TACTICAL AIRLIFT IN SEA

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HQ PACAF
Directorate of Operations Analysis
CHECO/CORONA HARVEST DIVISION

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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;

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 multifaceted 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 preceding 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.

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.

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.
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. 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) 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.

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. (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.
Figure 1 The Dual Structure of Airlift Command and Control

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

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.

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.

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.

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 634th Air Division was established in October 1966 at Tan Son Nhut to meet this increased demand.

This organizational change had two important features. First, the 17th Air Commando Wing became a unit of 7AF. Second, the 2d Aerial Port Group moved from Iachikawa to Tan Son Nhut and became a unit of the
Another important change was the USAF/USAF agreement to transfer Army
C-123 to the Air Force in 1967. These aircraft were transferred to the
9th Troop Carrier Wing at Cam Ranh Bay. Shortages of pilots and engineers,
maintenance difficulties, inadequate facilities, poor corrosion control,
complete Army records, nonstandard aircraft configurations, and an insuf-
cient 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-123 (C-130), the tactical airlift capacity
increased when the Air Force assumed control of the aircraft.

At the time of the C-123 reorganization it was suggested that the 7th Air
Base be deactivated and C-130s realigned as a wing at Cam Ranh Bay under the
17th AB. Other resources were to be distributed throughout PACAF. Pro-
ponents argued that "OV of maintenance and aircraft personnel led to in-
stability and divided loyalties. Opponents said permanent stationing
was undesirable because of manpower callings in Vietnam, the effect of the
Vietnamese economy associated with more U.S. personnel in-country, and
greater U.S. vulnerability to rocket and mortar attacks. After study of
the largest Air Force levels, the 71st AB was inactivated in 1969 and
its resources distributed within PACAF. "OV utilization of C-130s continued
and aircraft were distributed to the 5th Air Force in Japan and the 6th
Air Force in the Philippines and Taiwan.

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Data (See Figure 3).
In 1971 Major General Herring commented on the TDY utilization of the C-130 force:

... 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 334th 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 percent 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

PACAF 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
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.  

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.

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
flown 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. Racially, 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
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 con­
trol, continuous customer liaison, deployed turn-around capability, and
real time monitoring of aircraft and cargo movements. A centralized con­
trol 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 Sierra 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 allo­
cations 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. 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.

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 auxiliary 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. (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 generated 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 manual 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 affected 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, TAI0s, 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.

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. 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.

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: TAF-U9 (TAPA-SEA), 1960-1971

Figure 6  Tons Airlifted FY 61 through FY 71
Source: TAPA-SEA
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Thousands

FY 68 FY 69 FY 70 JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN

Monthly Average

Fiscal Year 1971 Monthly Totals

Tactical Airlift in South Vietnam
Airlift Accomplishments

Source: TAPA SEA
As of 30 June 1971

Annual Airlift Summary

<table>
<thead>
<tr>
<th></th>
<th>Total Passenger</th>
<th>Total Cargo</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 68</td>
<td>3,897,857</td>
<td>928,118</td>
</tr>
<tr>
<td>FY 69</td>
<td>4,644,367</td>
<td>911,419</td>
</tr>
<tr>
<td>FY 70</td>
<td>4,125,893</td>
<td>719,598</td>
</tr>
<tr>
<td>FY 71</td>
<td>3,175,102</td>
<td>397,323</td>
</tr>
</tbody>
</table>
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
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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.

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 disarming 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 rations and ammunition were often usable. It was considered probable that 60 inch parachutes would provide the same rate of fall for 250 to 150 pound bundles.
as the reeled 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 GRAOS.

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

<table>
<thead>
<tr>
<th></th>
<th>Sorties</th>
<th>Patients Examined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan - June 1969</td>
<td>4,203</td>
<td>60,219</td>
</tr>
<tr>
<td>Jan - June 1971</td>
<td>2,245</td>
<td>17,354</td>
</tr>
<tr>
<td>Percent Decrease</td>
<td>67</td>
<td>57</td>
</tr>
</tbody>
</table>

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.

M-171 and AH-1H A/A bombs were dropped from C-130 aircraft using precision guidance by Combat Skyspot (HOO-II) radar. The M-171 was a 10,000 pound bomb which had been designed for A-1 aircraft. Eight M-171 bombs were dropped during the initial SEA combat evaluation test in October 1968 called Combat Trap. Additional use of the C-130/M-171 weapon system was conducted during December 1968 in support of Operation Taylor Common. In March 1969, employment of the M-171 began using nick name Commando Vault. When the supply was exhausted in August 1970, its use was discontinued in favor of the more effective 15,000 pound AH-1H A/A.
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The B-64s created a zone suitable for the landing of three copters simultaneously. Occasionally the bomb was ineffective; at other times the landing zone could accommodate as many as five helicopters. Still, the bomb could be dropped consistently within 50 meters of the intended target.

By 1 December 1971, the 814th 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 on 12 June 1970. The blast cleared the drop zone of booby traps, pits, ditches, and other hazards. Enemy forces within one half of a kilometer were incapacitated by the physical and/or psychological effects of the blast.

Commando Vaults were not restricted to HLZs. During December 1970, Commando Vaults were dropped from altitudes of 18,000 to 22,000 feet to clear enemy wire, which obscured enemy supply trails. During January 1971, Commando Vaults were dropped on tactical targets such as passed enemy troops, bases, outposts, and cache sites. The device was also effective in neutralizing personnel cache sites.

For further information on Commando Vaults, see CHECO reports: Commando Vaults, Headquarters, PACAF, 23 September 1970, and The Cambodian Campaign 24 April to 1 July 1970, Headquarters, PACAF, 1 September 1970. Also included in this Report by General Herring (Footnote 14)
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[Document content redacted due to the sensitive nature of the material]
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Bombers dropped herbicides on the Ho Chi Minh Trail in Cambodia. C-130s dropped 88 million leaflets from 3 February to 22 March 1971 for the Lam Son 719 operation.

In July 1970 the C-130 operating location was changed from Ubbon 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 374 TAW 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 90th Special Operations Squadron. This unit flew herbicide missions of vegetation defoliation and enemy crop destruction, and insect control missions (primarily against malaria carrying mosquitoes). 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 C-130s 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 deactivation 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.

The number of airfields did not remain stable but varied with the tactical situation and the pacification program. 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 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**

<table>
<thead>
<tr>
<th>Type Field</th>
<th>C-7 Fields</th>
<th>C-123 Fields</th>
<th>C-130 Fields</th>
<th>Operational Fields</th>
<th>Operational Fields</th>
<th>Operational Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>9</td>
<td>7</td>
<td>6</td>
<td>14</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>92</td>
<td>86</td>
<td>72</td>
<td>66</td>
<td>34</td>
<td>31</td>
</tr>
<tr>
<td>III</td>
<td>16</td>
<td>13</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>117</strong></td>
<td><strong>106</strong></td>
<td><strong>94</strong></td>
<td><strong>86</strong></td>
<td><strong>64</strong></td>
<td><strong>58</strong></td>
</tr>
</tbody>
</table>


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.

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.

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.

**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, outside 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.

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

<table>
<thead>
<tr>
<th>Cargo (Tons)</th>
<th>Passengers (Number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan - June 1969</td>
<td>884,000 ........... 5,116,000</td>
</tr>
<tr>
<td>Jan - June 1971</td>
<td>376,000 ............ 2,773,100</td>
</tr>
</tbody>
</table>

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.
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.

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.

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.

Materials 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.

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

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.*

*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.
UNCLASSIFIED

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.
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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.

**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.

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 helicopter 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...