
Percent Decrease	47	57

Source: TAPA-SEA

Commando Vault

Commando Vault was an operation to create an instant helicopter landing zone in the jungle by dropping a huge bomb from a transport aircraft. Tactical air strikes had proven unsuccessful for this task because the resulting craters usually made the zone unsuitable for helicopter landing.[26/]

M-121 and BLU-82/B bombs were dropped from C-130 aircraft using precision guidance by Combat Skyspot (MSQ-77) radar. The M-121 was a 10,000 pound bomb which had been designed for B-36 aircraft. Eight M-121 bombs were dropped during the initial SEA combat evaluation test in October 1968 called Combat Trap. Additional use of the C-130/M-121 weapon system was conducted during December 1968 in support of Operation Taylor Common. In March 1969, employment of the M-121 began using nickname Commando Vault. When the supply was exhausted in August 1970, its use was discontinued in favor of the more effective 15,000 pound BLU-82s.

Often the bombs created a zone suitable for the landing of three helicopters simultaneously. Occasionally the bomb was ineffective; at other times the landing zone could accommodate as many as five helicopters. In 1971 the bomb could be dropped consistently within 50 meters of the intended target.

By 1 December 1971, the 834th AD had dropped 526 Commando Vaults.* Generally the bombs were used to create helicopter landing zones (HLZs) in support of various battles such as the Allied incursion into Cambodia or Lam Son 719. The blast cleared the drop zone of booby traps, punji stakes, and other hazards. Enemy forces within one-half of a kilometer were incapacitated by the physical and/or psychological effects of the blast.[27/]

Commando Vault's were not restricted to HLZs. During December 1970 13 BLU-82/Bs were dropped from altitudes of 18,000 to 22,000 feet to clear jungle canopy which obscured enemy supply trails. During Lam Son 719 at least 11 were dropped on tactical targets such as massed enemy troops, truck parks, base camps, and cache sites. The device was also useful in creating fire support base sites.[28/]

*For further information on Commando Vault see CHECO reports: Commando Vault, Headquarters, PACAF, 12 October 1970; and The Cambodian Campaign (29 April to 1 July 1970), Headquarters, PACAF, 1 September 1970; also see End-of-Tour Report by General Herring (Footnote 16).

Psychological Operations

Many types of aircraft were employed in psychological operations (PSYOPS). The versatile C-130 was the tactical airlift aircraft used in such operations as Fountain Pen and Frantic Goat.[29/]

Fountain Pen

Operation Fountain Pen was a psychological leaflet program directed against enemy controlled or contested areas in Laos. The US Embassy in Vientiane, Laos, approved the message content. The program was actually an extension of the Trail Program to areas in Laos other than the trail. MACV Psychological Operations Division, J3-11, determined mission requirements and selected the mix of leaflets approved by the Joint US Public Affairs Office and Vientiane. The 7th Air Force Special Operations Division published fragmentary orders weekly and controlled the missions. C-130s of the 35th Tactical Airlift Squadron flew out of Ubon, Thailand, to drop the leaflets at altitudes ranging from 15,000 to 25,000 feet. The standard load was 12 million leaflets and weighed 21,000 pounds.[30/]

Operation Fountain Pen began in May 1969. During the first six months an average of 25 million leaflets were dropped each month; the average for the following six months was 40 million each.

Frantic Goat

Frantic Goat psychological missions were flown at high altitudes over Laos, Cambodia, and South Vietnam (also by C-130s of the 35th Tactical Airlift Squadron). In 1970 and 1971 an average of 46 million leaflets

were dropped each month in Cambodia. C-130s dropped 88 million leaflets from 8 February to 22 March 1971 for the Lam Son 719 operation.

In July 1970 the C-130 operating location was changed from Ubon to Cam Ranh Bay. In January 1971 the 90th Special Operations Squadron (SOS) at Nha Trang assumed the Fountain Pen and Frantic Goat missions. In April 1971, the 374TAW began augmenting the 90 SOS PSYOP missions. Augmentation was necessary because of the commitment to fly two additional Fountain Pen sorties per week.

Ranch Hand

Ranch Hand was the name given to herbicide missions flown by the 12th Special Operations Squadron. This unit flew herbicide missions of vegetation defoliation and enemy crop destruction, and insect control missions (primarily against malaria carrying mosquitos).[31/]

Defoliation operations began in 1962, with crop destruction starting in mid-1964. Similar operations began in Laos in mid-1965 and in the demilitarized zone in mid-1967. Peak activity occurred in 1969 as UC-123s were converted to a jet augmented configuration.

Subsequently, operations declined because of budgetary restrictions, the Deputy Secretary of Defense restriction on use of herbicide ORANGE,* the inactivation of the 12th SOS, and general concern over the ecological environment. By May 1970 defoliation missions had ceased.

*A chemical which was effective against broad leafy vegetation.

In January 1971 crop destruction missions ended as the Deputy Secretary of Defense directed that all herbicide operations cease. In November 1971 two UC-123s remained for insecticide spray missions. The others had been reconfigured as cargo aircraft and reassigned to other units.*

Airfield Survey

Airfield surveys were completed on all airfields in South Vietnam prior to use by tactical airlift aircraft. Recurring surveys were accomplished every six months. Airfields that had major repairs or changes also received special surveys.[32/]

The number of airfields did not remain stable but varied with the tactical situation and the pacification program.[33/] Similarly, the operational status of airfields changed. Of the 300 airfields in South Vietnam in early 1970, 138 were used for tactical airlift operations. By mid-1971, 106 were operational.** (See Table 2 for airfield status).

*For a detailed account of these operations see CHECO reports: Herbicide Operations in Southeast Asia, Jul 1961-Jun 1967, Headquarters PACAF, 11 Oct 1967; and Ranch Hand: Herbicide Operations in RVN, Jul 1967-May 1971, Headquarters PACAF, Oct 1971.

**For further information on airfields see CHECO report, Forward Airfields for Tactical Airlift in SEA, Headquarters PACAF, 15 June 1970.

TABLE 2

STATUS OF AIRFIELDS IN SOUTH VIETNAM, OCTOBER 1971

	C-7		C-123		C-130	
Type Field	Fields	Operational	Fields	Operational	Fields	Operational
I	9	7	6	4	14	11
II	92	86	72	66	34	31
III	16	13	16	16	16	16
Totals	117	106	94	86	64	58

Source: Report, subject: "RVN Airfield Listing," 834th AD, 31 Oct 1971.

Airfields were one of the greatest limiting factors affecting airlift operations in Vietnam. They were restrictive because of their physical characteristics and also because the Air Force had little or no control over the resources to maintain many of them in usable condition.[34/]

Approximately 100 airfields were maintained solely by US Army engineers. Generally, airfields within the area of operations of US Army Divisions received adequate preventive maintenance. Others tended to be ignored until deterioration restricted operations or required closing. This problem increased as US units withdrew.

Airfields were located in the rice paddies of the Mekong Delta and the high mountain regions of the central interior. The contrasting terrain features presented a broad spectrum of engineering problems and

and made continuous maintenance imperative in order to keep the airfields operational. For example, seasonal flooding of the Delta region required extensive dredging to maintain airfield elevations above the water level. Regardless of the effort expended, some fields were under water during the wet season, the time when repairs were most difficult. Thus, dry season rehabilitation and repair was essential at most fields.

Many of the fields in the low areas were built on dikes lying between rice paddies. Soil was limited and subgrade stabilization was difficult. Aircraft congestion was a common problem because of limited lateral clearances and small parking areas.

Fields in mountainous areas were of minimum length because of surrounding terrain features such as trees, hills, ravines, rivers, and streams. Generally, runway subsurfaces were constructed of better materials but erosion still occurred during the long wet season. The laterite peneprime surfaces deteriorated quickly under vehicular traffic. Depressions developed causing the matting to separate or tear. Even when repaired, these tire hazards reappeared under heavy traffic.

Aluminum matted surfaces resulted in fewer sharp cutting edges but lateral slippage was more prevalent, especially where taxiways joined the runway. AM-2 matting was more durable and panel replacement was considered quicker and easier than with other types of matting.

Many of the fields were transferred to the Vietnamese control from 1969-1971. Airlift still trafficked these fields, but on a diminished basis. The Vietnamese planned to reduce the number of operational airfields to approximately one-half of the 117 utilized by US forces, providing a more manageable maintenance situation.

US Army engineer support was considered excellent when their efforts could be obtained. However, the Air Force needed civil engineers for interface with the army engineers and to advise and assist the tactical airlift commander. An alternative would have been the assignment of army engineers to the staff of the tactical airlift commander.

Aerial Port Activities

In 1969 tactical airlift carried more than 4.5 million passengers--the equivalent of the combined populations of Boston, Detroit, Cincinnati, Dallas, Oklahoma City, Omaha, and Honolulu. Total tonnage of cargo, mail, and passengers hauled in 1969 was 1,341,000 tons.[35/]

Doubling these statistics reveals something of the magnitude of aerial port activities. A ton of cargo was usually handled twice by aerial port personnel--once during loading and again during off-loading. The same was true for processing of passengers.[36/]

Highlights

In mid-1970 aerial port facilities ranged from large fully-equipped terminals at major air bases to austere terminals at remote airfields. A new complex opened at Bien Hoa in January 1970. It included an

air-freight terminal, passenger terminal, ALCE building, Military Airlift Command Post building, snack bar, latrines, outsides storage area, and a 40,000 pound pit scale. Major terminals such as those at Bien Hoa, Tan Son Nhut, Cam Ranh Bay, and Da Nang could process more than 3,000 passengers and 1,000 tons of cargo each day.[37/]

Aerial port activities declined along with the number of US forces in Vietnam. Cargo tonnage and passenger processing decreased 57 and 45 percent respectively, from 1969 to 1971. (See Table 3.)

TABLE 3

CARGO TONNAGE AND PASSENGERS PROCESSED

January-June, 1969 and 1971

	Cargo (Tons)	Passengers (Number)
Jan - June 1969	884,000	5,116,000
Jan - June 1971	378,000	2,773,100

Source: TAPA-SEA

Aircraft Load Planning

The variety of cargo to be processed and type of aircraft to be loaded required meticulous planning to ensure optimum allowable cargo load (ALC). Explosives, livestock, fuel, and equipment--all had different handling characteristics. The cargo capacity and loading characteristics of the three types of aircraft were different and added to the complexity of the planning and loading phase.[38/]

Loading flexibility was lost since C-7 and C-123 aircraft were not equipped to handle 463L pallets. C-123s would take the standard 463L pallet loaded on skate rollers with long dimensions (108 inches) along the longitudinal axis of the aircraft. The C-7 would take the half pallet or "speed pallet". Because of this incompatibility cargo tended to become identified as C-130 or C-7. Once palletized there was a reluctance to break it down and reconfigure for another type aircraft.[39/]

Cargo too large for a single pallet was loaded onto two 463L pallets which had been fastened together. These pallets were coupled together by a 10,000 pound capacity chain and called "married pallets". The married pallets enabled faster loading and resulted in better aircraft load utilization.[40/]

The pallets were separated by wooden spacers which occasionally slipped, causing the married pallets to jam in the aircraft 463L rail restraint system. Although several commercially produced couplers were tested, none were satisfactory. This suggested that research continue for development of an acceptable coupler/spacer to prevent lost time resulting from pallet jams.[41/]

Materiels Handling Equipment (MHE)

The 10K Adverse Terrain (AT) forklift was the backbone of forward area operations. It was the most reliable and versatile materials handling equipment (MHE) in Vietnam. Substitute equipment, particularly the

10K Rough Terrain Forklift, did not function well under adverse operating conditions. During May 1970 10K AT forklifts were equipped with battle proof tires. The tires increased operational reliability in a combat environment but required more frequent replacement because of tread wear.[42/]

Continued Air Force development of better MHE for use in forward areas was suggested. Light weight, durability, and mechanical simplicity were characteristics needing emphasis in follow-on equipment.[43/]

Critical Role

The aerial port role was critical in tactical airlift. In the Tet Offensive and siege at Khe Sanh in 1968 aerial port facilities were saturated. Aircraft were delayed for loading or unloading. The limiting factor was not aircraft or aircrews, but the ability of the aerial port to move the cargo. It became apparent to tactical airlift personnel that the Air Force must maintain an active, progressive aerial port nucleus capable of rapid expansion and able to meet requirements of contingency operations, even as US forces withdrew.*[44/]

*The historical development of the aerial port system in South Vietnam is recorded in CHECO reports: Assault Airlift Operations, February 1966; and Tactical Airlift Operations, June 1969, both published by Headquarters PACAF. Another CHECO report focuses on the facilities, materiel, communications, and personnel and enlarges upon major continuing problems of the aerial port program: USAF Aerial Port Operations in RVN, Headquarters PACAF, 5 August 1970.

Summary

The tactical airlift role in Vietnam was multifaceted. Airlift missions included airlift of cargo and personnel, aeromedical evacuation, HLZ preparation, psychological operations, defoliation, insecticide, airfield survey, and aerial port activities.

These missions were correlated with the degree of involvement of US forces. During the 1969-1971 period US forces were withdrawing. Thus, the activity of each airlift mission declined; some significantly.

CHAPTER IV

LAM SON 719

Introduction

This chapter examines the role of tactical airlift in a large scale operation involving U.S. Army, USAF, and Republic of Vietnam Armed Forces (RVNAF). Ground operations and tactical air support are described briefly to give perspective for examining the role of airlift. Each phase of the airlift operation is discussed: planning, deployment, resupply, and withdrawal. Finally, the impact and lessons learned are recorded.

The Campaign

Lam Son 719 was an incursion into Laos by a three division South Vietnamese force. Support forces included U.S. air strike and tactical airlift forces, the U.S. Army XXIV Corps (supporting fires and helicopters), and the VNAF (helicopters and A-37 strikes). The objective was to interdict the major north-south route structure in the Tchepone area and destroy as many enemy supplies as possible. The operation began on 30 January and ended 8 April 1971 as the last ARVN units were airlifted back to Tan Son Nhut Airfield, Saigon.

Lam Son 719 was to proceed in four phases: reopen supply routes and fire support bases in South Vietnam to ensure support for the operation in Laos; move RVNAF units along Route 9 to seize Tchepone, block north-south routes crossing Route 9, and seize or destroy supplies; secure rear lines and move southwest through base areas to destroy supplies and

block Route 914; and withdraw from Laos prior to the onset of the wet season, leaving harassing forces behind.[45/]

Ground Operations

On 30 January the U.S. 1st Brigade, 5th Infantry Division (Mechanized), with attached engineer units, moved down Route QL9 to open the road from Dong Ha to Khe Sanh. U.S. forces reached Khe Sanh on 31 January and engineers began restoring the runway and emplacing heavy artillery in the area. A task force secured Route QL9 and pushed on to the Laotian border, reaching it on 3 February. Armor and infantry task forces then swept north of Route QL9 and south of Khe Sanh toward the Laotian salient. The RVNAF assisted in the sweep and prepared for the move into Laos.[46/]

Early on 8 February the Army of the Republic of Vietnam (ARVN) 1st Armored Task Force moved along Route 9 into Laos. Simultaneously, five battalions of rangers and infantry made helicopter combat assaults into positions north and south of Route 9. The armored task force traveled 10 kilometers (km) the first day and 5 km the second day. Route 9 had numerous washouts and the dense underbrush along its sides slowed the progress of the two airborne infantry battalions screening for the armored column. Low cloud ceilings, poor visibility, and rain delayed the heliborne insertion of additional battalions until 10 February and hampered road improvement by ARVN engineers. The weather cleared on 10 February and the drive continued. The ARVN positions of 12 February changed little until 3 March. (See Figure 9). Two ranger battalions held positions

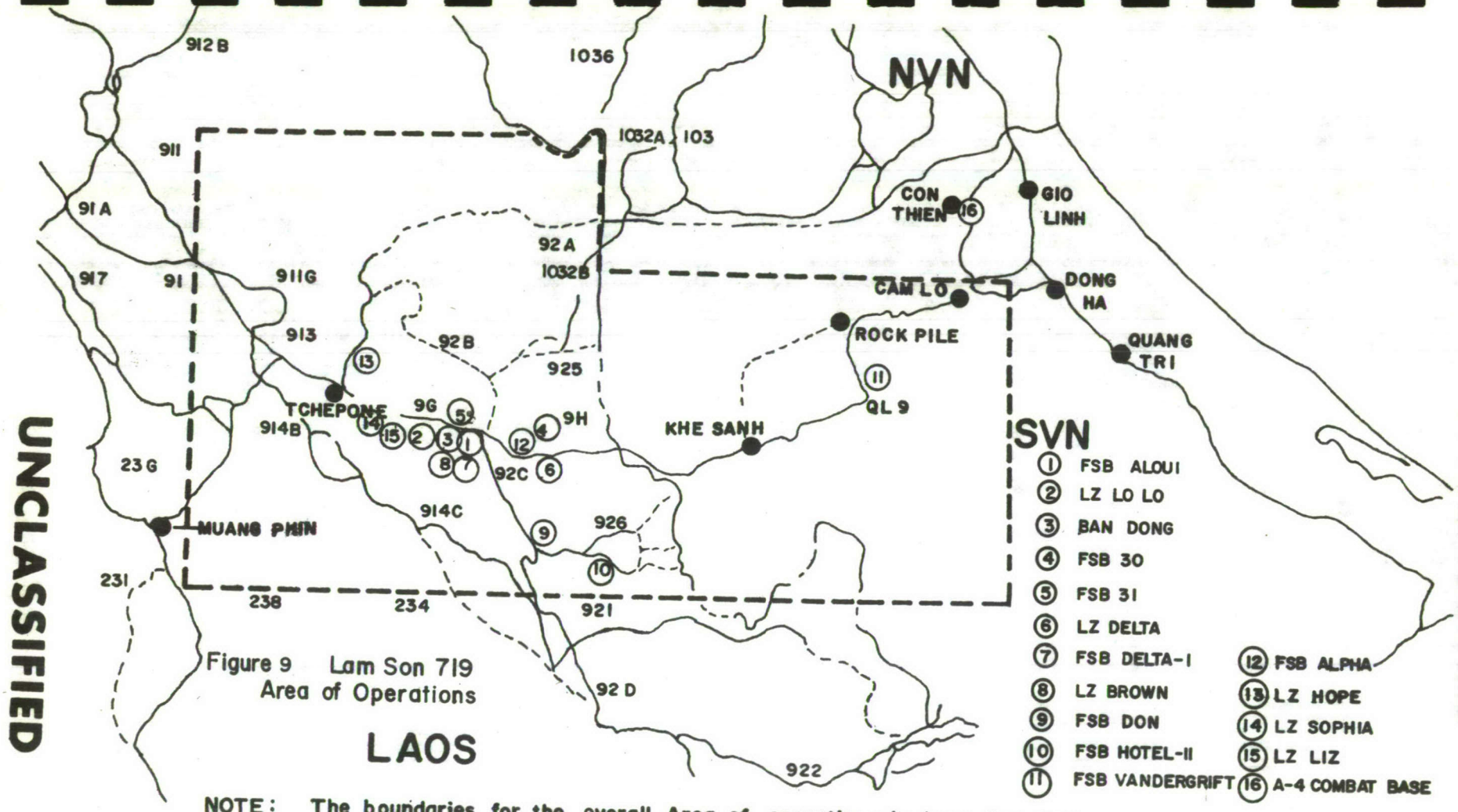


Figure 9 Lam Son 719
Area of Operations

NOTE: The boundaries for the overall Area of operations in Lam Son 719 varied in the early stages of the campaign. Figure 34 shows the AO that was finally established for reporting purposes.



Source : COMMANDO HUNT V,
Headquarters 7AF
May 1971

along Route 925 to screen the northern flank. Battalions of the 1st Airborne Division established fire support bases along the ridge north of Route 9, while units of the 1st Infantry Division operated south of the highway. The armored force operated along Route 9 and 92. By 16 February South Vietnamese forces in Laos numbered more than 10,000. Fire support bases were constructed on high ground overlooking Route 9.

Enemy resistance to the ARVN movements was light in the first four days. By 12 February communist troops had encircled them with infantry, artillery, mortars and rockets. Then the ARVN received attacks by fire and infantry probes as they searched for the enemy's supply caches and fortifications. Although U.S. air forces struck heavily, the intensity of the enemy attacks increased. Using coordinated tank and infantry attacks under the cover of heavy mortar and rocket fire, the enemy overran a ranger battalion on 18 February and an airborne fire support base on 25 February. The whole northern flank and the westernmost positions on the southern flank were engaged in heavy fighting with the enemy until 27 February. Then a lull permitted each side to replenish and reinforce. The NVA increased its strength to 35,000 by adding five infantry regiments. The South Vietnamese increased its force to 17,000 with two marine brigades, an infantry regiment, and two armored units.

On 3 March the South Vietnamese 1st Infantry Division began heliborne leapfrog maneuvers to Tchepone. One battalion was lifted to Landing Zone (LZ) Lo Lo on 3 March, another to LZ Liz on 4 March; two

were lifted to LZ Sophia on 5 March, and two to LZ Hope, north of Tchepone on 6 March. These last two battalions operated in the Tchepone area for four days and returned to the area near Sophia on 10 March.

The 1st Infantry Division redeployed to the east, conducting harassing probes against Route 914 as they moved. The enemy offensive began on 14 March. By 19 March all South Vietnamese units were in heavy contact. The battalions of the 1st Infantry fought desperately as did the airborne units holding on the north to cover the withdrawal of the armored task force along Route 9. After extraction of the 1st Infantry the Vietnamese marines received the brunt of the enemy attacks from the south. As the armored column moved east, it was ambushed several times and nearly overtaken by NVA tanks. In their accelerated withdrawal RVNAF units abandoned an unknown amount of equipment. Fortunately, tactical air strikes broke up the attack and covered the task force until it crossed back into RVN on 24 March. All South Vietnamese units were out of Laos by nightfall.

Reconnaissance and harassing units re-entered Laos on 24 and 31 March and 6 April for short periods of time. Operation Lam Son 719 ended on 8 April.

Tactical Air Support

Prior to Lam Son 719, about 10 percent of the strike sorties flown in Steel Tiger (Area of Southern Laos) supported Lao guerrilla operations against the Ho Chi Minh trail. For the multi-division Lam Son 719 operation, the tactical air effort shifted from interdiction to support of

ground forces.[47]

Sortie rates increased with the shift to close air support. During peak periods fighter aircraft flew 1.5 sorties per day and some units achieved a 2.0 rate. The Navy had three carriers on station for seven days during March. This increased the number of sorties available for Lam Son 719. The high of 337 tactical air sorties occurred on 10 March. Air operations in Lam Son 719 were provided without decreasing support in RVN, Cambodia, or Barrel Roll (Northern Laos).

Allied air forces flew 8,512 tactical air, 1,358 Arc Light, and 2,856 tactical airlift sorties in Lam Son 719. Total tactical air sorties included 147 by VNAF A-37s. Hammer FACs flew 1,291 sorties from 8 February through 24 March, averaging 29 sorties per day.

Role of Tactical Airlift

Tactical airlift was an important factor in Lam Son 719. Transport aircraft brought the troops to the deployment area, provided sustained airlift support during the operation and returned the troops to home bases during the redeployment phase.

Phase I - Preparation

Secrecy

The entire operation was planned and launched under a veil of secrecy. Initially the operation was referred to as Dewey Canyon II to make the enemy think the operation was similar to Dewey Canyon I--a sweep in the A Shau Valley. If the enemy was confused, so were many HQ 7AF staff officers. Lam Son 719 had been in operation several days

before it become clear that only one allied action was taking place.[48/]

Preparations for Lam Son 719 were so secretive that only the 7AF Commander and selected members of his staff attended the initial Top Secret SPECAT LIMDIS* briefing given by G-2, XXIV Corps, U.S. Army on 21 January. Among this group was the 834th Commander and two of his staff officers.[49/]

Initial Planning

The following day the 834th received more definitive instructions from JACJ-45 via a Top Secret message. The 1st ARVN Airborne Division and a Vietnamese marine brigade were to be moved from Tan Son Nhut to Quang Tri and Dong Ha, from 31 January through 4 February. Based on factors of 12.5 tons and/or 130 combat troops per C-130 and a 15 hour crew duty day, planners estimated that 222 sorties could move the 9,970 troops and 1,810 tons.

The 834th was unaware that U.S. forces would also be airlifted in the operation. This information came in unannounced in successive groups of Combat Essential requirements (CEs). This required extensive reprogramming of flow schedules, coordination with 834th Detachments 1 and 2 for crew availability, and coordination with MACJ-45 to establish priorities within the group of CEs. The C-130 Common Service Airlift and SEA scheduled passenger runs were discontinued and more off-shore

* Security designation, Special Category Limited Distribution.

C-130s were brought in to meet the additional requirements.

Only a few people were involved in the initial planning. Most of the airlift plan was verbal and lacked sufficient detail. The XXIV Corps published a detailed operations order, supplemented by a Seventh Air Force operations order. The order emphasized tactical air operations, with little attention to airlift. After the operation began an airlift plan was written as an annex to the 7AF operations order.[50/]

The original planners overlooked the fact that the operation coincided with the Vietnamese celebration of Tet. The Vietnamese, unaware of the impending operation, were on a holiday and could not state their airlift requirements. Ultimately U.S. advisors to the marine and army units determined the number of people and amount and type of equipment that would move in what sequence and when. However, there were no repercussions as the Vietnamese were satisfied with the decisions of the U.S. Advisors.[51/]

Management

The 834th AD planned to direct the airlift through the ALCC at Tan Son Nhut and ALCEs at Dong Ha, Quang Tri, and Da Nang. Thus a forward airlift task force element was established at Da Nang to perform the required planning and liaison functions with the XXIV Corps staff. As the operation progressed, this task force element was expanded to include a detachment of C-130 aircrews and operations and maintenance personnel.[52/]

A mission commander, combat control team, and a five-man maintenance team were deployed to Quang Tri and Dong Ha airfields. An aerial port mobility team was deployed to Dong Ha and the aerial port operating location at Quang Tri was augmented with additional personnel and equipment. Their task was to ensure that arriving aircraft unloaded and departed in minimum time.

Airfield survey and TALO personnel evaluated facilities, selected appropriate routes, established operational procedures, and coordinated these arrangements with Da Nang Departure Control, Panama Control at Monkey Mountain, Hue Approach Control, Pamper Control at Quang Tri, and the 834th AD. A preferred routing system was established since air traffic and approach control facilities in the northern area of South Vietnam were limited.

The airfield at Dong Ha had been closed for seven months and had to be reactivated. An Army Ground Control Approach (GCA) system, temporary airfield lighting, tower (operated by one man), nondirectional beacon, and an Air Force TACAN* were installed to permit 24 hour a day operations.

* Tactical Air Navigation (radio air navigation system).

Phase II - Deployment

The airlift of U.S. troops and equipment into Military Region (MR) I bases at Dong Ha and Quang Tri to provide air and ground support began on 27 January and continued through 6 February. The in-country C-130 fleet was augmented with ten additional aircraft from off-shore wings, bringing the number of C-130 aircraft in Vietnam to 58. The entire fleet was utilized on a 24-hour basis when the movement of the Vietnamese forces began on 30 January 1971. The movement of the ARVN 1st Airborne Division and the 258th Vietnamese Marine Brigade from Tan Son Nhut Airfield to Dong Ha and Quang Tri occurred between 30 January and 6 February with 247 sorties airlifting 9,280 passengers and 680 tons of cargo for a total payload of 1,715 tons. Twelve C-123 sorties were flown during the deployment--the only time these aircraft were used in the operation. In all, 4,609 tons were airlifted in the first phase.[53/]

During the three months preceding this operation the 834th AD averaged three priority sorties per day, carrying 190 tons a day. During the deployment, these sorties increased to 49 daily and carried 379 tons a day. The high of 102 sorties, carrying 758 tons of cargo and passengers, occurred on 4 February.

The deployment was completed on 6 February despite a number of aircraft delays at Dong Ha and Quang Tri. These delays were caused by limitations of the Army GCA equipment which was not designed to control multiple aircraft simultaneously. To compound this problem, the GCA was

inoperative a large part of the time because of maintenance problems and a lack of spare parts.[54/]

TABLE 4

DEPLOYMENT AIRLIFT FOR LAM SON 719
26 January-6 February 1971

	Cargo (Tons)	Passengers (Number)	Total (Tons)	Sorties
C-130	3,269	11,770	4,551	592
C-123	26	271	58	12
Total	3,295	12,041	4,609	604

SOURCE: Command Briefing, 834th Air Division, undated, pages 1 - 15.

Phase III - Resupply

Tactical airlift resupplied allied forces from 7 February through 27 March. Quang Tri, Phu Bai, and Da Nang Air Bases were the primary resupply points until 15 February when Khe Sanh was reopened.

Runway Construction

C-130s could not off-load at the main resupply base of Khe Sanh until a runway was constructed. The 3,900 foot airstrip had been closed since its abandonment in 1968 by U.S. forces and the entire area had to be cleared of mines left by the Americans. On 31 January U.S. Army engineers began constructing a new runway since the old airstrip was marred by shell holes and erosion. Work began on the old strip as well to provide backup capability. These two runways, with a new 350 X 800 foot steel

mat packing apron would provide the capacity to handle the large volume of resupply traffic.[55]

On 4 February the new 3,200 foot runway was completed and the first C-130 landed. It was apparent that the dirt strip was too soft when the wheels of the lightly loaded aircraft sank into the surface more than six inches. Consequently, engineers covered the runway with aluminum matting, completing the work on 15 February. The first POL sortie arrived the same day. Repairs on the old runway were completed on 1 March.[56]

Trucks and Helicopters

A massive resupply effort to sustain the Allied forces was mounted at the Khe Sanh combat support base. It was vital that adequate stores of JP-4 fuel and ammunition of all types be maintained at Khe Sanh. Since delivery by aircraft was delayed until reopening of the runway on 15 February, all supplies had to be transported by Army trucks or CH-47 helicopters and U.S. Marine CH-53 helicopters. The resupply strained the Army's transport capability as the engineering force struggled to keep Route 9 passable.[57]

The ARVN were resupplied almost entirely by helicopter. The armored task force and the airborne units designated to secure Route 9 could not insure safe passage for ARVN truck convoys. Consequently, it was not a reliable means of resupply.[58]

Artillery Free Corridors

The Khe Sanh Combat Support Base was surrounded by artillery fire zones. In order to accommodate the airlift operation, artillery free corridors had to be established through the area for the transport aircraft. Planners from the 834th AD contacted the XXIV Corps Artillery Officer and the air control agencies serving MR I to create a corridor from Hue, a terminal control zone at Khe Sanh, and an exit corridor to Quang Tri.[59]

The U.S. Army installed a low frequency radio beacon at Khe Sanh and the Air Force installed a TACAN for navigation in the corridors. The radio beacon could not be received beyond 10 miles and was not reliable for an ADF* approach into Khe Sanh. The TACAN coverage was excellent and reliable. Lock-on would occur before entering the corridor at Hue and hold even on the runway at Khe Sanh.[60]

This corridor and air traffic control arrangement permitted the airlift aircraft continuous access to Khe Sanh and exit from the area during daylight hours. Communications were established between the artillery and the air traffic control agencies in the event that the Commander XXIV Corps closed the corridor for firing during an emergency. Without this arrangement the required volume of resupply could not have

* Automatic direction finding (equipment)

been accomplished.[61]

Aircraft Control

Although the U.S. Army was responsible for the Khe Sanh airfield, Army aviation facilities were not adequate to meet Air Force needs for all-weather, round-the-clock operations. Consequently, the USAF 1st Mobile Communications Group installed, maintained and operated a GCA unit, control tower, TACAN, and runway and approach lighting. To ensure efficient and rapid cargo handling and C-130 turn-around, the 834th Air Division sent to Khe Sanh a mission commander, TALO, combat control team (one officer, two airmen), mobility team (one officer, 15 airmen), transportable airlift control element (TALCE), (one officer, three airmen), and a maintenance turn-around team (three airmen).[62]

Mission Commander and TALOs

A mission commander, responsible to the 834th AD Commander, directed airlift operations on the scene. TALOs were located at Khe Sanh and XXIV Corps (Forward). They coordinated Army airlift requirements and prepared emergency and special airlift requests. Operating with jeeps and radio equipment, they provided instant communications with XXIV Corps, the mission commander, and the 834th AD Command Post without interfering with the CCT's control of air traffic.

Combat Control Team

The Combat Control Team arrived on the first C-130 into Khe Sanh on 4 February. Since the airfield did not reopen until 15 February,

the CCT remained to provide long range HF (high frequency) radio communications. After the field reopened the CCT began flight following duties. This continued until 11 March when the TALCE was installed. The CCT then remained as a reserve for air traffic control and HF communications; and they were available to implement the emergency aerial resupply plan.

The helicopter traffic about Khe Sanh caused difficulties for arriving and departing C-130 aircraft, especially during the periods when only one runway was available. These difficulties were attributed to the extremely high density of rotary wing traffic, a lack of air discipline on the part of some U.S. Army helicopter pilots, and the low level of experience of Army tower operators in controlling fixed wing and rotary wing air traffic at Khe Sanh. This situation was partially resolved by the use of an Air Force control tower and USAF operators. Despite the difficulties, however, the resupply effort was adequate to sustain the combat units.[63/]

On 1 March a TALCE command module and six personnel were flown into Khe Sanh to support resupply operations. Deployment of the dormitory and sanitation modules and support components was delayed until 8 March when the new airfield ramp was completed. The TALCE became operational on 11 March and assumed the flight following and communications role.

Aerial Port Mobility Teams

Several aerial port mobility teams were used at Khe Sanh because of the large volume of cargo flowing into the base. Each team was equipped with adverse terrain fork lifts and able to unload an aircraft

with palletized cargo in less than five minutes. During peak operations a C-130 arrived on the average of every eight minutes.

Aerial port personnel and others worked around the clock despite marginal weather, primitive living conditions, and enemy harassment. Khe Sanh received over 500 rocket, artillery, and mortar rounds; and enemy ground probes and sapper attacks in 17 incidents from 9 March through 31 March.

Da Nang Operating Location

The sortie effort at Khe Sanh was sustained primarily by positioning 11 aircraft with supporting equipment, personnel, and aircrews at Da Nang under a special airlift headquarters. Aircraft flow into the corridor to Khe Sanh was controlled on the basis of ground capacity at Khe Sanh--to park, off-load, and relaunch the aircraft.

Only four delays were attributed to maintenance throughout the operation. This record was achieved by 68 maintenance specialists and 22 crew chiefs. Their equipment included 17 CONEX (container express) tools and spare parts, 11 equipment pallets with parts, and C-130 engines and propellers.

A rocket attack on Da Nang in late February destroyed one C-130 and damaged three others. Thereafter the aircraft were dispersed during the hours of darkness.

The Resupply Payload

C-130s flew 2,047 sorties during the resupply phase. This accounted for 21,200 tons of cargo and 13,717 passengers, totaling 22,509 tons. The most active days were on 3 March when 94 sorties carried 1,271 tons and 28 February when 114 sorties carried 1,202 tons. Khe Sanh was the most active resupply point with 14,585 tons off-loaded there. (See Table 5).

TABLE 5

RESUPPLY AIRLIFT FOR LAM SON 719
7 February-27 March 1971

Location	Cargo Tons	Passengers	Total Tons	Sorties
Khe Sanh	14,141	4,657	14,586	1,168
Quang Tri	3,941	2,508	4,206	418
Dong Ha	252	1,017	344	43
Phu Bai	1,600	2,279	1,834	225
Da Nang	1,043	2,831	1,221	137
Other	243	425	318	56
Total	21,220	13,717	22,509	2,047

SOURCE: Command Briefing, 834th Air Division, undated, pages 1 - 55.

Commando Vault

Commando Vault missions were important to the mobile tactics of the RVNAF forces. During the Lam Son offensive C-130 aircraft dropped 25 BLU-82/B 15,000 pound bombs for Helicopter Landing Zone (HLZ) preparation and destruction of targets. Of the 25, 11 were dropped on tactical targets such as enemy troops, truck parks, base camps and cache sites. The remainder were used to create HLZs and fire base sites.[64/] The majority of the HLZs could accommodate three to four aircraft simultaneously.

Aerial Resupply

The 834th AD could airdrop supplies to the South Vietnamese units operating in Laos at any time. The airdrop plan provided for a two-mile wide artillery-free air corridor over Route 9 from Khe Sanh to Tchepone. A TACAN was installed for navigation in the corridor by the 1st Mobile Communications Group. The TACAN was located four nautical miles southwest of Khe Sanh.

The 834th AD took extensive precautions to ensure safe use of the corridor. Routing, control of artillery fire, and airdrop procedures were coordinated with specific ARVN combat units; ARVN Corps, G-4; U.S. XXIV Corps, G-4; and Headquarters MACV. Only the ARVN I Corps Commander could activate the corridor and clear the area of other air traffic and artillery fire. Once the corridor was activated, the plan called for a combat controller at Khe Sanh to deploy to Red Lion, the joint US/ARVN

artillery control center (located one mile west of the airfield), to ensure positive control of Allied artillery.

At Da Nang more than 350 tons of ammunition, POL, and rations specially configured for various type Vietnamese units were palletized, inspected, and rigged for Container Delivery System (CDS) airdrop. A platoon of U.S. Army riggers stood ready to rig an additional 50 tons per day if required.

If airdrops were to be used, C-130s would proceed from Da Nang along the Hue-Khe Sanh corridor. Once over Khe Sanh the aircraft would orbit, delaying entry into the Laotian corridor until synchronized with ± 2 minutes time over target at the drop zone. Airdrops would occur at 15 minute intervals. The airdrop corridor was 4,000 to 10,000 feet from Khe Sanh to a point 10 nautical miles from the drop zone where it extended to ground level.

Dropping cargo from an altitude of 600 to 800 feet, at an airspeed of 130 knots, with flaps down and the rear doors open would present a lucrative target for 37mm and .50 caliber antiaircraft weapons. So a different tactic was planned. The C-130s would come in low at tree top level, climb to 600 to 800 feet, drop the load, and then go in low again. The aircraft would then return to Khe Sanh, fly the 077 degree Khe Sanh/ Quang Tri leg and return along the coast to Da Nang.

Air drop zones were also established to ensure accurate delivery of the cargo. Drop zones measuring 550 X 200 meters were to be cleared along the 283 degree heading of the corridor. The impact point would be clearly marked with timing panels and colored smoke to indicate drop/no drop and wind direction.

The airdrop was not used in Lam Son 719. When the scheme of maneuver became one based upon fixed fire support bases, resupply in Laos was accomplished by helicopters.

Phase IV - Withdrawal

The final segment of Lam Son 719--withdrawal of forces and equipment--began 28 March and ended 8 April 1971. Return cargo included excess ammunition, rations, the Air Force GCA unit, two Air Force TACAN units, the TALCE, aerial port mobility team and combat team equipment, and salvageable aluminum matting. RVNAF forces and USAF personnel were airlifted to military bases in the Saigon area.

The largest withdrawal mission was accomplished during 1 - 6 April and required 57 sorties and the airlift of 4,600 ARVN combat troops and equipment totaling 959 tons. (See Table 6 for summary of withdrawal airlift.)

TABLE 6

WITHDRAWAL AIRLIFT FOR LAM SON 719
28 March-8 April 1971

Location	Cargo (Tons)	Passengers (Number)	Total (Tons)	Sorties
Khe Sanh	978	174	998	82
Phu Bai	102	8,155	1,321	91
Quang Tri	91	1,330	250	22
Total	1,171	9,659	2,569	195

SOURCE: Command Briefing, 834th Air Division, undated, pages 1-15

The withdrawal was complicated by the simultaneous airlift of elements of the 1st Air Cavalry Division (Airmobile) U.S. Army from Military Region III to Military Region I, to support another operation. Also, ARVN forces had to be moved into Military Region II to counter increased enemy activity in the vicinity of Pleiku and Dak To.

Impact

The total impact of Lam Son 719 on the enemy was indeterminate. Airpower played a significant role in Lam Son 719 by providing air strikes, air mobility, resupply, and withdrawal capability. Undoubtedly, many more thousands of troops would have been required in such an operation and more lives lost without the efficacy of air forces. And certainly the logistics capability of the U.S. Army would have met a severe test had

Khe Sanh not been reopened to aircraft on 15 February.[65] (See Table 7 for total airlift provided.)

TABLE 7

TACTICAL AIRLIFT FOR LAM SON 719
26 January-8 April 1971

Date	Mission	Cargo (Tons)	Passengers (Number)	Total Tons	Sorties
26 January - 6 February	Deploy	3,295	12,041	4,609	604
7 February - 27 March	Resupply	21,220	13,717	22,509	2,047
28 March - 8 April	Redeploy	1,171	9,659	2,569	195
	TOTAL	25,869	35,417	29,687	2,846

SOURCE: Command Briefing, 834th Air Division, undated, pages 1-15.

Lessons Learned

Joint operations required thorough and comprehensive planning to be effective. Whenever such operations involved large scale airlift, it was important that airlift personnel be included in the initial planning. This would enable Air Force personnel to use the predeployment phase to plan and arrange for essential airlift support and assist Army planners in understanding the capabilities and limitations of airlift.[66]

Factors to be considered in the initial planning phase included artillery free corridors, airfield survey, communications, navigational

aids, mobility teams, support and maintenance facilities, field equipment, combat control teams, TALCEs, recurring airlift requirements, housing, and mess facilities.

Operations involving a large volume of Air Force airlift and Army helicopter traffic required the use of Air Force air traffic controllers and Air Force navigational aids and approach facilities. Army GCA equipment was not designed to provide for multiple IFR approaches and departures. Further, Army air traffic controllers had neither the training nor experience to control the large volume of traffic.

It was desirable to operate from a single base. This permitted consolidation of maintenance resources, supply and support facilities, and controlled launch of airlift aircraft. This, in turn, resulted in a more even flow of traffic into forward bases. Moreover, operations were simplified and more economical.

Close coordination between airlift personnel and the Army logistics staff was essential. Changing tactical situations on the battlefield changed the logistic requirements. Often this necessitated a change of priorities or method of delivery to ensure timely and safe delivery of personnel and supplies.

An airlift task force including assigned aircraft, aircrews, and support personnel and equipment was essential to an effective and efficient large scale airlift. A task force working directly with Army

combat units tended to be more responsive because they gained a greater knowledge and understanding of daily operations. Aircrews who flew regularly became familiar with the procedures and requirements. This tended to expedite the flow of air traffic.

Summary

Lam Son 719 was an incursion into Laos by RVNAF forces to interdict a major route structure near Tchepone and destroy enemy supplies. Tactical air forces struck the enemy in support of the ground operation. The U.S. Army XXIV Corps provided helicopter and supporting fires but its ground forces remained within the South Vietnamese border. Tactical airlift carried the forces to the deployment area, resupplied them during the battle, and returned them to their original bases when the campaign ended.

The campaign was launched in such a covert manner that initial airlift planning was insufficient. This contributed to the delay in reopening of the airfield at Khe Sanh and to air traffic control problems.

Airlift control elements and planners overcame these difficulties and each phase of the airlift was executed successfully. Aircraft flew 2,856 sorties, carrying 29,687 tons (including passenger and cargo).

A number of lessons concerning future airlift were learned from Lam Son 719. Airlift planners considered it essential that they be included in the initial planning of operations involving large scale airlift in

order to ensure essential support. Army air traffic control equipment and personnel were inadequate to control a large volume of air traffic. Close coordination between airlift personnel and the Army logistics staff was essential due to changing battle conditions. An airlift task force was also necessary to ensure effective and efficient airlift for large operations such as Lam Son 719.

CHAPTER V

TACTICAL AIRLIFT OF THE VNAF

Introduction

This chapter examines the growing capability of the VNAF airlift. Described are the type and number of aircraft, training status of personnel, airlift highlights, and aerial port training.

Aircraft

In January 1969 the VNAF airlift force consisted of one squadron of sixteen C-119s and one squadron of sixteen C-47s. All were based at Tan Son Nhut AB. By September 1971, 32 C-123s had been transferred from the 834th AD to the VNAF, with 16 more scheduled by 31 December 1971. C-7s were to be transferred as VNAF crews became qualified. One VNAF squadron was to activate 1 Mar 72 with 24 C-7s (16 UE + 8 NOA). The second VNAF squadron was to activate 1 May 72 with 24 C-7s (16 UE + 8 NOA). A third squadron was to activate 1 Jul 72 with 16 UE aircraft.[67/]

The addition of jet-assisted C-123Ks permitted airlift operations into many short and previously inaccessible airstrips. This capability would be enhanced further with the transfer of C-7s. The overall result would be effective VNAF support to ARVN staging areas and fire support bases.

By mid-1972 the VNAF airlift force would increase from two types of aircraft to four; from 32 aircraft to 128. Average airlift capability would increase from 126 tons per day in mid-1971 to 485 tons per day by mid-1972.

Training

In January 1970 the 834th AD (315 Tactical Airlift Wing) began training selected VNAF aircrew members and maintenance personnel for C-123 aircraft. By the end of 1971, 112 C-123 pilots were expected to complete the training.[68/] (See Table 8.) C-47 first pilots were transitioned into C-123 aircraft. Aircraft commanders for C-7s were to come from C-47 and C-119 resources. All VNAF pilots and co-pilots were graduates of pilot training courses in the United States. Many of the navigators were graduates of the VNAF undergraduate navigation course established at Tan Son Nhut in 1970.

TABLE 8

VNAF TRAINING SCHEDULE FOR

TACTICAL AIRLIFT AIRCRAFT

Aircrews	
Pilots	112
Navigators	6
Flight Mechanics	60
Loadmasters	60
Maintenance	
Specialists and crew chiefs	143

SOURCE: End of Tour Report, by Major General Herring

In March 1971, Air Force Advisory Team 5 (AFAT-5) identified the serious shortage of aircraft commanders. Of the 242 staff and line aircraft commanders required, no more than 175 would be available by the end of the year. This was based on the assumption that every first pilot assigned in March 1971 (56) would upgrade to aircraft commander by December. Even so, this would provide only 70 percent of the required number of aircraft commanders.

In addition to aircrew, maintenance training was required for the two new types of aircraft. Mobile training teams were dispatched to Phan Rang AB during 1970-71 to conduct maintenance training. Skilled VNAF maintenance men were trained by the teams as instructors. An integrated maintenance team then instructed other VNAF personnel.

The transfer of aircrew and maintenance training for the C-123s and C-7s from the United States to South Vietnam were well advised. This transfer of training built confidence in VNAF ability to become self-sufficient, and it saved approximately $800,000. But perhaps more important was the expected achievement of operational ready status several months earlier than would have been possible if training had been conducted in the United States.

Airlift Highlights

During 1970 VNAF transports carried 39½ percent of the RVNAF cargo. The average remained around this level during the first six months of 1971. The low of approximately 24 percent occurred during March-April when USAF airlift supported Lam Son 719. With the activation of one

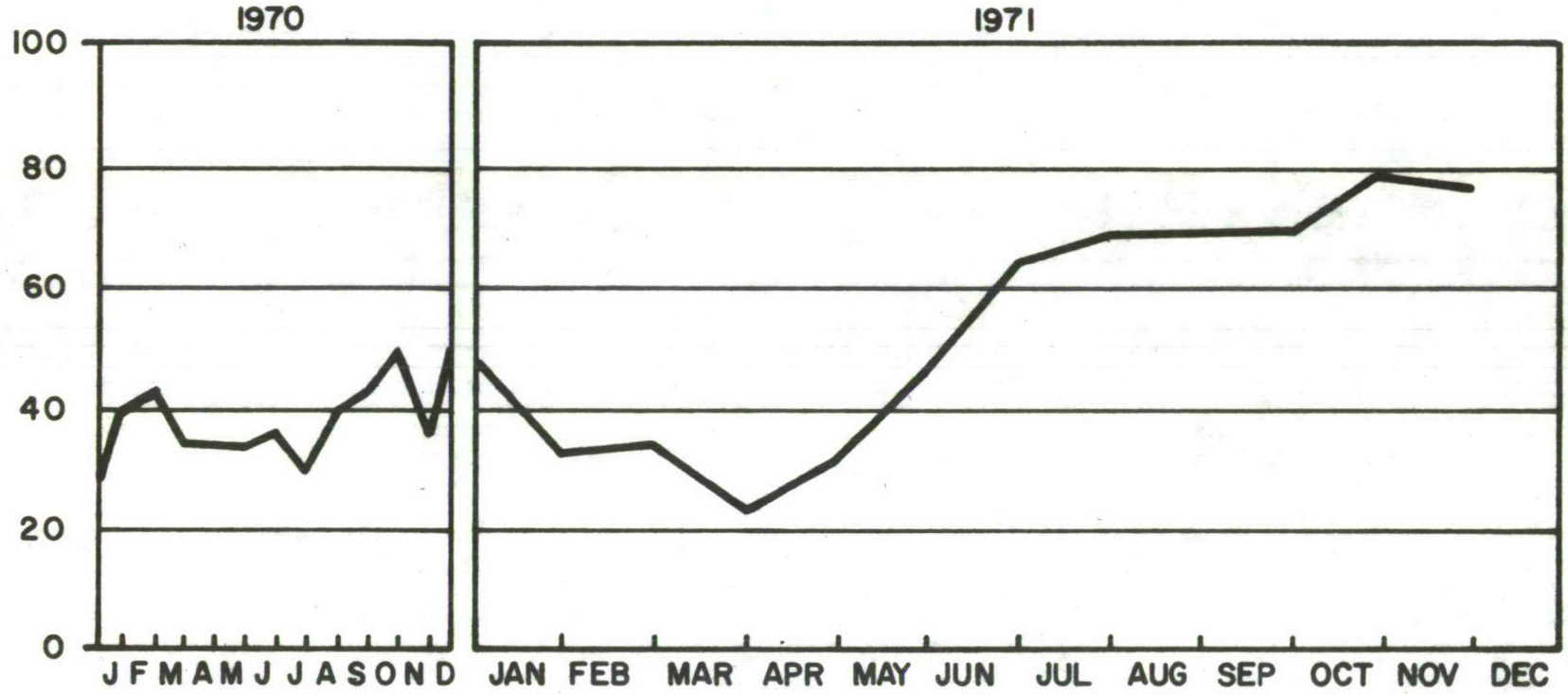
C-123 squadron in May and another in July, the monthly percentage rose steadily, reaching 68 percent in July and a peak of 80 percent by the end of October. Troop transport reflected a similar trend for both years. (See Figures 10 and 11).

Approximately 25 percent of VNAF airlift during 1971 was devoted to Cambodian operations, as were many of the 1970 missions. Operation Eagle Jump, for example, in December 1970, supported ARVN operations in the vicinity of Kompong Cham airport. The operation was considered successful, but there was some confusion resulting from inadequate command and control procedures. Corrective efforts underway in 1971 to improve airlift communications and to train a combat control team.

VNAF airlift forces demonstrated a surge capability during operation Eagle Jump in December 1970 and operation Lam Son 719 in March and April 1971. Operational sorties for December 1970 increased by nearly 200 over the preceding three month average. In March and April, the number of sorties was approximately 150 more than the number flown in January and February 1971.

By the end of 1971 self-sufficiency of VNAF airlift forces was becoming a reality. The transfer of C-7s to the fleet would enhance airlift capability further. The equipment and training provided by CRIMP,* the assistance provided by the Advisory Group, and the training by the 834th AD was achieving results. In 1970 the VNAF carried over 30 percent of

*Consolidated RVNAF Improvement and Modernization Plan.

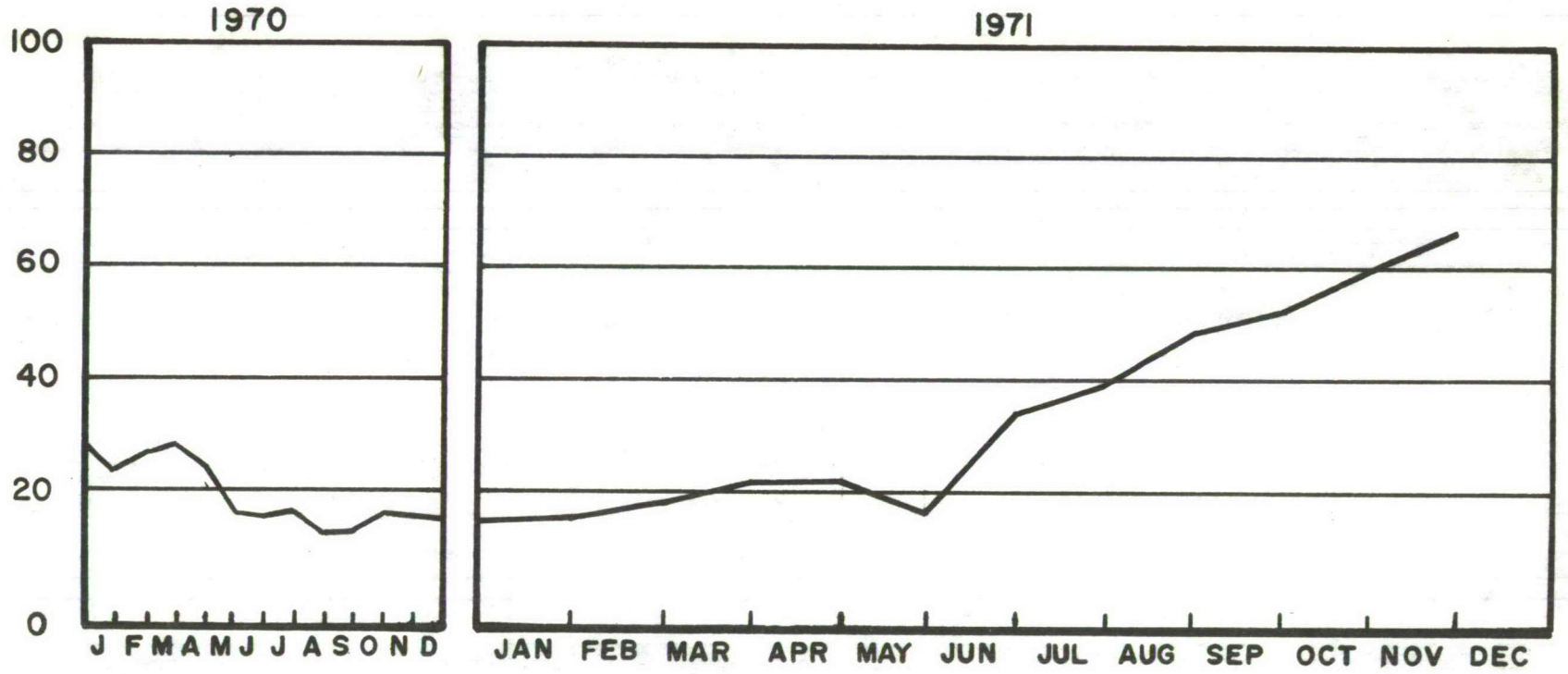


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Figure 10 Airlift Support of RVNAF (Transport)
% Cargo Carried by VNAF

Source : VNAF Status Review, Directorate of Comptroller, Management Analysis Division, Air Force Advisory Group, November 1971.



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Figure 11 Airlift Support of RVNAF (Transport)
% Passengers /Paratroops Carried by VNAF

Source: VNAF Status Review, Directorate of Comptroller, Management Analysis Division, Air Force Advisory Group, November 1971

the airlift required by the RVNAF. This capability was to triple by July 1972. Although a continued pilot shortage was forecast, a demonstrated surge capability was evidence that the VNAF could generally provide transport aircrews when necessary.

The most serious constraint was a lack of facilities at Tan Son Nhut. AFAT-5 personnel believed that facilities such as buildings and ramp space were not adequate to provide an overlap of USAF and VNAF airlift capability. This meant that the VNAF capability would increase only as USAF airlift was phased out. Certainly the percentage of VNAF airlift of RVNAF requirements increased as the USAF airlift percentage declined in the last half of 1971.

Aerial Port

Informal training of the Military Air Transportation Terminal (MATT) personnel of the VNAF began in 1965 but a formal program did not begin until 1969. Formal training included documentation procedures, passenger and cargo handling, 463L and MHE operation, load planning, records keeping, and safety. Personnel were trained to operate basic 463L equipment, including the 10K standard and adverse terrain forklifts. However, they were not trained on 463L K-loaders since the K-loaders were not required for C-47, C-119, and C-123 aircraft.[69/]

Integrated aerial port training was accomplished only at VNAF request. Training which resulted in an upgrading of skill level of the Vietnamese trainee required specific approval by HQ VNAF because of manpower restrictions. An average of 50 VNAF personnel participated in integrated

training each month from 1969 through 1971. Approximately 90 were upgraded in 1970 and 100 in 1971.[70/]

In 1970 the 2d Aerial Port Group began making arrangements to transfer operating locations to the VNAF. To enhance turnover a special mobile training team provided concentrated MATT training during a 60 day period prior to transfer. By the end of 1971 the VNAF had assumed control of 15 aerial port operation locations.[71/]

Summary

In January 1969 the VNAF airlift force consisted of 16 C-119s and 16 C-47s. By the end of 1971 48 C-123s had been added. USAF C-7s were to total 48 by 1 May 1972 and were to be transferred as VNAF crews became qualified.

Training of aircrews and maintenance personnel was conducted in-country and was progressing satisfactorily. However, a shortage of aircraft commanders was forecast to continue for the immediate future.

The percentage of RVNAF airlift supported by the VNAF increased from 1969 through 1971 and by October 1971 reached a high of 80 percent. The VNAF force was achieving self-sufficiency.

Progress had also been made with integrated training of aerial port personnel. By the end of 1971 the VNAF controlled 15 aerial port operating locations.

CHAPTER VI

CONCLUSIONS

The Trend of Airlift

Tactical airlift played a vital role in the war during the 1969 to 1971 period. Nevertheless, all airlift mission activity declined, except for training of VNAF airlift forces. Despite its declining role a number of important factors concerning tactical airlift operations were recorded.

Planning

The planning phase of operations involving large scale airlift should include airlift personnel. This would enable airlift personnel to advise the army and tactical air forces of the limitations and capabilities of airlift. It would also permit adequate preparation at primary forward area operating locations. Involvement in the initial planning of Lam Son 719 by airlift personnel might have prevented the 11 day delay in opening of the Khe Sanh air strip--a delay which occurred when ground forces needed supplies desperately.

Army air traffic control equipment and personnel could not control satisfactorily a large volume of air traffic. Thus, Air Force equipment and controllers should be utilized in operations of the magnitude of Lam Son 719.

It was essential that airlift personnel coordinate closely with the army logistics staff because changing battle conditions often changed the type of supplies needed and the time and method of delivery. An airlift task force employing mission commanders, CCTs, TALOs, ALCEs, mobility teams, and TALCEs was essential to effective and efficient airlift of a large scale.

Organization and Control

USAF tactical airlift in Southeast Asia began with a series of temporary measures to satisfy short term airlift requirements. As the war continued beyond original expectations and airlift requirements increased, a larger and more permanent organization was needed.

The organization which evolved was encumbered by a dual structure of command and control. C-130s, aircrews, and maintenance personnel were assigned TDY from offshore wings throughout the war. This structure violated accepted management principles of unity of command and unity of direction. Authority, responsibility, and loyalties sometimes became confused. Nevertheless, the airlift mission was accomplished. This was attributed primarily to the airlift personnel involved: they were motivated and competent.

The actual control of airlift was a mix of both centralized and decentralized. C-130s and C-123s were utilized in CSAS, which was compatible with the USAF concept of centralized control, and C-7s were

dedicated to specific army units, which was compatible with the Army concept of decentralized control. This dichotomy of control gave the armed forces the best aspects of centralized and decentralized control.

Retention of personnel, procedures, and equipment which have proved useful in the past should provide the nucleus of a viable tactical airlift capability in the future. Certain organizational elements resulted in a control structure that yielded continuous customer liaison, turn-around capability, and real time aircraft control. Consequently, there was optimum utilization of the airlift force. These organizational elements should be preserved for future employment: ALCC, ALMS, ALCEs, TALOs, CCTs, and TALCEs.

These elements could form the nucleus of a tactical airlift support group. They would be the means by which the airlift commander managed his forces in a contingency area. This unit should include essential vehicles, communications, other equipment, and support personnel to establish an airlift system. Certainly aerial port personnel, equipment, and facilities would be included since they form an integral part of an airlift system.

In a peace time environment the tactical airlift group could engage both in civil assistance and in training exercises involving large scale joint maneuvers. The size of the unit would depend upon future needs for global tactical airlift. A study should be conducted to determine these needs. Such a study should identify the number and type aircraft and personnel, and other equipment and facilities to be included in the force.

Airlift Management System (ALMS)

ALMS was an attempt to integrate all the critical decision variables relevant to management of airlift forces. The system was not successful in its first operational test and served primarily to disseminate the manual frag. Nevertheless the ALMS concept had merit and warranted further development.

Aerial Delivery Systems

The container delivery system, 1528 LAPES, and GRADS were effective air drop methods. Testing of GRADS should continue in order to improve the procedure and increase its flexibility.

Airfields

Airfields were the greatest limiting factors to tactical airlift. Construction criteria and responsibilities of the Air Force and Army should be clearly defined. Engineering capability to build, maintain, and survey airfields should be acquired by the tactical airlift organization, by assignment of USAF civil engineers or USA engineers to the tactical airlift staff.

The Aerial Port

Aerial port activities played a critical role in tactical airlift, particularly in a large scale operation. It was neither aircraft nor aircrews that limited operations, but the saturation of aerial port facilities. The use of mobility and combat control teams assisted the aerial port in coping with this problem. Materiels handling equipment

was a critical factor in the operation. The Air Force should develop a forklift with the rugged and reliable features of the 10K adverse terrain forklift but smaller and lighter in weight for ease of deployment. Future aircraft and supporting vehicles should be compatible with the 463L system. Alternatively, a pallet system should be devised which is adaptable to tactical aircraft expected to remain in the inventory.

Assessment

The USAF began tactical airlift in Vietnam to support the French against the Viet Minh. In the years that followed airlift support increased. By 1962 airlift forces were stationed in-country on TDY and in 1966 a permanent airlift organization was established to improve airlift effectiveness. Operational procedures were refined and the largest tactical airlift force in USAF history also became the most effective. Small units operated in areas 5 to 10 times larger than in previous conflicts. Rapid repositioning of forces rather than the retention of large reserves characterized the commitment of ground forces. Virtually every type of ground tactical unit had been moved into combat and supported logistically by air.

Airlift supplied ground forces which operated in a land where climatic conditions and topography restricted conventional ground mobility, and provided them the greatest mobility in the history of warfare. The tactical airlift force not only performed its role, it also assisted the VNAF in attaining a self-sufficient airlift capability.

APPENDIX I

THE TRANSPORTATION REQUEST SYSTEM

THE TRANSPORTATION REQUEST SYSTEM

General

The user in the field requested routine and special transportation of supplies through Movement Control Centers (MCCs) located with each field force command. If highway transportation was inappropriate the request was forwarded to the district Transportation Management Agency (TMA), the regional TMA, and finally the MACV TMA. Any of the agencies in the channel could disapprove the request. Emergency requests were submitted directly to the MACV Command Center. The TMA was the focal point for all users of military railway, inland waterway, coastal shipping, troop carrier, and cargo airlift transportation. TMA considered all transportation modes in order to satisfy transportation requirements. If airlift was selected as the mode TMA notified the 834th ALCC of the transportation requirement. ALCC prepared the frag order directing the airlift wing to schedule an aircraft to the onload point. After loading, the aircraft transported the cargo to its destination.

Cargo moved according to three basic categories: emergency, special, and routine.

Emergency Priority

Aeromedical Evacuation (AME) Urgent. Immediate response to save life; effectively the highest priority recognized in SEA.

Tactical Emergency (TE); The highest cargo and/or troop priority. Reserved for tactical movement into combat and reinforcement of units engaged with the enemy. Response time: Aircraft had to be at on-load point within two hours after ALCC received notification by TMA.

Emergency Resupply (ER): Movement of primary materials to forces in combat. Response time: two hours.

Combat Essential (CE): Movement relating to forces positioned for immediate combat; also movement in relief of national disaster. Response time: eight hours.

AME Priority. Response time: 24 hours.

Special Priority

Other Special Mission Airlift Requests (SMARs): In addition to emergency categories, SMARs included:

(a) cargo not qualifying as combat essential but requiring more expeditious shipment than routine priority.

(b) special cargo (outsized, overweight, special-handling required, or incompatible loads)

(c) cargo and/or personnel involved in special operations (such as Lam Son 719) and unit moves. Response time: to ensure delivery by required delivery date.

Routine Priority

Routine Operational Requirements:

(a) AME Routine. Routine AME missions were scheduled daily and therefore delivered to proper facilities within approximately 24 hours. However required response time was 72 hours.

(b) Priority 1: Movement requiring expeditious shipment but not in direct support of combat. Response time: four days.

(c) Priority 2: Movement of auxiliary items or personnel to prevent impairment of operations. Response time: eight days.

(d) Priority 3: Movement of administrative personnel and equipment. Response time: 20 days.

(e) Priority 4: Routine resupply and training. Response time: 30 days.

Source: "MACV Transportation Request System," a three page paper, 834th AD, undated; and unpublished CHECO report, "Tactical Airlift in SEA," January 1969 - June 1971.

APPENDIX II

THE AIRLIFT MANAGEMENT SYSTEM (ALMS)

THE AIRLIFT MANAGEMENT SYSTEM (ALMS)

Hardware

The ALMS computer configuration consisted of an IBM 360/50 located at 7th AF and two remote IBM 1130/2250s located at the 834th Air Division. The 1130s were connected to the 360 with secured data link lines. The computer system was linked to selected units in the field by AUTODIN.* Other field units were connected (by manual interface) to the computer system by the AN/UYA-7. The ALMS system and the FRAG-PREP** system configurations were similar. This made possible the preemption of one software environment by another in case of contingencies or unexpected equipment malfunctions.

The 1130 systems, duplicates of each other, were the primary input/output (I/O) devices. The 1130 computers were originally intended for the I/O, the display, and the temporary storage of data. With the installation of stand alone programs the 1130 computing capability was used, but not to full capacity.

Associated with the 1130 computers were IBM 2250/4 Graphic Display Devices, medium speed punched card reader/punch and line printer, disk storage devices, and a synchronous communications adapter which provided the link for communication with the 360. The 360 was equipped with two card readers, card punches, and line printers. External storage consisted of disks and magnetic tapes. The 360 used communications data adapters to process information being transferred to and from the remote 1130s and the AUTODIN system.

Software

The ALMs software included government-furnished software (GFS) and contractor supplied programs in support of the 360/50 and 1130 computers. GFS included compilers and operating systems for the 360/50 and 1130 computers, AIME (a communications system for the 360/50, and the 1130/2250 Graphic Subroutine Package. CDC supplied software for the ALMS application

*Automatic digital Network
**The Seek Data II function that scheduled tactical air strike and reconnaissance missions.

subsystem which contained software to extend the capabilities of the GFS to meet the particular requirements of ALMS.

Systems Programs

Programming languages used in ALMS were the assembly language, Assembler F, and the procedural oriented language COBOL F. The 1130 system was the 1130 Disk Monitor System. The 360 system was the 360 Operating System (OS) using multiprogramming with a variable number of tasks (OS/MVT) option. The OS/MVT controlled input, information processing, and output of the ALMS computers. 360 OS included supervisory routines, input/output routines, assemblers and compilers, and service programs and utilities. The input/output routines used Indexed Sequential Access Methods (ISAM) to control the format and access of data stored in the peripheral storage devices.

Automation Programs

The application programs supplied by CDC comprised the heart of ALMS. These programs performed data base maintenance, schedule preparation, frag order preparation, and mission following functions.

Communications

ALMS used three communications media within its system: 1) computer-to-computer secure data link, 2) AUTODIN, and 3) AN/UYA-7. Telephones were also used.

Data Link

Each of the 1130s was connected to the 360/50 at 7AF via secured data link circuits (1.5 miles of cable). The circuits, synchronous, half duplex, were modulated at both ends to insure integrity of transmitted data. XG-13 encrypton devices were used at both locations to allow transmission of classified information. The circuits were interfaced to the 360 using IBM 2701-1 Data Adapters.

Automatic Digital Network (AUTODIN)

ALMS was interfaced with the Defense Communication System AUTODIN through the 2701 ASCII AUTODIN adapter and was capable of transmitting

and receiving messages via automatic switching centers from all units having access to an AUTODIN terminal. The AUTODIN interface in a Multi-programming Environment (AIME) program processed messages between the ALMS computer and the switching centers and converted EBCDIC to ASCII codes and vice versa. Messages were transmitted to AUTODIN by AIME from three possible sources: ALMS programs, a 360/50 connected card reader, and the AIME RETRANS program. The RETRANS program recovered messages from an off-line history tape and passed the messages to AIME for re-transmission. The recovered messages could be transmitted to selected addresses or all addresses in the original message.

AUTODIN terminals were collocated with ALCEs, selected port facilities, and specified flying units. These terminals were assigned to the airlift command control agency; however, some were used by other agencies.

The requirement for security sometimes reduced efficiency. Even though the terminals were collocated only communications personnel with the proper security clearances could operate the secure AUTODIN terminal. Control agency personnel did not have access to the terminal. When the terminal and the agency were in adjoining rooms the procedure was satisfactory. However, in other cases the terminal and the agency were located in separate rooms, floors, or buildings. The time required to process messages through the terminal increased as the distance between the terminal and the agency increased. This time became critical in the mission following task.

AN/UYA-7

The UYA-7 was a semi-compact digital/voice communications terminal which used high frequencies (HF) to transmit and receive data. The data could be in either fixed or open format or normal voice depending upon the user's needs. The equipment could interface with communications security (COMSEC) equipment to provide secure communications. The UYA-7 equipment was obtained from the SEEK LIFT and SEEK CARGO programs. Originally, the SEEK LIFT and SEEK CARGO programs were to provide the capability for independent, mobile, secure communications for the tactical theater. After ALMS became an approved system, it was determined that the UYA-7 should be an integral part of the system.

One method of interface was to manually transcribe the incoming data onto punch cards and then transmit the cards via AUTODIN. Another method was direct electronic UYA-7/computer interface without manual intervention. A third method (adopted) was to electronically interface the receiving master station with a special card punch/reader. Automatically produced

punched cards were taken to the AUTODIN terminal for transmission to the computers. The best method would have been direct computer interface. No documentation was available to show why this approach was discarded. The third method was troublesome because the UYA-7 card punch was mechanically unreliable. This was caused by poor engineering, lack of parts, lack of maintenance documentation, and a lack of understanding by maintenance personnel.

The mobility of the UYA-7 provided a tactical communications system for operational control of tactical forces in a rapidly changing environment. It offered secure digital communications between control agencies and forward operating locations where the means of communications were unreliable, unsecure, or nonexistent. The four configurations used for SEA airlift were 1) permanent master station, 2) transportable ALCE (TALCE), 3) suitcase, and 4) jeep version. The three permanent master stations were located at the ALCC and the ALCEs at Cam Ranh Bay and Da Nang. These three points served as the interface with the AUTODIN system. The TALCEs, suitcase, and jeeps reported to the master station at the head of their respective UYA-7 net. The TALCEs were transportable by air and equipped with the UYA-7 HF equipment and VHF and UHF radios. The suitcases were semi-portable, self-contained versions. The jeep version was installed in the AN/MRC-108 communications jeep. The master stations and the TALCEs had two HF channels; the suitcases and jeeps had one channel. The master stations also had ancilliary equipment, a paper tape punch/reader, a card punch, a card reader, and a wide page printer. The paper tape capability was never used. The card reader was never used operationally. As noted before, the card punch was faulty and could not be used. The wide page printer was used extensively. The COMSEC modems were never used in SEA. They were being transported to the theater at the time the system was terminating. One major problem was foreseen, however. Because of the classified nature of the COMSEC modems, it would have been extremely difficult for UYA-7 operating personnel at forward operating locations to perform their normal tasks in addition to preventing compromise of crypto equipment. The UYA-7 could be used for receiving information from the computer (for example, a frag) or to transmit information to the computer (for example, flight following data).

Source: "User's Evaluation of the Airlift Management System (ALMS), 31 October 1971, 834 Air Division."

RESEARCH NOTE

The unpublished source materials for this report are recorded on CHECO Microfilm, Cartridge Number S-559. The Schutt interview is recorded on CHECO Microfilm, Cartridge Number S-490.

FOOTNOTES

1. (S) CHECO Report Assault Airlift Operations, Headquarters PACAF, 23 February 1967. (Airlift, 1967)

2. (S) Ibid.

3. (S) Ibid.

4. (S) CHECO Report Tactical Airlift Operations, Headquarters PACAF, 30 June 1969. (Airlift, 1969)

5. (S) Airlift, 1967.

6. (S) Ibid.

7. (S) Airlift, 1969.

8. (S) Ibid.

9. (S) Airlift, 1967.

10. (S) Ibid.

11. (S) Airlift, 1969.

12. (S) Ibid.

13. (S) Ibid.

14. (S) Ibid, and Hq PACAF (DOLOX) critique, dated 8 March 1972.

15. (S) Interview, topic 834th AD Operations. With Major General John H. Herring, Jr., Commander, 834th AD, by Walter F. Lynch, 10 June 1971.

16. (U) Report End of Tour Report, Project CORONA HARVEST, by Major General John H. Herring, Jr., June 1969 - June 1971. Information in this chapter is based on General Herring's End of Tour Report unless indicated otherwise. (Herring Report)

17. (S) VNAF 5th Air Force Equipment Utilization. The VNAF were to receive 48 C-123s by 31 December 1971 and 48 C-7s by 1 May 1972.

18. (U) This discussion represents the views of the author.

19. (U) Ibid.

20. (U) Hq PACAF ltr, 1 March 1971, subject: "Evaluations of Airlift Management System". (Distributed to: Hq USAF/XOO/PRC/PRP, USAFE, TAC, MAC, and ESD.)

    The Herring report, while unclassified, is caveated Air Force Eyes Only.

21. (S) Report Tactical Airlift Performance and Accomplishments Southeast Asia, RCS: 7AF-U9 (TAPA-SEA), Published monthly by Automated Systems Division, Directorate of Operations, Headquarters 834th AD, APO San Francisco 96307. (TAPA)

22. (U) Interview, topic: Tactical Airlift. With Major Jimmy B. Pickens, Scheduling Officer, 834th AD, by Major Ronald D. Merrell, 1 Oct 1971. (Pickens Interview)

23. (U) Herring Report. Material in this section is based on this reference unless indicated otherwise.

24. (U) Ibid.

25. (U) Pickens Interview.

26. (S) CHECO Report Commando Vault, Headquarters PACAF, 12 October 1970. The material in this section is based on this reference unless indicated otherwise. (Commando Vault)

27. (U) Herring Report.

28. (U) Ibid.

29. (S) CHECO Report Airborne Support of Psychological Operations in SEA, pending publication at Headquarters PACAF, December 1971. The material in this section is based on this reference unless indicated otherwise.

30. (S) Report "Quantitative Analysis of Operation Fountain Pen," 10 May 1969 - 12 June 1970, DEPCHMAGTHA, 25 September 1970.

31. (S) CHECO Report Ranch Hand: Herbicide Operations in RVN Jul 1967 to May 1971, Headquarters PACAF, October 1971. The material in this section is based on this reference.

32. (U) Manual, 834th AD Manual 55-1, Tactical Airlift Operations, 15 August 1970.

33. (S) CHECO Report Forward Airfields for Tactical Airlift in SEA, Headquarters PACAF, 15 June 1970.

34. (U) Herring Report. The remainder of the material in this section is based on this reference.

35. (U) Report, subject: "The Vietnam Airlifter," 2 February 1970, Volume I, Number II.

36. (U) CHECO Report: USAF Aerial Port Operations in RVN, Headquarters PACAF, 5 August 1970.

The Herring report, while unclassified, is caveated Air Force Eyes Only.

37. (U) Ibid.

38. (U) Herring Report.

39. (U) Ibid.

40. (U) Ibid.

41. (U) Ibid.

42. (U) Ibid.

43. (U) Ibid.

44. (U) Interview, Brigadier General John H. Herring, Jr., Commander, 934 AD, by Lieutenant Colonel Jack L. Humphries, June 1970.

45. (S) Report, Commando Hunt V, Headquarters 7th Air Force, May 1971. (Commando Hunt V)

46. (S) Ibid. The material in this section is based on this reference.

47. (S) Ibid.

48. (S) Interview, topic: Operation Lam Son 719. With Major Gilbert K. St. Clair, Executive Officer CHECO, 7th Air Force, chief writer of Lam Son 719, by Major Ronald D. Merrell, October 1971.

49. (S) Command Briefing, 834th Air Division (AD), undated, pages 1 - 15. (Command Briefing.) Note: Material in the following sections is based on this reference unless indicated otherwise.

50. (S) Interview, topic: Operation Lam Son 719. With Colonel Carleton E. Schutt, Deputy Director Operations, 834th AD, by Colonel John F. Loye, Jr., and Major Gilbert K. St. Clair, March 1971. (Interview, Schutt)

51. (S) Ibid.

52. (S) CHECO Report Lam Son 719, 30 Jan - 24 Mar 1971, The South Vietnamese Incursion into Laos, Headquarters PACAF, 24 March 1971. (Lam Son 719)

53. (S) Lam Son 719.

54. (S) Interview, Schutt.

55. (S) Ibid.

56. (S) Lam Son 719.

The Herring report, while unclassified, is caveated Air Force Eyes Only.

57. (S) Ibid.

58. (S) Ibid.

59. (S) Ibid.

60. (S) Letter Vice Commander 834th Air Division, subject: Project CHECO Report "Lam Son 719, 30 Jan 71 - 24 Mar 71," 11 May 1971. (Letter, Vice Commander 834th AD)

61. (S) Ibid.

62. (S) Lam Son 719.

63. (S) Ibid.

64. (U) Herring Report.

65. (U) This conclusion is drawn by the author.

66. (S) Letter, Vice Commander 834th AD. The materiel in this section is based on this reference.

67. (S) CHECO Report Improvement and Modernization of the VNAF, Headquarters PACAF, 8 October 1971.

68. (U) Herring Report.

69. (U) Ibid.

70. (U) Ibid.

71. (U) Ibid.

The Herring report, while unclassified, is caveated for Air Force Eyes Only.

GLOSSARY

AAF	Army Air Field
AB	Air Base
AD	Air Division
ADF	Automatic Direction Finding
AF	Air Force
AFAT-5	Air Force Advisory Team 5
AIME	A Communications System for the 360/50
ALCC	Airlift Control Center
ALCE	Airlift Control Element
ALMS	Airlift Management System
ALO	Air Liaison Officer
AME	Aero Medical Evacuation
APGp	Aerial Port Group
AFSq	Aerial Port Squadron
ARVN	Army of Vietnam
AT	Adverse Terrain
AUTODIN	Automatic digital network - a DOD communications network for transmitting digital data
CAMRON	Consolidated Aircraft Maintenance Squadron
CCT	Combat Control Team
CDC	Control Data Corporation
CDS	Container Delivery System
CE	Combat Essential
CEA	Circular Error
CHECO	Contemporary Historical Examination of Current Operations
CINCPAC	Commander-in-Chief, Pacific Command
COBOL	A computer program language
COMSEC	Communications Security
CONEX	Container Express
CRIMP	Consolidated RVNAF Improvement and Modernization Plan
CSAS	Common Service Airlift System
DASC	Direct Air Support Center
DET	Detachment
ER	Emergency Resupply
FOL	Forward Operating Location
FORTRAN	A computer program language
FRAG PREP	The SEEK DATA II function that scheduled tactial air strike and reconnaissance missions

GCA	Ground Control Approach
GFS	Government Furnished Software
GRADS	Ground Radar Aerial Delivery System
Half Pallet	Used for loading C-7 aircraft (half the size of 463L pallet)
HF	High Frequency
HLZ	Helicopter Landing Zone
IBM	International Business Machines Corporation
IFR	Instrument Flight Rules
I/O	Input/Output
ISAM	Indexed Sequential Access Methods
JCS	Joint Chiefs of Staff
Km	Kilometers
LAPES	Low Altitude Parachute Extraction System
MAC	Military Airlift Command
MACV	Military Assistance Command, (South) Vietnam
MCC	Movement Control Center - An extension of TMA
MED EVAC	Medical Evacuation
MHE	Materiels Handling Equipment
MILSTAMP	Military Standard Transportation and Movement Procedures
MT	Mobility Team
NVA	North Vietnamese
OL	Operating Location
ORANGE	A chemical used to destroy broad leaf vegetation
PAC	Pacific Area Command
PACAF	Pacific Air Force
POL	Petroleum, Oil, and Lubricants
PSYOPS	Psychological Operations
RAAF	Royal Australian Air Force
RDD	Required Delivery Date
RVN	Republic of Vietnam

SD II	SEEK DATA II
SEA	Southeast Asia
SMAR	Special Mission Airlift Request
SOS	Special Operations Squadron
Speed Pallet	See Half Pallet
STOL	Short Take off and Landing performance
SVN	South Vietnam
TALO	Tactical Airlift Liaison Officer
TAPA	Tactical Airlift Performance and Accomplishments
TAS	Tactical Airlift Squadron
TAW	Tactical Airlift Wing
TDY	Temporary Duty
TE	Tactical Emergency
Tet	The Lunar New Year holiday observed in Vietnam and other Asian countries early in the Julian year
TMA	Transportation Management Agency
US	United States
USA	United States Army
USAF	United States Air Force
UHF	Ultra High Frequency
VHF	Very High Frequency
VNAF	(South) Vietnamese Air Force