REPORT TO THE CONGRESS

Logistic Aspects Of Vietnamization--1969-72

B-159451

Department of Defense

BY THE COMPTROLLER GENERAL OF THE UNITED STATES

JAN. 31, 1973

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-159451

To the President of the Senate and the
Speaker of the House of Representatives

This is our report on the Logistic Aspects of Vietnamization--1969-72. The General Accounting Office performed this study to inform the Congress concerning the capacity of the South Vietnamese to operate, manage, maintain, and control the military equipment and supplies furnished to them by the United States. We are also reporting on future assistance which the South Vietnamese may need if they are to maintain a viable logistics system.

Our study was made pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

Copies of this report are being sent to the Director, Office of Management and Budget; the Secretary of Defense; and the Secretaries of the Army, Navy, and Air Force.

Comptroller General
of the United States

PREFACE

The North Vietnamese offensive of 1972 tested the effectiveness of Vietnamization of the Republic of Vietnam Armed Forces (RVNAF). It also gave the General Accounting Office (GAO) an opportunity to evaluate RVNAF logistics capability under combat conditions while U.S. military personnel who worked on Vietnamization were still available, their impressions of their experiences still fresh, their management information systems still working, and their records intact.

The Deputy Chief of Staff Logistics of RVNAF accompanied the GAO study team during most of its activities in Vietnam. He and his staff were fully cooperative. They made their records available, arranged for all observational visits to Vietnamese bases and activities, and cooperated in our unrehearsed interviews with RVNAF officers and enlisted men.

The Department of Defense (DOD) opened its files and allowed us to examine its studies and operations reports. Senior logisticians in the Departments of the Army, Navy, and Air Force who had worked on Vietnamization assisted the GAO study team.

At our request, general officers from Headquarters, Commander in Chief, Pacific (CINCPAC), and from the U.S. Military Assistance Command, Vietnam (MACV), who had worked with the RVNAF logistics system and Vietnamization, accompanied the GAO study team. They candidly helped to clarify matters that were confusing or not apparent from our observations, obtained data and opinions and reviewed and commented on the various report segments and on the completed draft report.

We visited RVNAF logistical and tactical organizations in all four corps areas. We talked with U.S. generals and RVNAF generals, U.S. privates and RVNAF privates, all ranges of noncommissioned and commissioned officers in between, and U.S. civilians and contractor technical representatives. We also talked with RVNAF tactical and logistical personnel and with U.S. tactical and logistical advisors to RVNAF.

Among the Army of South Vietnam (ARVN) organizations we visited were the Central Logistics Command; logistics commands in each of the tactical corps areas; direct support

units; a combat division logistics battalion; a forward administrative and supply unit for the Regional and Popular Forces of RVNAF; a collection and classification company, which is the first stage beyond the combat division level for equipment salvage and property disposal; the technical service organizations; and supply organizations for ordnance, engineering, and signal equipment.

In the Vietnamese Navy (VNN) we visited the Navy shipyard, the Navy supply depot, Navy training centers, and several types of support bases below the main depot level.

In the Vietnamese Air Force (VNAF) we visited the Air Logistics Command; several air divisions; and a number of repair, maintenance, overhaul, supply, and base management organizations.

U.S. personnel and organizations included the Assistant Secretary of Defense (Installations and Logistics); the Office of the Surgeon General, U.S. Army; logistics personnel of the Army, Navy, and Air Force in the United States and Vietnam; the four tactical U.S. Army Regional Advisory Commands in Vietnam and the advisors with each ARVN combat division; Air force and Navy advisors; the Chief Surgeon, MACV, and his staff; the Newport Army Terminal, Saigon; and the U.S. Property Disposal Holding Activity, Ho Nai.

As can be seen from the above, we probed into the logistics systems of the Army, Navy, and Air Force of South Vietnam and into the U.S. support of the RVNAF logistics systems. Because of our broad scope we could not pursue any particular subject in depth. We did obtain some depth perception, however, by asking the same key questions and discussing the same subjects separately with tactical and logistics personnel--both United States and RVNAF--in each of the four tactical corps.

A number of the observations we have made in the report are based on the examination of or evaluation of classified data. This data has not been included in our report.

We relied on statistics and data furnished to us by U.S. forces and RVNAF and did not independently test or verify the information. We did, however, visit the maintenance plants and shops, supply bases, and other logistics facilities.

We observed the activities and discussed them with RVNAF operators, U.S. advisors, and contractors and we brought our judgment, experience, and knowledge from prior GAO studies to bear on what we observed and the information we received. We therefore believe that our report fairly represents what RVNAF can do and what it was doing at the time our study ended in November 1972.

We did not, however, attempt to evaluate the quality of what RVNAF was doing in terms of maintenance, repair, and overhaul of equipment. When our study indicated the quality of performance, we have mentioned it in our report.

A draft of our report was reviewed by the Secretary of Defense. He stated that it is a balanced report, highlighting progress on one of the most important programs of the DOD. He concurred with the draft report.

It should be borne in mind that this report and our study related wholly to the material and organizational aspects of the turnover to Vietnam. Accordingly the report does not in anyway purport to deal with the political implications of the turnover, recognizing that the term Vietnamization is subject to varying interpretations. Our endeavor was, to the fullest extent possible, to obtain and present a summary of the material aspects to convey something of their dimensions, how they were approached, and their current status. GAO recognized that logistics is only one aspect of Vietnamization and that the ultimate success or failure of this policy will be influenced by other factors equally as important, such as the ability and resolve of Vietnamese leaders. GAO did not attempt to evaluate or measure the progress being made in these intangible areas.

Contents

ABBREVIATIONS

ALC	Area Logistic Command
ARVN	Army of South Vietnam
C-E	communications - electronics
CINCPAC	Commander-in-Chief, Pacific
CONUS	Continental United States
DOD	Department of Defense
DSU	direct support unit
GAO	General Accounting Office
ICS	integrated communications system
ISB	intermediate support base
LSB	logistic support base
LSM	landing ship-medium
LST	landing ship-tank
MACV	Military Assistance Command, Vietnam
medevac	medical evacuation
O&M	operation and maintenance
PF	Popular Forces
PMS	planned maintenance system
POL	petroleum-oil-lubricants
RF	Regional Forces
RVNAF	Republic of Vietnam Armed Forces
VNAF	Vietnamese Air Force
VNN	Vietnamese Navy

CHAPTER 1

OUTLOOK FOR THE FUTURE

The nature of the conflict in South Vietnam has been such that generally the time, place, and intensity of combat have been an enemy prerogative. Therefore, requirements imposed on the RVNAF logistics system are largely a function of the intention, capability, and actions of the enemy; and, in turn, past experience has shown that what the enemy can and will do has not been susceptible to accurate prognostication.

Nevertheless, if it is to be assumed that the North Vietnamese invasion of 1972 is representative of the pressure that the enemy can bring to bear for the foreseeable future, we can analyze the potential logistics capability of RVNAF. Further, it is reasonable to assume that the most favorable conditions for maturing RVNAF logistics capabilities would be those of freedom from hostilities. Such conditions would permit development of the economic base necessary for South Vietnam to bear any significant additional portion of the monetary and materiel support of its armed forces.

If we make one further assumption, i.e., that South Vietnam will be an independent political entity of a type meriting American support and enduring an actual or potential enemy threat from within or without which will require a sizable military force in being, we can give some informed judgments of the future.

It is within the framework of these assumptions that the following "outlook" is presented.

MANAGING AND MAINTAINING THE LOGISTICS SYSTEM

The U.S. Armed Forces have made impressive progress in a relatively short time in equipping and supplying RVNAF and training it in the use, maintenance, repair, overhaul, and rebuild of complicated equipment. They have also designed and placed in operation a sophisticated logistics system for supporting RVNAF.

The South Vietnamese in turn have demonstrated a capability for managing their own affairs and for understanding the

technical and logistical problems confronting them. RVNAF personnel, drawn primarily from an underdeveloped and agrarian background, have adapted in a remarkably short time to requirements of the modern technology necessary to provide themselves with a relative degree of logistics self-sufficiency. They are able to operate and service the bulk of the equipment furnished to them.

Advisory and technical assistance

It is clear that the South Vietnamese will continue to require some foreign aid. For instance, as pointed out in chapters 3 and 5, it will be some time before the Vietnamese will reach their anticipated capability for repairing and overhauling some of their major ordnance, engineering, and air force items. And for some items, offshore support will be required. In the fall of 1972 the C-130 transport aircraft entered the RVNAF logistics system for the first time. RVNAF will require training in operating and maintaining the new equipment, and support both in Vietnam and offshore will be required on these items for some time to come.

The distribution system

More importantly, when fully trained in the use of equipment furnished to it, RVNAF should be able to meet most of its air, ocean, and ground logistics requirements.

We believe that, on the basis of its performance during the 1972 offensive, RVNAF has adequate sealift to meet the needs of hostilities of the type prevailing prior to the 1972 invasion. There may continue to be a shortfall in ocean transport capability to meet a main force attack. However, it is not U.S. policy to provide even U.S. forces with their own ocean transport capability, and it relies on commercial augmentation to meet its sealift needs. Therefore, the RVNAF shortfall for meeting peak requirements is not unusual providing there is adequate back-up capability to meet emergencies. RVNAF should prepare and be ready to implement contingency plans for augmenting its own sealift assets to meet contingency requirements.

Another area requiring further study and continued planning by RVNAF and its advisors is the use of air transports and particularly the helicopter. Because of the various combat, logistics, medical, and administrative

missions for which the helicopter is used, we cannot evaluate the adequacy of the VNAF helicopter fleet for logistics purposes alone. Nor can we estimate the logistics burden, apart from other requirements, which may be placed on the helicopter as a result of future enemy action.

It is difficult to determine RVNAF helicopter support requirements since we do not know the amount of U.S. helicopter support RVNAF received during the invasion. Such information might not be particularly instructive in any event, since many of the VNAF squadrons had been newly formed and lacked experience at the time of the invasion. Thus these squadrons probably needed more augmentation than if they were fully trained and experienced. However, a comparison of the size of the VNAF helicopter fleet with the U.S. helicopter fleet in Vietnam at its peak and an evaluation of the total U.S. helicopter missions flown during the invasion (see chapter 5) suggests to us that the VNAF helicopter fleet may be marginal at this time in its capacity to meet all the burdens which could be placed upon it.

The air transport fleet has been augmented by C-130 aircraft in quantities approximating the amount of U.S. augmentation required during the 1972 invasion. With the addition of C-130 aircraft to its force, VNAF probably has adequate lift capacity to meet its needs. However, air transport is critical to RVNAF's mobility, and peak needs for air transports cannot be precisely anticipated. We believe it essential, therefore, for VNAF to have contingency plans for commerical or other augmentation of its transport fleet to fly the less hazardous missions in the event of a main force attack. It should also work continually to improve its air cargo loading and rigging skills in order to maximize the use of its available cargo aircraft.

For these reasons and because of the increasing effectiveness of enemy antiaircraft fire, RVNAF and its advisors should analyze in depth the uses of, and priorities for the use of, its helicopters and other air resources to insure that nonessential functions are minimized. In making this analysis combat tactics which require, or seem to require, helicopter and other air logistics support should be examined. This analysis should be directed to the maximum substitution of ground transportation for noncritical air transportation. The ground transportation system is the best developed and most effective delivery system in RVNAF.

Facilities

The U.S. Department of Defense now owns no facilities in Vietnam, and construction to improve RVNAF facilities will be completed in the near future. A major problem for RVNAF will be resisting the temptation to utilize and maintain all of the facilities they now own. The use and maintenance of bases excess to critical requirements is a drain on managerial and technical talents and reduces the manpower available for combat duty.

We believe RVNAF should continually analyze its facilities, with a view to base closures and dismantling of facilities not essential to its mission.

Maintenance capability

RVNAF is, or soon will be, maintaining and repairing the bulk of its equipment. Our study did not evaluate either the quality or the productivity of these activities. However, the work is being performed by a large number of trainees and newly trained technicians working in an industrial base installed within 3 years. And, as pointed out in chapter 3, there is a shortage of at least one type of quality control equipment for testing the adequacy of repairs to vehicle motors.

There was also no system in ARVN for insuring that items, beyond the maintenance capability of the unit in possession of them, would be sent to the next higher echelon for repair. We heard allegations that such items are frequently cannibalized and disposed of at the lower echelon.

It is reasonable to assume, therefore, that increased management attention must be focused on both the quality and productivity of maintenance operations.

As RVNAF technicians gain more experience and as computer systems assume increased controls of maintenance cycles for major items, improvements in the maintenance and repair capability should continue. To augment this progress and to reduce future replacement costs to the United States, ARVN should be provided additional quality control equipment to be used at the general depots as necessary to assure the capability for measuring the effectiveness of ARVN

maintenance activities. When it cannot be installed at the lower echelon support level, it should be used to test the lower echelons' quality of work on a sample basis. RVNAF should also be provided with a control system to insure that items beyond the maintenance capability of the unit controlling the item are sent to the next higher echelon for repair.

As the computer-based supply management systems become fully implemented, controls over inventories should continue to improve. But for it to be fully effective, inventory managers will have to develop and receive timely information on the manually controlled inventories at the Area Logistics Commands (ALC) and the air bases.

The entire RVNAF supply system needs to be indoctrinated with the importance of (1) making periodic physical inventories, (2) comparing stock records, (3) investigating to establish reasons for discrepancies, and (4) making corrections and systems improvements once the reasons for discrepancies have been established.

RVNAF managers should strengthen controls over items in transit and over procedures for receipt of shipments by consignees and for feedback of receipt data to the inventory managers.

LOGISTICS PLANNING

In November 1972, the time our study was completed, RVNAF was largely equipped and the various components of the logistics system had been designed and installed, or were being installed. Further modifications, such as consolidation of the 12 field depots of the ALCs into two associated depots, were under consideration. All of this was accomplished in 3 years using principles, systems, and techniques patterned after those in the U.S. military services. The logistics system seems to be adequate to meet the needs of RVNAF.

But logistics systems are not static. They are dynamic systems which must change in response to new technology, concepts, and changing requirements. Nor does it necessarily follow that American systems adapted to the Vietnamese environment are the best systems for RVNAF. Therefore, as the present systems in RVNAF mature and when the full

complement of top and middle managers are developed, the RVNAF Central Logistics Command should engage in a long range effort to determine its future logistics goals and requirements, tailored specifically to the Vietnamese environment and known enemy capabilities and to develop plans for their accomplishment.

POTENTIAL FOR THE SOUTH VIETNAMESE TO SUPPORT THEIR OWN MATERIEL REQUIREMENTS

To determine the South Vietnamese potential for financing their continuing materiel requirements out of their own fiscal resources would require an in-depth analysis of the potential for economic development of South Vietnam. Such an analysis is beyond the scope of this study. However, studies of the economic potential of South Vietnam have been made by the U.S. Agency for International Development, by organizations within DOD, and by private organizations. We can draw from these sources and make some generalizations concerning the capabilities of South Vietnam to provide for its own military materiel support by briefly summarizing the nature of some key elements of the agricultural-industrial base.

Industrial base

When Vietnam was divided in 1954, several industries--paper, glass, textiles, and cement--were developed in South Vietnam. The United States has since encouraged the development of these and other industries, including several which can produce items to support military needs. And the United States is supporting the in-country procurement of these Vietnamese-produced items for RVNAF use. At the time of our study, contracts of over $30 million had been awarded, or were being considered for award, to South Vietnamese firms for materiel support of RVNAF. Included were such items as dehydrated rice, uniforms, denim cloth, sandbags, lumber, paint, barbed wire, batteries, light bulbs, and pharmaceuticals.

For some of these items, the quality of the products has not met military requirements and the manufacturers are being encouraged to improve it. These efforts are a beginning in enabling the South Vietnamese to provide some of their own military materiel requirements; the investments

in productive capacity and the items being produced can readily be coverted to civilian use; and the Vietnamese business community is receiving experience in the quality control and specification standards of the world market.

However, the items which the South Vietnamese can produce, or are being encouraged to produce, can provide only minimal support for the type of military force represented by RVNAF. Therefore, if South Vietnam is to increase its own support capability, it would have to develop the financial resources to pay for importing its military equipment.

Agricultural base

To finance such imports South Vietnam would have to increase its exports, and the most promising exports for the future are agricultural products. However, the information we have studied suggests that there is little possibility that agricultural exports alone could support RVNAF.

Vietnam is, and will continue for some time to be, primarily an agricultural country. Agricultural pursuits contribute the largest single share of the gross national product and involve a large majority of the population. Rice is the diet staple of the South Vietnamese and is the largest agricultural product.

Prior to 1964 the two principal South Vietnamese exports were rice and rubber. But the increased tempo of the war has adversely affected rice and rubber production, and South Vietnam has become a net importer of rice. Rejuvenation of the rubber plantations is dependent on an uncertain world market and on relatively long periods of stability in Vietnam.

It is, therefore, apparent that a period of reconstruction is required before South Vietnam can become self-sufficient in foodstuffs, much less produce a surplus for export.

In short, South Vietnam will require foreign aid and time to develop its industry and agriculture before South Vietnam can significantly contribute to its own military materiel support.

THE FUTURE U.S. ROLE

Given the assumptions set forth on the first page of this chapter, the United States will have to provide materiel support to RVNAF for the foreseeable future. We have not attempted to estimate the annual level or cost of this support because of the uncertainties of the results of the peace negotiations which were in progress at the time our report was being prepared and because the levels of hostilities or the absence of hostilities cannot be predicted. These are key determinants of the levels of support required.

We have already discussed the extent and duration of the technical and advisory assistance which will be required and the indications are that the need for this assistance will continue to decline.

We believe U.S. logisticians should direct continuing attention to (1) monitoring the Vietnamese stewardship over the more than $5 billion in U.S. arms with which they have been equipped, (2) improving RVNAF effectiveness and reducing U.S. costs by improving the efficiency of RVNAF in asset management and in the maintenance of its equipment, (3) evaluating RVNAF's resupply requirements, (4) insuring that RVNAF returns to the United States supplies and equipment which become surplus or no longer useful to it; operating a continuing property disposal program for the materiel return by RVNAF, and (5) supporting the training of RVNAF personnel.

AREAS FOR MANAGEMENT STUDY

In this report we have observed that RVNAF has a workable, responsive logistics system. However, it should surprise no one if that system--constructed in a short period of time with a need for middle managers and staffed by relatively inexperienced technicians--is not functioning with maximum economy or efficiency.

Therefore, DOD managers and internal auditors should expect to find weaknesses in the logistics system and should direct their efforts to assisting RVNAF in improving performance in the areas of weakness. In addition, U.S. activities in support of RVNAF have impacted other areas of DOD activity and the nature and extent of this impact should be studied.

While almost any area of RVNAF logistics might benefit from a detailed management review, we believe that the interests of the Congress and of good management would be best served if management audit efforts for the near future are directed to the following areas.

--Adequacy of accountability controls over equipment and supplies managed by RVNAF.

--Property disposal activities of the United States and RVNAF.

--Efficiency and effectivnesss of maintenance of equipment.

--Effectiveness of training and utilization of trained manpower.

--Readiness of selected RVNAF units.

--Contract activities in support of RVNAF.

--Utilization of RVNAF air, ocean, and ground transports.

The GAO intends to give priority, within its resources, to these areas and will coordinate its audit efforts with those of DOD.

The following areas for management attention do not directly involve Vietnam but are areas on which Vietnam has had an impact.

--Effect of buildup of RVNAF on readiness of U.S. military units.

--Effect on U.S. military industrial reserve equipment because of the delivery of industrial plant equipment to RVNAF.

--System for management and control of military tires in the Pacific--U.S. military forces and countries receiving military assistance.

These areas will also receive GAO audit attention.

CHAPTER 2

BACKGROUND

On Midway Island, June 8, 1969, the President of the United States and the President of the Republic of South Vietnam announced their decision to replace U.S. troops with Vietnamese Forces. This announcement, the subsequent withdrawal of U.S. troops, and the training and assumption of the total military role by the South Vietnamese have become known as "Vietnamization."

In his announcement, President Nixon ordered the immediate redeployment of a U.S. division (25,000 men) from Vietnam. At the same time, President Thieu announced that Vietnamese troops would replace the withdrawing American forces. President Nixon said that the situation would be reviewed regularly using three criteria to determine further replacements:

> "First, the progress insofar as the training and equipping of South Vietnamese Forces;
>
> "Second, progress in the Paris peace talks; and
>
> "Third, the level of enemy activity."

In testimony in 1970 before the DOD Subcommittee of the House Appropriations Committee, Defense Secretary Melvin Laird testified that as of July 1, 1969, a program had been instituted to accomplish "an orderly transfer to the South Vietnamese, within a reasonable time frame, of the major responsibilities that the United States has assumed." The objective of the program was to increase the South Vietnamese capability so it "would be adequate to defeat not only the Vietcong but the invading North Vietnamese forces as well."

The program had three phases, he said:

1. Transfer of the U.S. ground combat role to South Vietnamese forces.

2. Transfer of logistics and support activities to the Republic of Vietnam.

3. Allowing a small U.S. military advisory group to remain in South Vietnam.

The purpose of this report is to focus on the second, or logistics, phase of Vietnamization cited by Secretary Laird.

On July 21, 1969, MACV issued its plan for transferring logistics and support activities to the Republic of Vietnam. The plan, known as the Country Logistics Improvement Plan, was

> " * * * to provide a coordinated long range program of major objectives and courses of action for improving the logistics operations of the Republic of Vietnam Armed Forces (RVNAF). The ultimate objective is to achieve a self-sufficient RVNAF logistics system."

The term "self-sufficient" should be clarified at the outset. The overriding goal of logistical Vietnamization has been to develop RVNAF's capabilities for sustaining its combat and combat support forces with combat service support. DOD never identified self-sufficiency, in its purest sense, as an objective. Complete self-sufficiency is a goal that cannot be realized by a small, basically agrarian economy in the throes of a modern conventional war.

The Country Logistics Improvement Plan was directed toward improving military logistics procedures, operations, supplies, logistics forces and facilities, and materiel. Priority was to be given to command emphasis and training. RVNAF was to operate effective supply operations, exercise supply discipline, and attain maintenance standards.

The American military advisor was not to become operational. But we found that advisors through necessity became operational in a few cases. For instance, in 1971 the U.S. Navy had to virtually take over, redesign, and operate the VNN supply system. At the time our study, U.S. Navy personnel were training VNN personnel in supply system operations.

Nevertheless, in our opinion, the number of U.S. logistics advisors was so small by the fall of 1972 in comparison to the vast maintenance, repair, overhaul, supply, and

distribution activities being conducted in RVNAF, that the U.S. advisors could only have been lending a helping hand.

Most advisors with whom we talked said they were not operational. Many of them said their advice would be needed for periods ranging from 3 to 18 months (one advisor in a highly technical area estimated 3 to 5 years); others said their assistance was no longer needed, and that their particular RVNAF units could operate without them.

The Country Logistics Improvement Plan was responsive to directives from CINCPAC, the services, the Joint Chiefs of Staff, and DOD; it set the tone for Vietnamization by the people directly responsible for carrying it out, i.e., the U.S. military personnel in South Vietnam. The overall plan was flexible and was ultimately succeeded or augmented by a number of additional plans. The final changes in the plans were responsive to the massive main-force North Vietnamese assualt of 1972.

Since there was no public indication in 1969 that the war in the air and on the sea would be transferred to the South Vietnamese, this report will cover only those aspects of the air and sea activities that have been turned over to them.

The U.S. objective in terms of airpower was to provide the South Vietnamese with a primarily defensive capability. This included provisions for close air support of ground operations, a military passenger-freight air transport capability, and air defense against known or anticipated enemy airstrikes. There was no provision for strategic or tactical airstrikes over North Vietnam. Aircraft of limited range and capability could penetrate North Vietnamese air space in the border areas.

The force structure was designed primarily to enable RVNAF to cope with the type of Viet Cong-North Vietnamese activity that characterized the period between the "Tet offensive" in 1968 and the North Vietnamese offensive of 1972.

The VNN was to (1) assume full responsibility for combat in the extensive rivers and waterways of South Vietnam, (2) provide a coastal surveillance system to detect and block enemy infiltrations of men and supplies, and

(3) provide a limited amount of naval bombardment support for ARVN engagements in South Vietnam coastal areas. In addition, RVNAF would use VNN vessels to provide intracoastal water transportation for all three services at the level required for the type of combat experienced between the 1968 and 1972 offensives.

CHAPTER 3

THE ARMY OF SOUTH VIETNAM

SUMMARY

In July 1969 the ARVN logistics system, according to U.S. military logisticians whom we interviewed, was working moderately well considering the makeup of the force structure. The ARVN consisted of about 393,000 troops organized into 10 infantry divisions, an airborne division, and 20 ranger battalions. The Marine Division of about 9,300 men was deployed as an elite support division. ARVN was supported by about 250,000 men in the Regional Forces (RF) and 175,000 in the Popular Forces (PF).

PF, in effect a local militia, are equipped primarily with small arms for village and hamlet defense. RF are primarily provincial troops under control of the province chief. RF may be characterized as a form of light infantry, better trained, equipped, and supplied to fight as organizational units than PF and having the mobility to operate within their provinces. RF and PF complement ARVN within their areas, but, unlike main force units, they are not available for positioning to combat the enemy wherever he may choose to do battle in South Vietnam.

The ARVN divisions were not mobile outside of the tactical zones to which they were assigned, and a countrywide capability for shifting men and materiel from one zone to another was virtually nonexistent.

ARVN was equipped with quantities of armor and artillery, and with trucks, other wheeled vehicles, and some shallow-draft intracoastal transports. In some cases, its equipment inventory was not inconsiderable. For instance, in 1969 it had about 36,000 wheeled vehicles and about 35,000 communications and electronics devices.

Its supply management system was manual and controlled separately by the technical services. Asset visibility and asset management was poor--warehouses were bulging with unusable or obsolete parts and supply items from old French and Japanese stocks; wall-to-wall and selected physical inventories measured against stock records were not a prominent

feature of the management and control systems; and reserve stocks supporting ARVN's equipment were low.

The ARVN supply system for petroleum oil and lubricants (POL) was primarily one of packaged products. The system had bulk-storage tanks in only four cities, and they were used primarily to fill 55-gallon drums and 5-gallon cans. The system had only a few ocean tankers and tank trucks for delivering bulk fuels. Only the base depot in Saigon handled aviation fuel.

It was dependent primarily on U.S. forces or contractors for its air mobility; for division-size surface transport moves; for its short- and long-term resupply; for overhaul, repair and rebuilding of its equipment; for construction of facilities, highways, and harbor improvements; and for operation and maintenance of the ocean terminals and the countrywide communications system.

By November 1972, ARVN had grown to over 460,000 men, while the Marines and RF and PF also had grown significantly.

Increased supply, maintenance, repair and overhaul requirements resulted from this expansion due to greater density and new types of equipment including vehicles and weapons. Examples of the types and quantities of items transferred are: over 850,000 small arms, over 60,000 trucks and trailers and over 5,000 combat vehicles, tanks and artillery.

The supply management system at the general depot was being automated; major items of equipment were being managed centrally and were being accounted for on a countrywide basis; physical inventories had been completed or were in process or planned; inventories were being purged of obsolete and slow moving items; the storage depots were being improved; and the supply function was being consolidated and removed from the technical services. Reserve stocks of supplies and spare parts had been increased so that requisitions generally were being satisfied at the fill rate goal established for the Vietnamization program.

The POL system had been improved. ARVN was operating the U.S. oil pipelines; major bulk-storage facilities were operating; tank trucks and trailers were in operation; and ARVN was operating POL testing and analysis laboratories.

ARVN was supporting most of its land transportation needs; except for containerized freight and heavy lift requirements, and doing it well--accomplishing division-size moves.

ARVN divisions and other units had been deployed by land and by air from one tactical corps to another and into Cambodia.

It was repairing, overhauling, or rebuilding 93 percent of the items requiring repair, including nearly all high-density items. All ports and facilities had been turned over to RVNAF. South Vietnam, with contractor support, assumed responsibility for its own highways and the Vietnamese were being trained to operate and maintain their own communications equipment and system.

The above is, in our opinion, an impressive record of achievement. This is not to say there are no problems.

The rapid expansion and the introduction of new equipment has stretched thin the top management talent. There is a serious shortage of middle managers and of trained technicians, which training and experience will solve. This means that, in some areas, the ARVN will require external support for some time in the future.

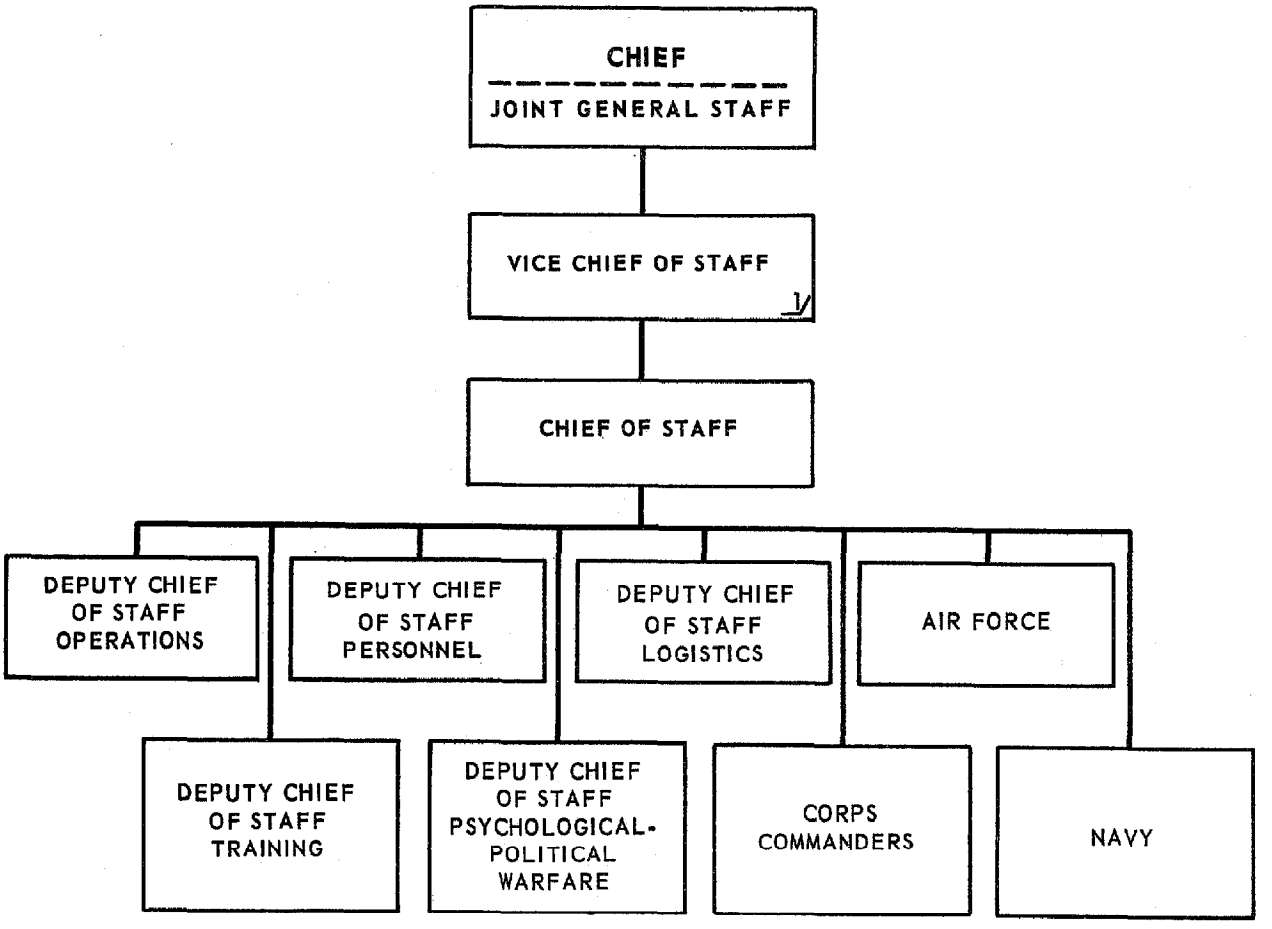
When spare parts shortages occur, they must be filled through U.S. Army channels, as is the case with American military units. Asset management needs improvement, internal controls of supplies and supply movements need strengthening, and controls over ammunition usage are a problem. Controls over consumables are also a problem, particularly for items which are useful in the civilian economy such as tires, POL, and batteries. There is a need for continuing and increased command emphasis in the area of preventive maintenance; and, the RVNAF budget has not been able to provide funds adequate for proper maintenance of facilities.

Some items must be repaired, rebuilt, overhauled, or replaced by sources outside of Vietnam, for the foreseeable future.

THE ORGANIZATION FOR LOGISTICS

RVNAF is predominantly an Army organization with the Air Force and Navy functioning as independent components. Below is a simplified organization chart of RVNAF.

REPUBLIC OF VIETNAM ARMED FORCES ORGANIZATION



1/Vice Chief of Staff is the concurrent commander of the Regional and Popular Forces

The Chief, Joint General Staff, RVNAF, is responsible to the Prime Minister and the Minister of National Defense for commanding the Armed Forces, including the Forces' organization and development, use of manpower, logistics plans and national resource plans. The Joint General Staff is staffed by Army generals; therefore, the Army, to a large extent, controls the size of the fiscal, equipment, logistical, and manpower resources available to the Air Force and Navy.

Air Force and Navy headquarters are responsible for the organization, improvement, training, logistical support (except for common services and items provided by Army), and employment of their subordinate units in compliance with policies established by the Joint General Staff. The Air Force and Navy operations will be covered in subsequent chapters.

ARMY OF SOUTH VIETNAM LOGISTICS

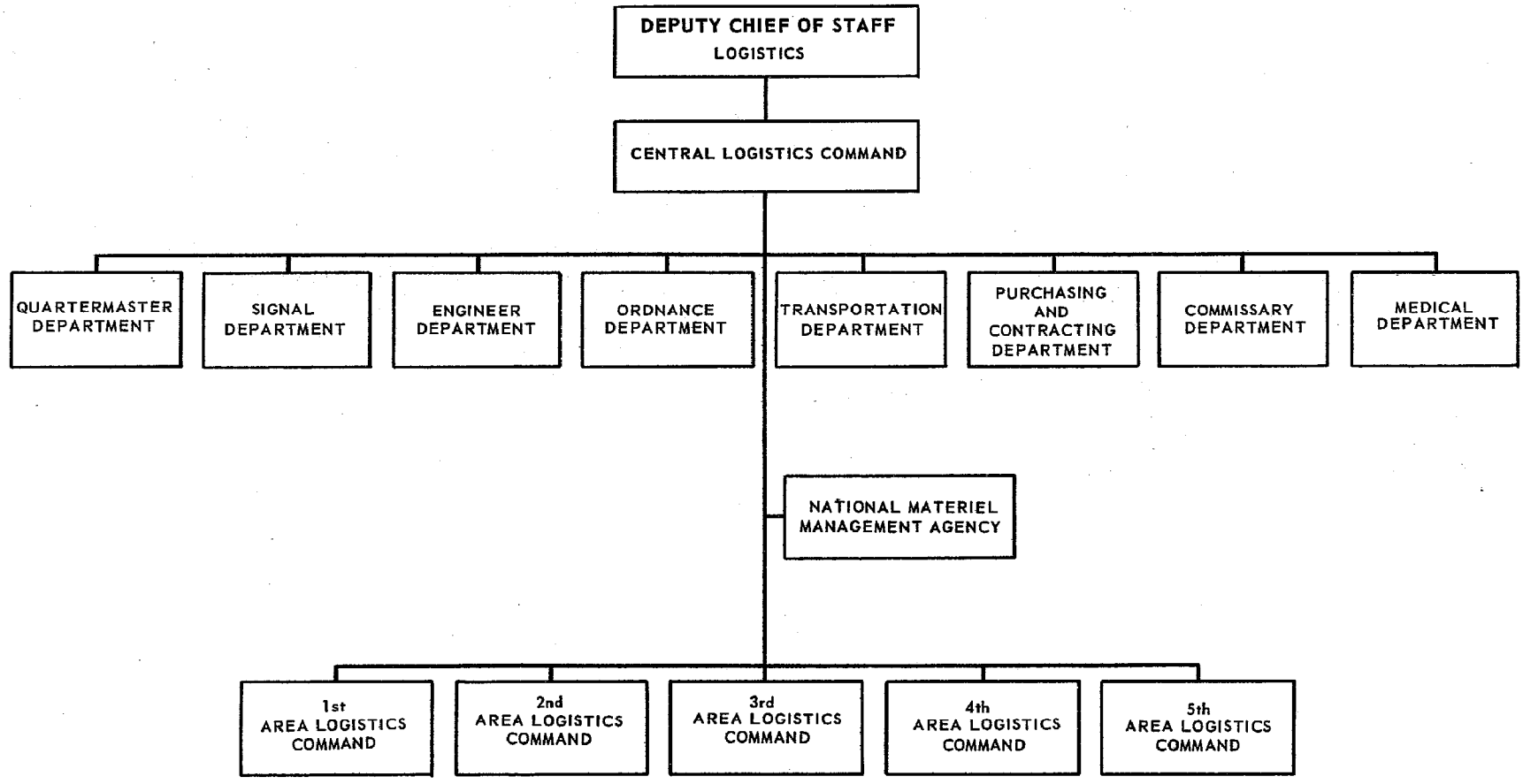
The Deputy Chief of Staff for Logistics, Joint General Staff, is also the commander of the Central Logistics Command, which has a technical service and supply structure similar to that of the American Army in the 1950s. As Commander, Central Logistics Command, he controls and commands the ARVN logistical organizations.

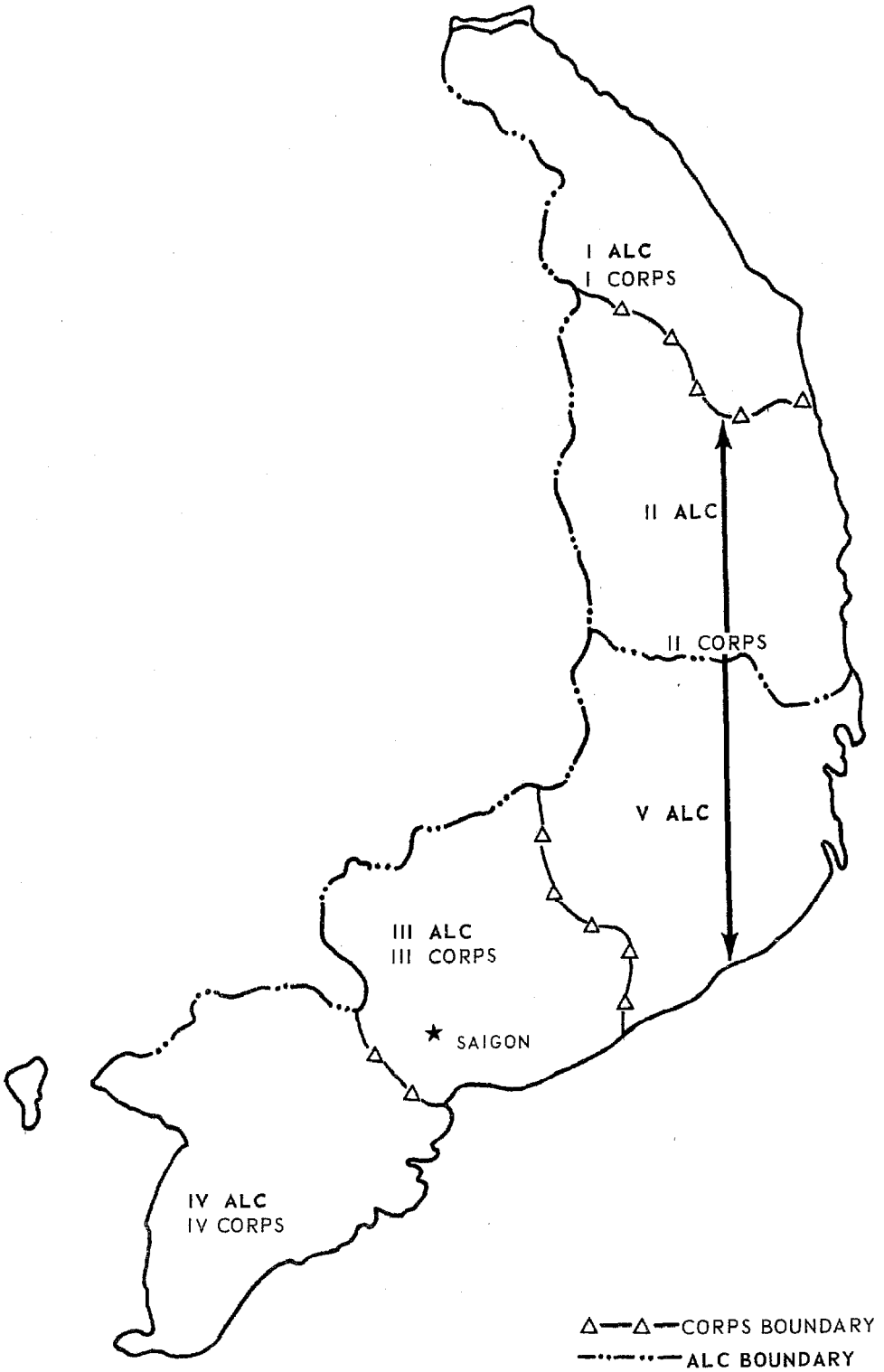
In 1969, the Central Logistics Command was organized as shown in the chart on page 20 and has remained substantially the same since that time, except for the National Materiel Management Agency which was added in 1971.

The country is divided into four tactical military corps areas or zones, each with a corps commander. The five ALCs directly support the military units in the four corps and in the Capital Military District. The ALCs' boundaries are closely aligned with those of the four corps, except that the II Corps area contains both the 2d and the 5th ALC (see illustration on page 21). ALCs command and control logistics units and installations, including facilities engineers in their areas. Each ALC has various field depots, general support maintenance units, and direct support units (DSUs).

Five of the six technical departments--Signal, Ordnance, Quartermaster, Engineer, and Medical--provide common-item supply support to the Army, Navy, and Air Force and complete logistical support for RF and PF.

REPUBLIC OF VIETNAM ARMED FORCES LOGISTICS ORGANIZATION




I ALC
I CORPS
II ALC
II CORPS
V ALC
III ALC
III CORPS
SAIGON
IV ALC
IV CORPS
CORPS BOUNDARY
ALC BOUNDARY

Each technical department provides or supervises the technical maintenance, repair, or overhaul of the equipment for which it is responsible and also operated the base depot system for the equipment and spare parts and supplies for that equipment.

Most U.S. supplies for the Engineer, Medical, and Signal Departments, are received at base depots in the Saigon area. Most ordnance items are received at the base depot in Saigon, but ammunition and other selected items of supply can be shipped directly through other ports to various ammunition base depots and to what are known as medium support battalions in ALCs. The Quartermaster Department directly receives all supplies either at its base or field depots, except for bulk and some packaged POL, which is received through three commercial oil companies--Caltex, Esso, and Shell.

The transportation service is unique among the technical departments because its provides service to all the military services but does not supply or maintain its equipment. The Ordnance Department performs these latter functions.

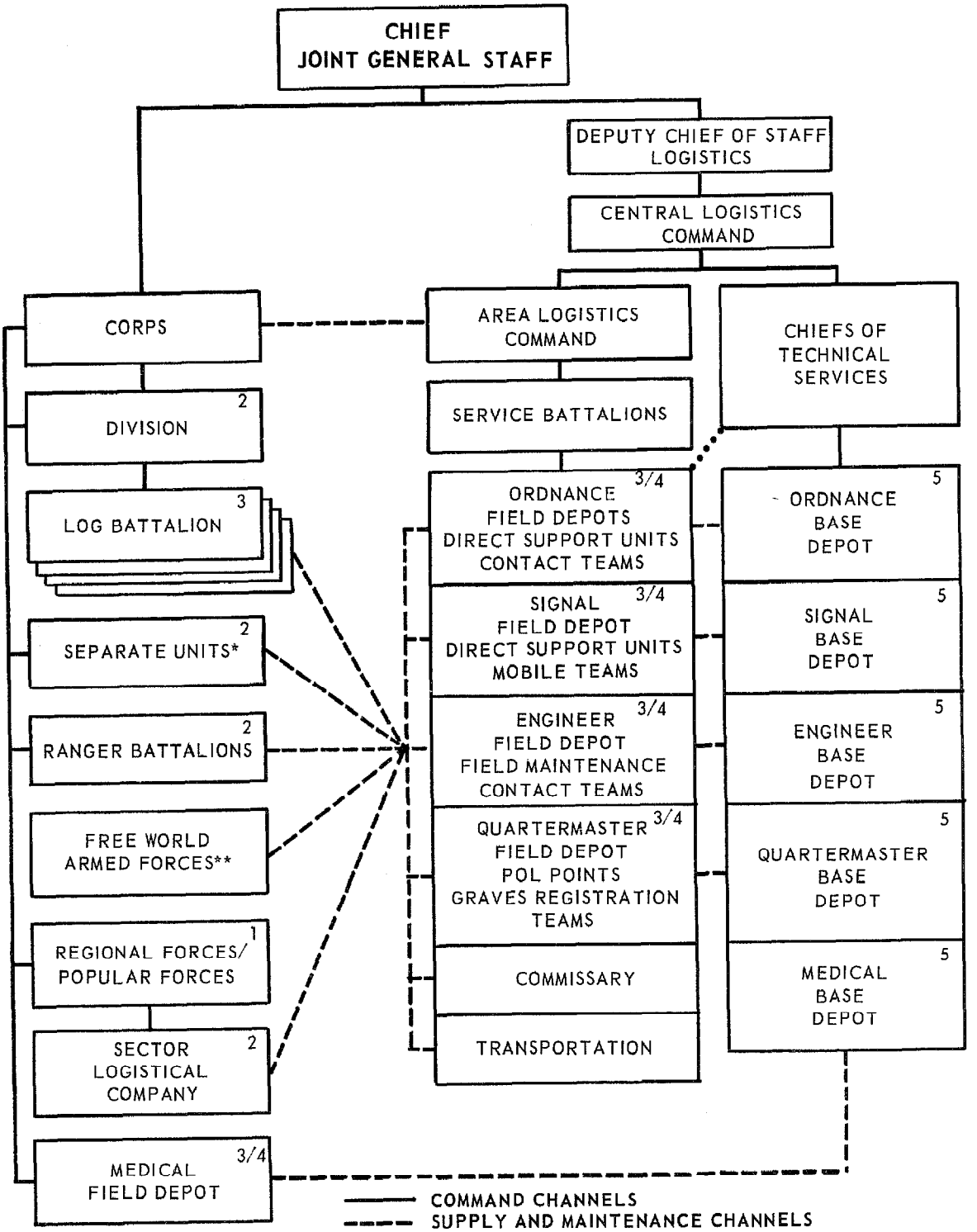
The Commissary Department receives its supplies from the Quartermaster Department and manages the commissary system both for troop issue and resale to military families.

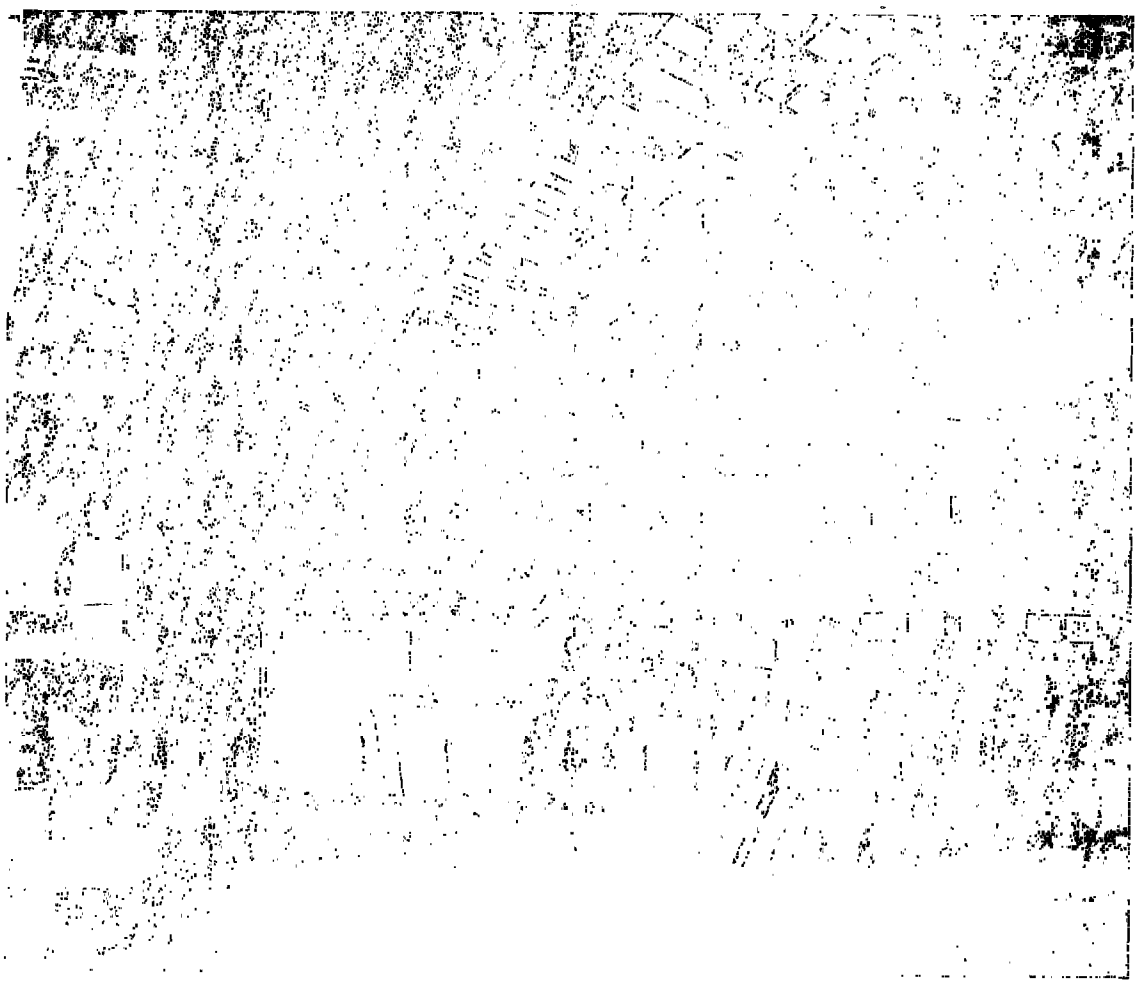
The illustration on the following page shows the relationship among the technical services, ALCs, and the tactical organizations.

The base depots served as the basic supply sources for the technical service field depots throughout Vietnam. The base depots managed all supplies and stocks for the in-country bases and were the only activities authorized to submit requisitions to the U.S. supply system.

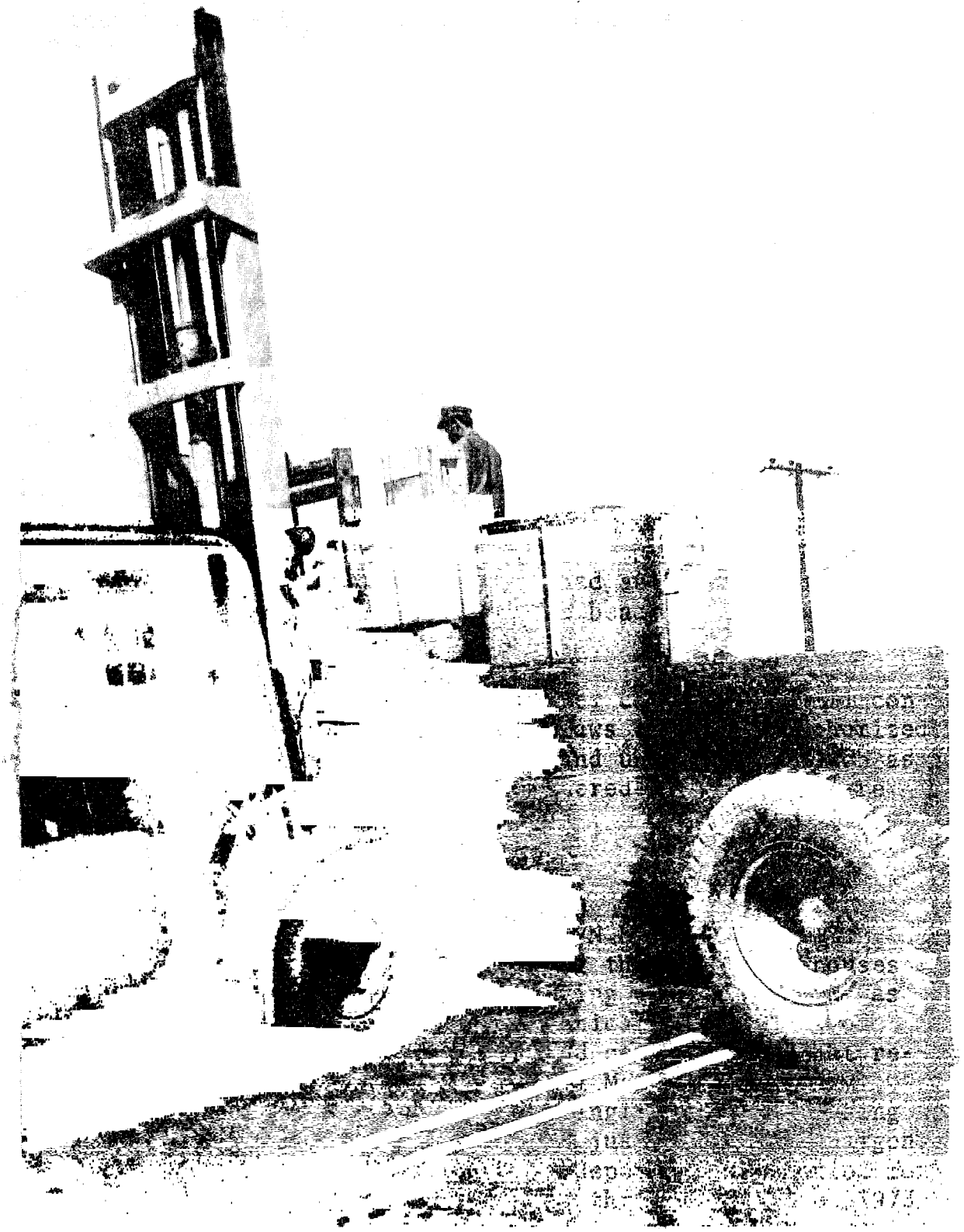
The technical service supply field depots are components of the five ALCs. ALCs command and control all field depots and DSUs in their respective geographical areas. These field depots maintain and manage the basic supplies needed to support their geographical areas. The field depots obtain their stock from the base depots and supply the technical service DSUs and division logistics support battalions.

RVNAF LOGISTICS CHANNELS





Interior of ARVN warehouse



ARVN supplies being shipped from depot

Blank Page

26

ASSET MANAGEMENT

Up to the time of our study in September 1972, the five technical services (Engineer, Ordnance, Signal, Quartermaster, and Medical) operated relatively independent supply systems, subject to guidance from the RVNAF Central Logistics Command. The systems were similar to manual stock control procedures used by U.S. military services many years ago. For example, stocks were accounted for on manually posted cards and requisition objectives and reorder quantities were computed manually. The systems provided very little statistical data for management analysis, and that available was generally out of date and prone to error. In July 1969 the ARVN supply system was providing only marginally adequate support to ARVN combat units. The system was slow and unresponsive to changing requirements.

Since 1969, ARVN supply activities have supported RF and PF and have supplied common-use items to VNN and VNAF.

In 1969 ARVN supply support for allied forces was limited to a few subsistence items. By February 1972 ARVN was furnishing a wide variety of supplies and services including ammunition supply support for all ground forces in Vietnam.

Development of improved management and supply procedures

In 1969 the entire ARVN materiel management system was operated manually. At that time MACV recognized that the large quantities of items, customers, and transactions could not be managed effectively on a manual basis. Consequently, MACV employed the Computer Science Corporation to study the feasibility of an automated materiel management system. When MACV accepted the corporation's system, it asked the corporation to install the system and train the South Vietnamese to operate and maintain it.

The study results and recommendations were incorporated into the RVNAF Automated Materiel Management System. Basically the automated system was to (1) standardize and improve the previous ARVN manual system; (2) support the ARVN base depot complex with inventory management, maintenance management, and a logistics personnel subsystem; (3) provide the

necessary interfacing with the U.S. supply system; and (4) generate management information not previously available for RVNAF and U.S. needs.

The RVNAF Automated Materiel Management System has been under development for almost 3 years. The system will continue to expand at least through 1973. The improvements and functions of the system are summarized as follows:

1. An IBM 360/40 computer and peripheral equipment was acquired and installed. The system can accumulate demand data for 250,000 line items and stockage data for 100,000 line items. It can also maintain data for 15 storage locations and identify 1,500 authorized requisitioners.

2. An asset balance file, authorized stock list, and master catalog was established.

3. Requisitions and related documents, including stock availability, materiel release orders, issue notices to customers, and receipt confirmations are being processed.

4. Requisitioning objectives are being computed and replenishment requisitions are being processed.

5. ARVN personnel were trained in automatic data processing functions such as programing, analysis, and documentation. Also, an ARVN instructor cadre for the system's operations was developed.

6. A subsystem for establishing a consolidated ARVN depot was developed to manage and control the physical movement and positioning of stocks.

After the supply subsystem is fully operational, the RVNAF Automated Materiel Management System will be developed to include major item and depot maintenance management subsystems. The automatic data processing services contract for developing and implementing the supply system has been expanded to provide for complete development and implementation of these subsystems.

Supply performance

Supply performance improved immediately after the RVNAF Automated Materiel Management System became operational in 1972. The chart below shows a comparison between the prior system's best monthly performance and the automated system's first month's performance.

Improvements in Supply Performance

	Prior system	Automated Materiel Management System
Requisitions processed during 1 month	14,000	24,000
Issues and backorder releases processed	10,000	23,000
Issues from declared excesses	-0-	$327,000
Receipts processed at base depot	6,000	13,800
Issues processed daily at base depot	400	530
Average order and shipment time at field depot	38 days	23 days

The above statistics are for ordnance repair parts, the first technical service commodity activated. In most cases the automated system did almost twice as much as the punch-card system.

Control over consumables

Controlling consumables, particularly items that are useful in the civilian economy such as tires, POL, and batteries, has been a continuing problem.

Because of the high tire consumption rate in RVNAF, the U.S. forces and RVNAF have had to tighten controls over issues of new tires and the return of tires for recapping. The United States had provided RVNAF with two tire recapping plants which are expected to satisfy a large percentage of RVNAF tire requirements. Offshore sources must provide the balance.

Our Saigon office's survey of the tire problem yielded strong indications that the problem stemmed from "leakage" of good military tires into the civilian economy. One way

this may be done is for a civilian to obtain a worn-out, nonrecappable tire from a property disposal yard or other source. The worn-out tire plus cash or other consideration are then illegally exchanged for a good tire on a military vehicle.

Thus a tire that had been classified as nonrecappable and had been turned in for disposal is placed on a military vehicle and returned to the military system, and a good military tire is lost into the civilian economy.

We believe that controls should be established to preclude nonrecappable tires from returning to the military system. A possible solution is contained in the U.S. Army regulation which states that tires classified as nonrecappable will be destroyed by cutting their beads before releasing them to the property disposal yard. It appears that bead mutilation could be performed at the collection, classification, and salvage facilities operated by the U.S. Army, Vietnam, and ARVN.

At the close of our study DOD had authorized the burning of these tires or cutting of the beads prior to their disposition.

We believe that the controls over consumables will continue to be troublesome unless the laws against unauthorized use of military tires are enforced and unless items such as tires and batteries which are considered nonreparable are rendered useless.

BASE DEPOT CONSOLIDATION

The technical departments of ARVN had been managing their own supplies and were operating their own warehouses at various locations in Saigon. During our study ARVN was in the process of relieving the technical departments of their supply management functions and centralizing that responsibility in the National Materiel Management Agency. The supplies are being stored in a single base depot using vacated U.S. Army facilities located just outside of Saigon. The movement from the existing base depots was scheduled for phased execution from September 1972 through September 1973.

Contractors will accomplish the physical movement and control of stocks in transit. The contractor developed

computer programs and a movement control center to manage stocks in transit and to preselect and control storage locations at the new depot. Contract movement support will cost about $2.2 million.

Consolidation hopefully will improve warehousing, transportation access, customer support, and security, and will reduce overhead costs.

Proposed changes in logistics structure

Further consolidation and improvement of the supply system is being planned. A joint ARVN and MACV study group recommended that the supply function of the eight field depots in the 3d and 4th ALCs be consolidated into the new ARVN associated depot together with the supply functions of the four base depots. They further recommended that the supply function of the 12 field depots in the 1st, 2d and 5th ALCs be consolidated into two additional associated depots.

The National Materiel management Agency would control the three associated depots and the materiel management function would be incorporated into the RVNAF Automated Materiel Management System.

The joint study group also recommended that the 132 DSUs be consolidated into composite direct support groups.

DISTRIBUTION SYSTEM

In 1969 the ARVN transportation system generally was oriented toward each military region. There was very little traffic between regions. Consequently, a countrywide capability for shifting men and materiel from one region to another was virtually nonexistent.

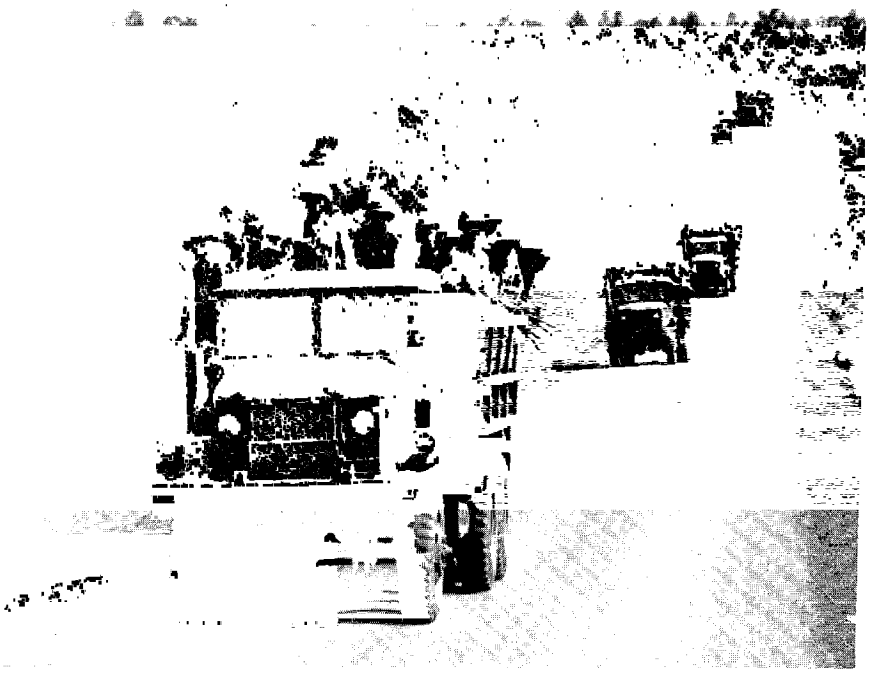
But, during the latest offensive, ARVN recognized the need for mobility and, when necessary, moved both troops and materiel between military regions. For example, during the North's siege of An Loc it was necessary for the South Vietnamese to reinforce its forces. A division was disengaged from combat in the delta (military region 4) and was moved to An Loc (military region 2) in 3 days. Part of the move was accomplished using air transportation, but most of it was accomplished via highway.

The North Vietnamese isolation of Kontum in April 1972 and the subsequent threat to Pleiku again tested the flexibility of the ARVN logistics distribution system. ARVN had been resupplying Kontum from Qui Nhon to Pleiku along Highway 19 and then north to Kontum. Eventually, the North Vietnamese gained control of the An Khe pass along Highway 19 and prevented ARVN from using Highway 19 to support Pleiku.

In order to resupply Pleiku, the chief ARVN logisticians diverted some light truck companies from Qui Nhon and some medium and light truck companies from Saigon to Cam Ranh Bay. These truck companies then moved cargo from Cam Ranh Bay north to Ninh Hoa, west to Ban Me Thuot, and then north over extremely difficult terrain and inferior roads. Advisors at Pleiku said the supply system consistently resupplied the RVNAF forces at Pleiku. When the An Khe pass was reopened, ARVN moved its truck companies back to Qui Nhon and again resupplied Pleiku via Highway 19 and the An Khe pass.

This type of diversion of routes and shifting of truck companies was a new experience for RVNAF and showed the growing flexibility of the distribution system under the most adverse conditions and the system's ability to move troops and supplies to the areas in need.

Trucks transporting supplies over open highway



Truck convoy transporting troops over secondary roads

Highway operations

As U.S. units have phased out, ARVN has assumed the mission of providing all highway transport. According to MACV personnel, the ARVN transportation units are fully proficient in operations and management.

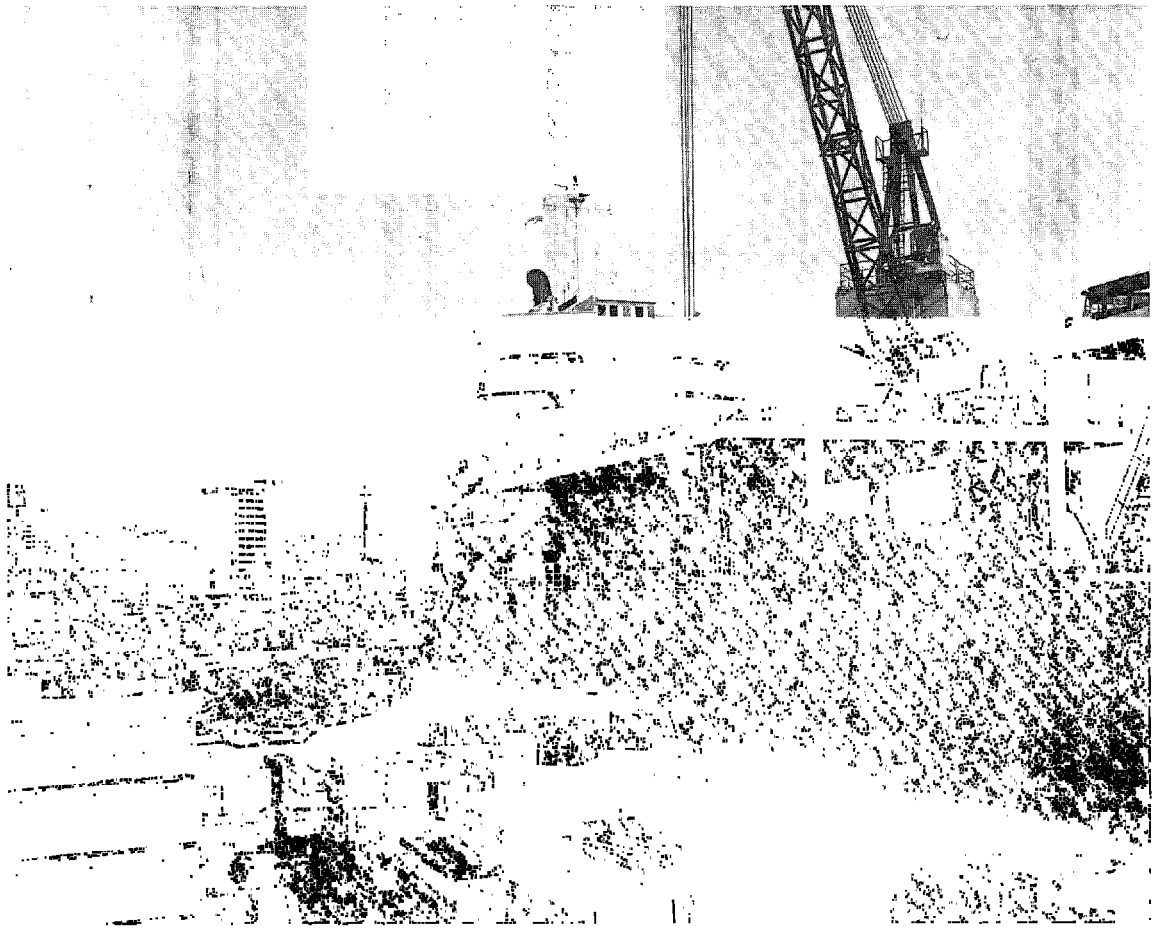
ARVN has six transportation truck groups with more than 2,400 transport vehicles, which is about 300 less than authorized. One group is assigned to each of the five ALCs and one group is under the control of RVNAF, Department of Defense Transportation. The truck groups assigned to the ALCs have up to five light truck companies and one medium truck company. Each truck company is authorized 60 transport vehicles.

During our visit to Vietnam we talked to U.S. tactical and logistical advisors from every military region. These advisors told us that, for every operation requiring the movement of either troops or cargo, the ARVN transportation units accomplished the mission if the roads were open.

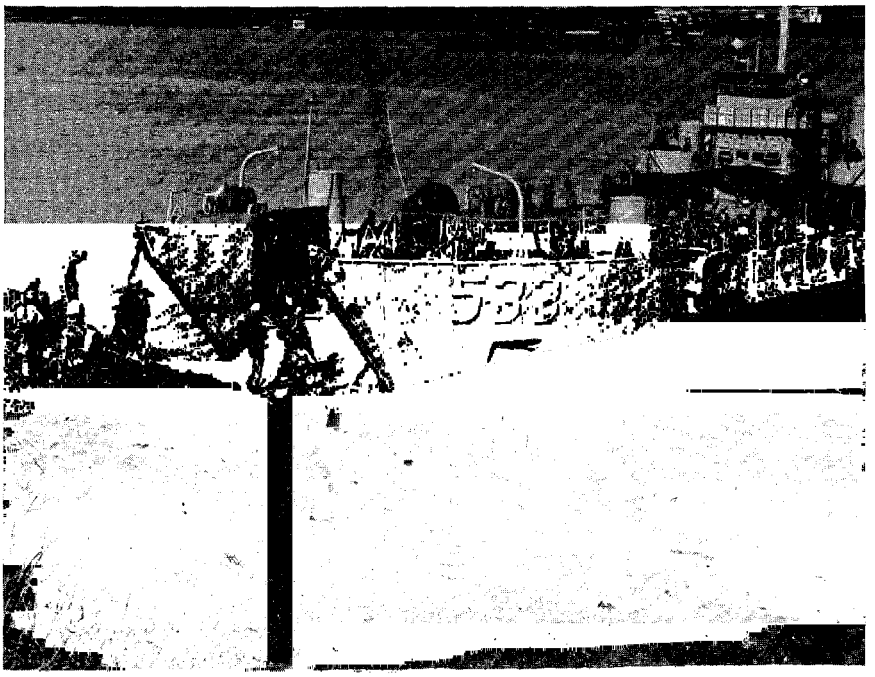
Port operations

The military port system in the Republic of Vietnam consists of primary ports at Saigon, Newport, DaNang, Qui Nhon, Nha Trang, and Cam Ranh Bay and a series of smaller coastal and inland ports. Inbound cargo is discharged at Saigon or DaNang and, if destined for a shallow-draft port area, is transshipped by military or commercial transport as designated by the Central Logistics Command Movements Control Center. Movement from shallow-draft ports to destination is effected by military and commercial highway resources or by ARVN marine craft.

By November 1972, ARVN had taken over the operation of all ports, including the Saigon port where the bulk of supplies and equipment furnished to RVNAF enters the country.



Port operation in Saigon



Ship preparing to unload troops and cargo over beach

Water transport operations

All ARVN watercraft, including 10 landing craft, utility, and 94 landing craft, medium-8, are used for logistical support missions directed by the Central Logistics Command or the local commanders. In addition, the Central Logistics Command allocates the use of VNN's six landing ship tanks (LSTs) and five landing ship mediums (LSMs). The chart below shows the amount of cargo transported by RVNAF and U.S. water transports during fiscal years 1971 and 1972.

Cargo Moved by Water Transports
During Fiscal Years 1971 and 1972

Fiscal year	RVNAF		United States		Total
	Short tons	Percent	Short tons	Percent	Short tons
1971:					
First quarter	44,230	47	50,514	53	94,744
Second quarter	60,875	63	36,375	37	97,250
Third quarter	49,808	70	21,714	30	71,522
Fourth quarter	47,560	63	27,437	37	74,997
1972:					
First quarter	73,012	76	22,544	24	95,556
Second quarter	86,394	68	40,280	32	126,674
Third quarter	99,752	60	65,249	40	165,001
Fourth quarter	181,647	68	88,466	32	270,113

During the fourth quarter of fiscal year 1972 RVNAF moved more cargo than the combined total moved by RVNAF and its allies in any quarter during the past two fiscal years. Whether this large increase will continue is problematical because, according to DOD officials, many RVNAF assets are old and there is a shortage of trained maintenance personnel.

More than half of the 88,500 short tons of cargo moved by the United States during the fourth quarter of 1972 was moved by U.S. LSTs and LSMs. It was the opinion of U.S. officials in Vietnam that, prior to the 1972 North Vietnamese offensive, RVNAF had sufficient LSTs and LSMs to transport the required cargo. But, as a result of the increased cargo required to be moved since the invasion, considerable U.S. support has been required, as shown by the following chart.

Short Tons of Cargo Transported by LSTs and LSMs

	RVNAF		United States		Total
Month	Short tons	Percent	Short tons	Percent	Short tons
April	7,819	68.7	3,559	31.3	11,378
May	5,136	20.2	20,210	79.8	25,346
June	4,027	14.1	24,558	85.9	28,585
July	5,005	18.5	22,008	81.5	27,013
August	5,517	33.0	11,194	67.0	16,711
September	5,253	31.4	11,491	68.6	16,744

According to MACV officials the RVNAF LST and LSM transport capability is inadequate to support sustained and massive resupply shipments generated under combat conditions. Consequently, unless the movement requirements are reduced or RVNAF is provided with additional assets, Vietnamization of the sealift system will not be achieved.

Railroad

The railroad is not used as a major mode of transportation because the enemy can easily interdict it. No U.S. military support is provided. The major operational segment runs from Saigon to the Long Binh-Bien Hoa area.

The ammunition system

In 1969 there were two separate ammunition supply systems in Vietnam: one to support U.S. and free world forces and another to support Vietnamese forces. In most cases the depots of the two systems were located at the same places.

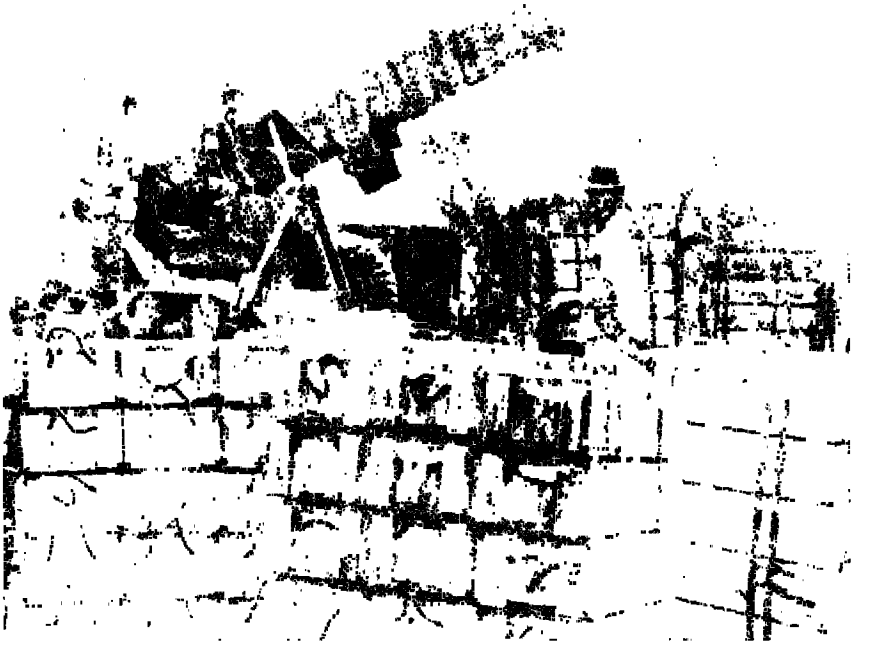
In 1970 planning was initiated to consolidate the two systems with the objective of developing ARVN capabilities to manage a joint support ammunition supply system. Since that time major improvements in the ARVN system have included

--construction of $25 million worth of physical facilities including 163 new storage magazines;

--establishment of an ammunition surveillance system by training ARVN personnel; and

--establishment of an ammunition maintenance, renovation, preservation, and packaging capability.

As a result of the improvements ARVN was able to assume responsibility for ammunition supply support for all ground combat forces by April 1972.



Ammunition being loaded for shipment to combat area

The petroleum system

In 1969 the ARVN POL supply system primarily stored and distributed only packaged products. The system had bulk-storage tanks in only four cities, and these tanks were used primarily to fill 55-gallon drums and 5-gallon cans. The system had only a few tankers and tank trucks for delivering bulk fuels. Only the base depot in Saigon handled aviation fuels.

In February 1971 a plan was developed to convert the existing POL system to a bulk-handling system. The plan was to improve the system's facilities and equipment so ARVN could provide direct support to U.S. and other free world military assistance forces.

By September 1972 almost all facilities and equipment required had been provided to ARVN, including

--major bulkstorage facilities;
--fuel system supply points;
--tank trailers and trucks; and
--POL laboratories.

PROCUREMENT

The principle U.S. military supply procurement activity in Vietnam, the Army Procurement Agency, has contributed to Vietnamization through expanded procurement from Vietnamese sources. In January 1972, the Procurement Agency was authorized to procure Vietnamese items at prices up to 125 percent of estimated U.S. prices (cost plus transportation and packaging) for the same or similar items. This program directly benefits RVNAF by encouraging in-country production of military articles. The program also directly benefits the Vietnamese economy by providing jobs and foreign exchange earnings.

In fiscal year 1971 the Procurement Agency procured $8.8 million worth of local items; this increased to $18.2 million in fiscal year 1972, and is projected to be $37 million in fiscal year 1973. On a percentage basis the increase was even more notable: in 1971 local procurements accounted for less than three percent of the Procurement Agency's procurement while in 1973 it will account for 41 percent.

ARVN efforts towards self-support for supplies have centered in a local procurement program and production of supplies. In addition to some food items, ARVN procures small dry batteries and some clothing and construction items.

Local procurement has not been without its problems. Some Vietnamese contractors' quality control standards are weak and some contractors have had difficulty meeting contract specifications. For example, the South Vietnamese can produce such things as light bulbs, batteries, and dried rice. But, the light bulbs are of poor quality and burn out quickly, the battery manufacturer has had difficulty meeting military specifications, and the first quantities of dried rice produced had to be rejected. Nevertheless, the program is a small step in developing the productive capacity of the civil sector.

MAINTENANCE, REPAIR, OVERHAUL, AND REBUILD CAPABILITY

The accelerated introduction of modern ordnance, signal, and engineer equipment had taxed base depot support capabilities to the limit and had increased maintenance, repair, and overhaul requirements below the depot level. Deficiencies in the areas of utilities, facilities, and equipment severely limited efforts to improve depot support. These problems were common to the 40th Engineer Base Depot, the 60th Signal Base Depot, and the 80th Ordnance Rebuild Base Depot (now known as the Army Arsenal), all located in Saigon.

Rather than attack the problems separately on an individual depot basis, a program was established in October 1969 to improve base depot capability by developing a single base depot improvement plan. The principal aspects of the plan were to enhance depot facilities, utilities, and equipment; to standardize and modernize electrical power and distribution systems; and to acquire and install new equipment to rebuild and maintain RVNAF assets. The plan outlined

- --current capabilities of the depots to provide maintenance support to RVNAF;
- --the increased requirement for depot maintenance necessary to support the improvement and modernization of RVNAF and force structure increases;
- --improvements needed in personnel skills, training facilities, equipment, and tools; and
- --funds required for the program and an implementation schedule.

The rebuild capability

The depot improvement program--at a cost of over $25 million--was specifically designed to provide ARVN with an in-country rebuild capability for most engineer, signal, and ordnance items of equipment and was considered essential for the Vietnamization of the logistics effort.

The plan provided for increasing production capacity and capability so that by fiscal year 1975 ARVN could accomplish most rebuild requirements in-country. Before the improvement plan began, virtually all engineer and ordnance items requiring depot maintenance were repaired outside Vietnam. Since July 1970, an increasing percentage of maintenance has been performed in-country as shown by the chart below.

	Percentage of Depot Maintenance Performed In-Country	
Depot	Fiscal year 1971	Fiscal year 1972
Engineer	26	54
Ordnance	50	71
Signal	66	86

Our examination of maintenance data shows continuing improvements in fiscal year 1973.

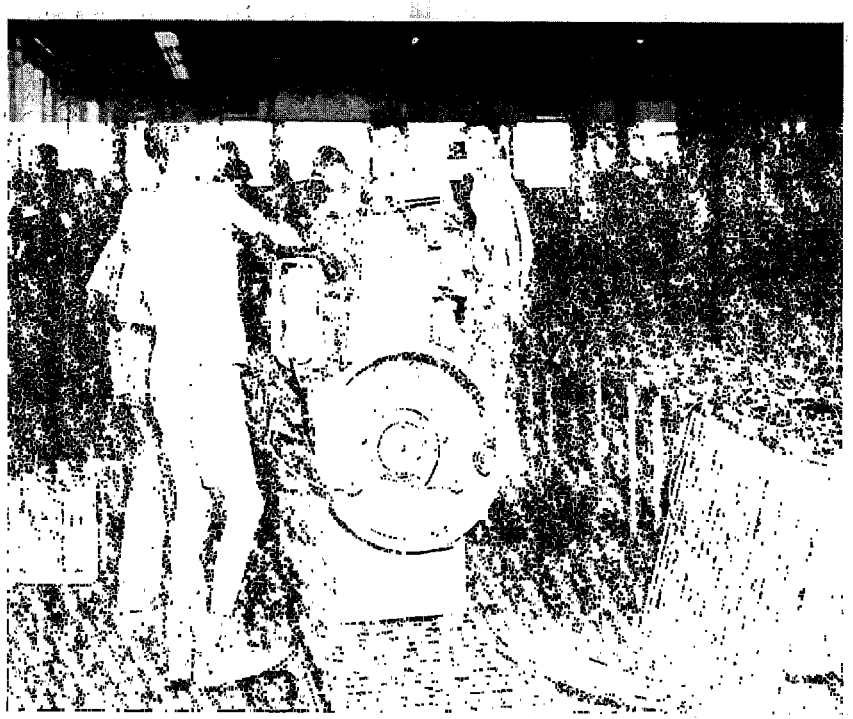
Prior to the base depot improvement program, the 40th Engineer Base Depot had an appreciable backlog of engineer equipment for rebuild and the 60th Signal Base Depot was incapable of performing fifth-echelon maintenance (overhaul and rebuild). At the 80th Ordnance Depot, selected tracked vehicles and major assemblies were being shipped out-of-country for rebuild. The increase in equipment density and the introduction of new equipment into the ARVN inventory was expected to aggravate the conditions and cause a further shortfall in production at the base depots.

Examples of the achieved and planned quarterly productive capacities follow.

	Army Arsenal Average Quarterly Production		
Category	Fiscal year 1971	Fiscal year 1972	Fiscal year 1973 (note a)
Wheeled vehicles	56	169	292
Tracked vehicles	42	45	32[b]
Artillery	27	36	48
Major assemblies:			
Engines	187	722	973
Transmissions	168	516	573
Transfers	200	451	581

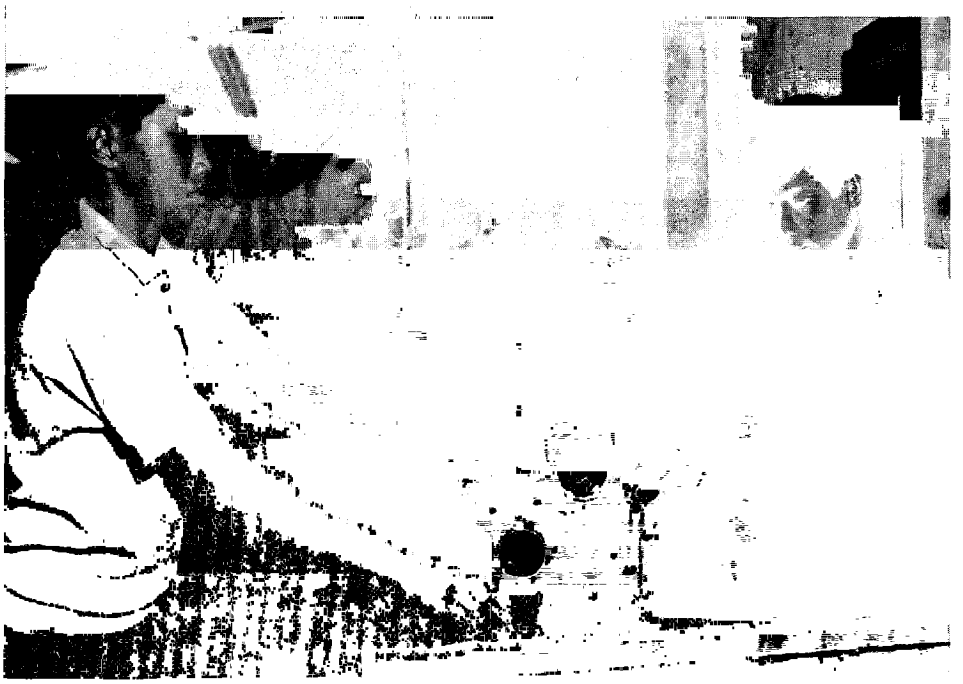
[a]Production is based on actual production during the first quarter of fiscal year 1973.

[b]Assets were not available due to recovery problems in the early stages of the 1972 offensive.



Engine being readied for overhaul

Engine crankshaft being reground



Engine washdown being performed by technical students

Self-sufficiency for some items may not be achieved until 1975. For other items there are no plans for ARVN to become self-sufficient in maintenance of some of the more sophisticated items of equipment.

This is primarily because quantities to be repaired do not justify the costly facilities required. Even though the facilites and equipment exist for overhauling, some items will continue to be repaired offshore through fiscal year 1973 to allow ARVN to develop experience with mass production techniques.

Although the amount of in-country maintenance is reportedly increasing, we did not evaluate the quality of the maintenance. In fact, during our visits to Vietnam we noted that all authorized test equipment--such as dynamometers--had not been furnished to RVNAF. Thus, equipment was not being tested adequately after being repaired, and therefore maintenance personnel could not adequately evaluate the quality of the repairs.

Depot facilities and equipment

The depot facilities, constructed by the French and Japanese during World War II, were approximately 25 years old.

They included 189 buildings situated on approximately 250 acres. The warehouses and shops varied from steel-structured masonry to sheet-metal structures with earth floors. They suffered from old age and disrepair, inadequate water and electrical power, improper or nonexistent drainage, insufficient hardstands, unpaved internal roads, insufficient storage facilities, and deficiencies in latrines and sewerage.

The industrial equipment, also old, consisted primarily of French and Japanese models for which repair parts, in some cases, could not be obtained. Nearly half of the major equipment items required replacement and new equipment was required to meet additional support requirements.

Each depot was carefully studied to determine those facilities and equipment which could be improved most efficiently and economically.

The 40th Engineer Depot required new drainage ditches, hardstands, and gravel areas; repair of roofs of existing warehouses and shops; and the construction of new storage buildings. Additional generators were needed to provide adequate power for new equipment.

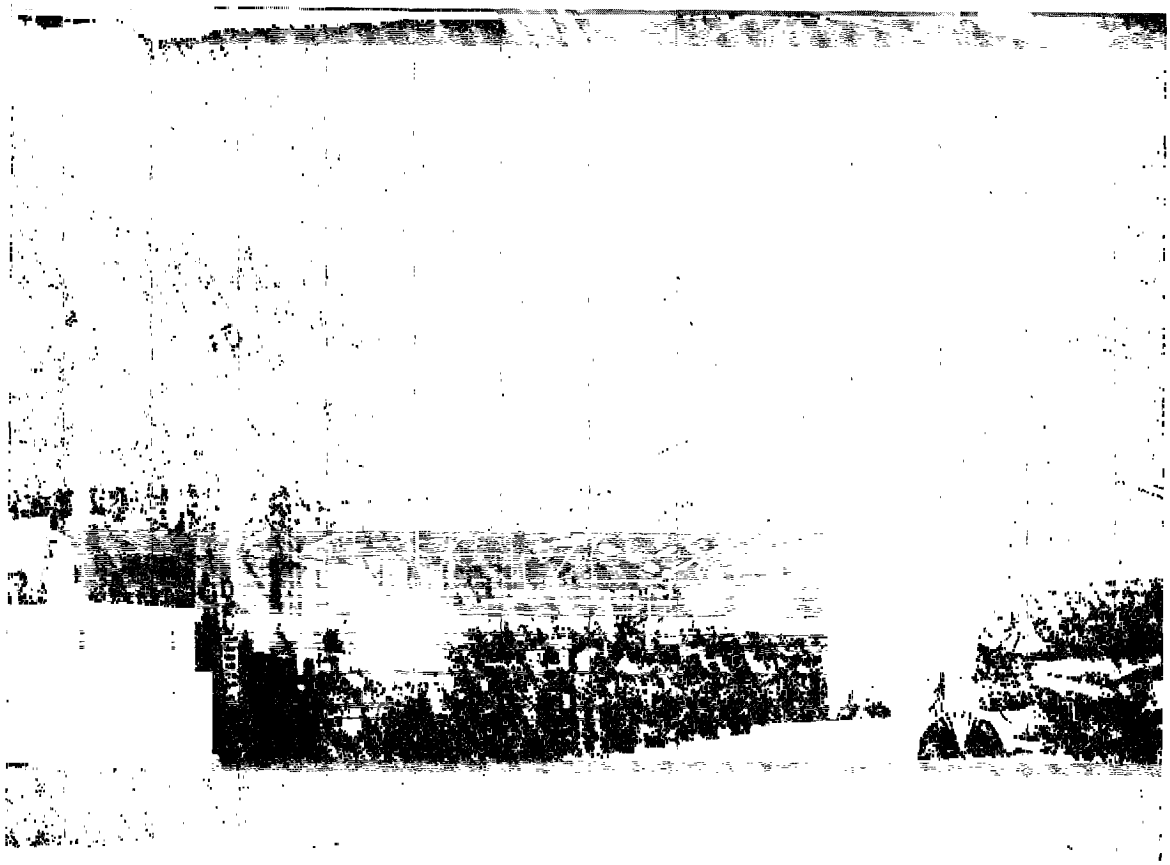
The 60th Signal Base Depot required an improved electrical distribution system, new work benches and electronic testing equipment, construction of a cold-storage facility for batteries, and the development of an adequate testing laboratory.

Although the grounds and facilities of the 80th Ordnance Depot were in better condition than those of the other depots, this installation experienced the greatest increase in rebuild requirements due to extensive growth of ordnance equipment in RVNAF. This depot required power-generating equipment, a modernized electrical distribution system, improved machine tools and shop equipment, and a completely restructured layout of shops to provide for more efficient rebuild operations.

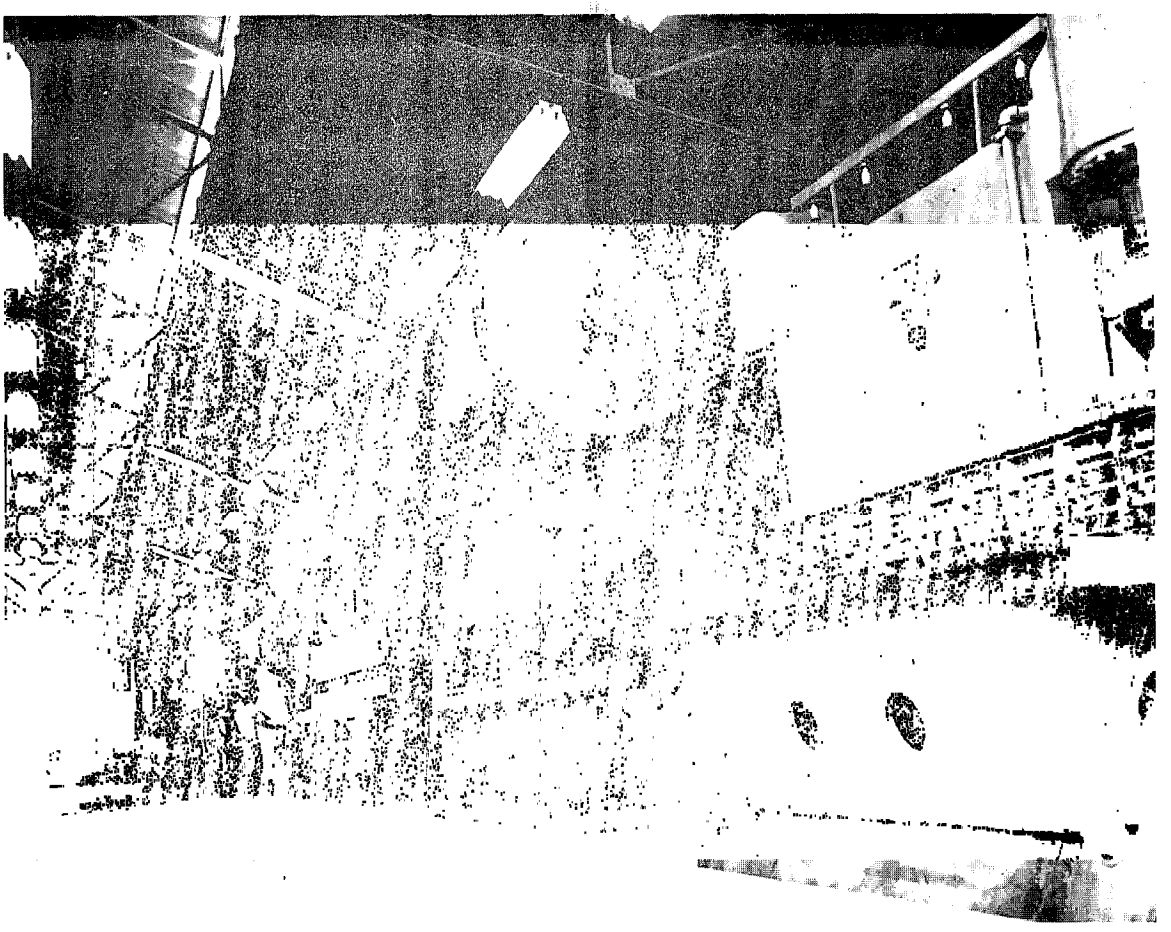
Most of the physical modification and new construction was completed during 1971; however, continued improvements such as ventilation, lighting, and equipment modification are being made. Final costs were estimated at $17.1 million.

Nearly 500 pieces of industrial equipment were provided from the used equipment inventory of the Defense Industrial Plant Equipment Center. This equipment was valued at $3.3 million and was obtained at a cost of $1.3 million--the cost of rehabilitation.

The enlarged and modernized plant facilities and equipment required expanded management and labor forces. Authorized personnel strengths had to be implemented, and increased emphasis had to be placed on training personnel to insure attainment of desired skill levels.



ARVN Metal Shop



Heavy metal-working machinery

The labor force

Significant progress has been achieved in expanding and training the work force at the base depots. Since the implementation of the base depot improvement plan, the size of the work force has almost doubled. A comparison of authorized and onhand personnel at the depots in October 1969 and August 1972 is shown below.

Depot	October 1969		August 1972	
	Authorized	Onhand	Authorized	Onhand
80th Ordnance	2,714	2,304	4,295	4,014
40th Engineer	1,209	843	1,808	1,857
60th Signal	1,004	712	1,727	1,609
Total	4,927	3,859	7,830	7,480

Although personnel strengths at the depots were approaching authorized levels overall, there was a significant shortage of skilled civilian personnel. This was particularly true at the 80th Ordnance Depot. Its manpower status as of August 1972 follows.

	Authorized	Onhand
Military	1,206	1,451
Civilian management	0	402
Civilian skilled	3,089	620
Civilian unskilled	0	1,541
Total	4,295	4,014

Salaries that are not competitive with those of contractors and private firms in the Saigon area are the primary reason for the shortage of skilled civilian personnel at the depots. Also, all males between the ages of 18 and 41 were subject to military service, which created a serious shortage of eligible male employees in this age group.

Because of the large shortage of skilled civilian personnel, civilian unskilled personnel have attempted to perform the jobs of skilled personnel. As a result, considerable emphasis has been placed on the quality assurance aspects of the depot operations.

Minimal redundancy in the industrial base

There is no commercial industrial base to back up the maintenance capabilities of ARVN.

U.S. officials have advised us that they are aware of the lack of redundancy in the ARVN's industrial base. But they do not consider it feasible to provide ARVN with additional facilities, considering the quality of equipment ARVN has and the cost required to provide industrial base redundancy.

Maintenance capabilities at Area Logistic Commands

During our trip to Vietnam in September 1972 we visited the maintenance facilities at four of the five ALCs. During

these visits we were told that ARVN had been repairing increasing amounts of equipment. The schedule below shows the maintenance accomplishments for ordnance items at the 2d ALC during 1971 and the first half of 1972.

2d ALC Ordnance Maintenance
(third and fourth echelon)

	1971			First half of 1972		
Designation	Quantity requiring repair	Quantity repaired	Percent	Quantity requiring repair	Quantity repaired	Percent
Weapons	22,960	22,832	99	17,869	17,754	99
Artillery	718	687	98	309	308	99
Combat vehicles	435	396	91	245	241	98
Vehicles	3,098	2,746	89	1,772	1,594	89

Also at the 2d ALC we noted that, during 1971, 161 pieces of road and bridge construction equipment were repaired and during the first half of 1972 they had already repaired 177 pieces.

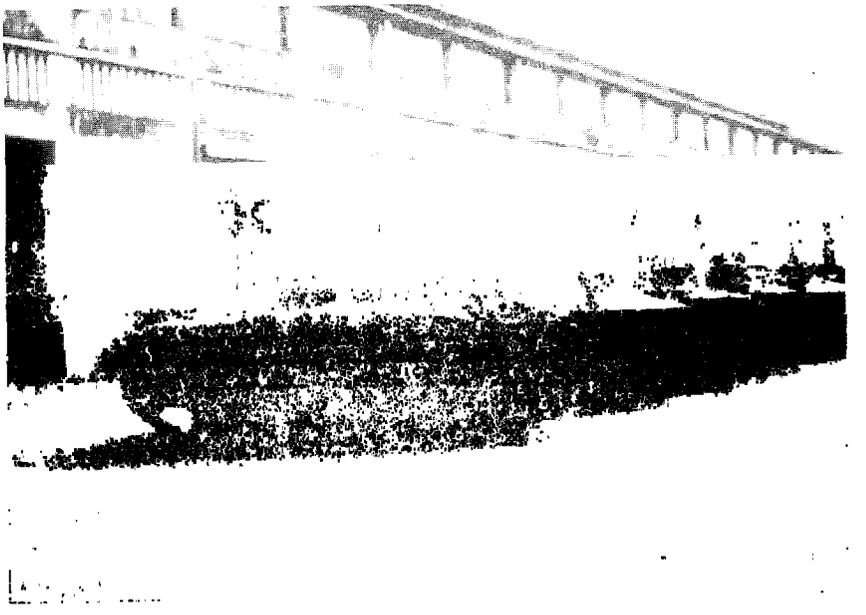
The schedule below shows, for selected items, the quantity of ordnance, signal, and engineer equipment repaired at the 5th ALC from April 1, 1972, to August 4, 1972.

Designation	Quantity requiring repair	Quantity repaired	Percentage	Quantity deadlined for parts
Ordnance	6,018	5,532	92	320
Signal	670	587	88	33
Engineer	136	94	69	20

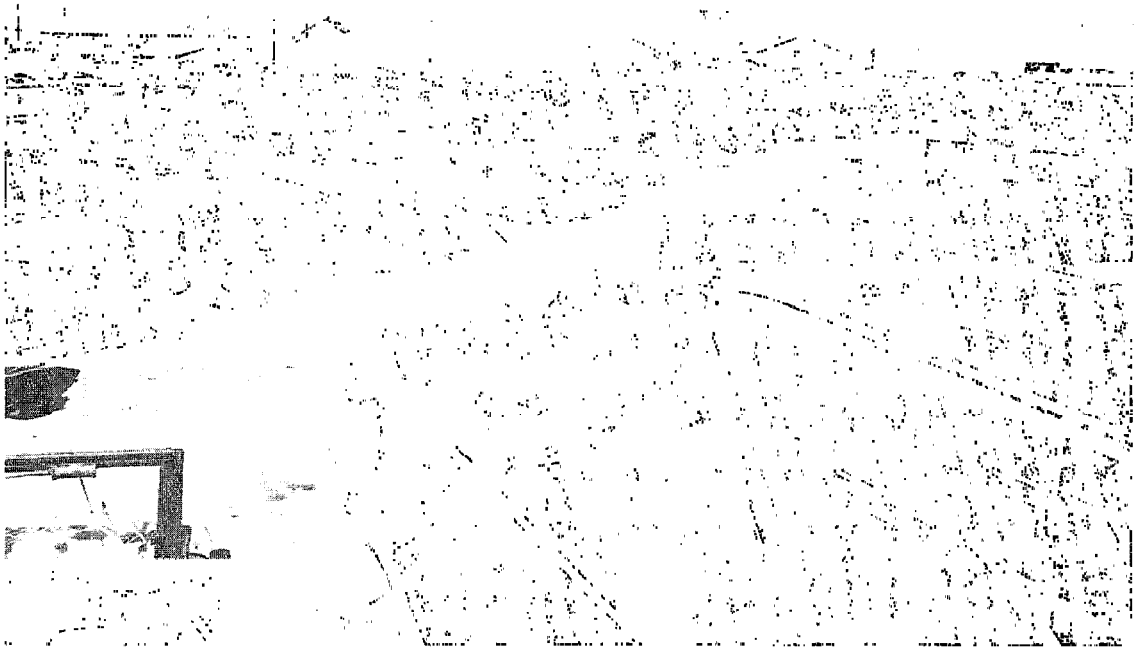
These statistics indicate that ARVN has been repairing large quantities of equipment and a large percentage of the equipment requiring repair.

But these statistics do not indicate the quality of the repairs. For example during the first half of 1972 the 2nd ALC had repaired a quantity of combat vehicles equal to about 83 percent of the total combat vehicles assigned to supported units, and had repaired a number of artillery pieces exceeding the total supported. Thus the volume of repairs seems to be excessive in terms of the total items supported.

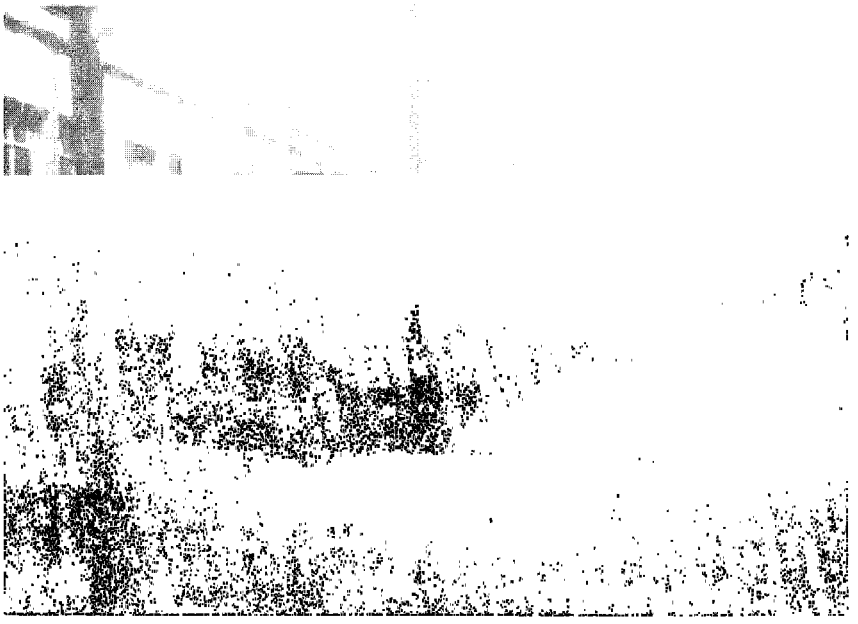
Tanks being overhauled by ARVN



Line of overhauled tanks ready for service



Trucks awaiting major repair



Repaired trucks awaiting shipment to ARVN units

Since the quantity of items requiring third- and fourth-echelon maintenance has been high in relation to the quantity of items supported, it is possible that first- and second-echelon maintenance has not been performed on these items or that the quality of this maintenance has been inadequate. It is also possible that the third- and fourth-echelon maintenance has not been durable. We did not attempt, however, to evaluate the quality of the ARVN maintenance capability.

Preventive maintenance

It was the opinion of most of the U.S. advisors we talked with during our trip to Vietnam that ARVN did not have a viable preventive maintenance program. These advisors cited the lack of command emphasis as the primary deterrent. In the few locations where preventive maintenance was a viable program, the advisors said that command emphasis was very much apparent.

During our visits to some of the maintenance facilities in Vietnam we observed certain conditions indicating that preventive maintenance practices were not being implemented. For example, several advisors told us there was not enough lubricating oil to change oil at prescribed intervals. We observed engine blocks severely pitted, which advisors said was probably caused by insufficient oil.

In each shop we visited we randomly examined grease fittings and found most to be "bone dry."

An analysis of the performance of a major RVNAF unit during the offensive indicates its effectiveness was impaired because of poor preventive maintenance. One U.S. advisor who was with the elements of the unit in combat said these elements had acquitted themselves well but that poor maintenance was a factor adversely impacting on its performance.

From this discussion, discussions with other U.S. advisors, and analysis of other data, we believe that there were weaknesses in the unit's maintenance training and practices. In part this occurred because of a

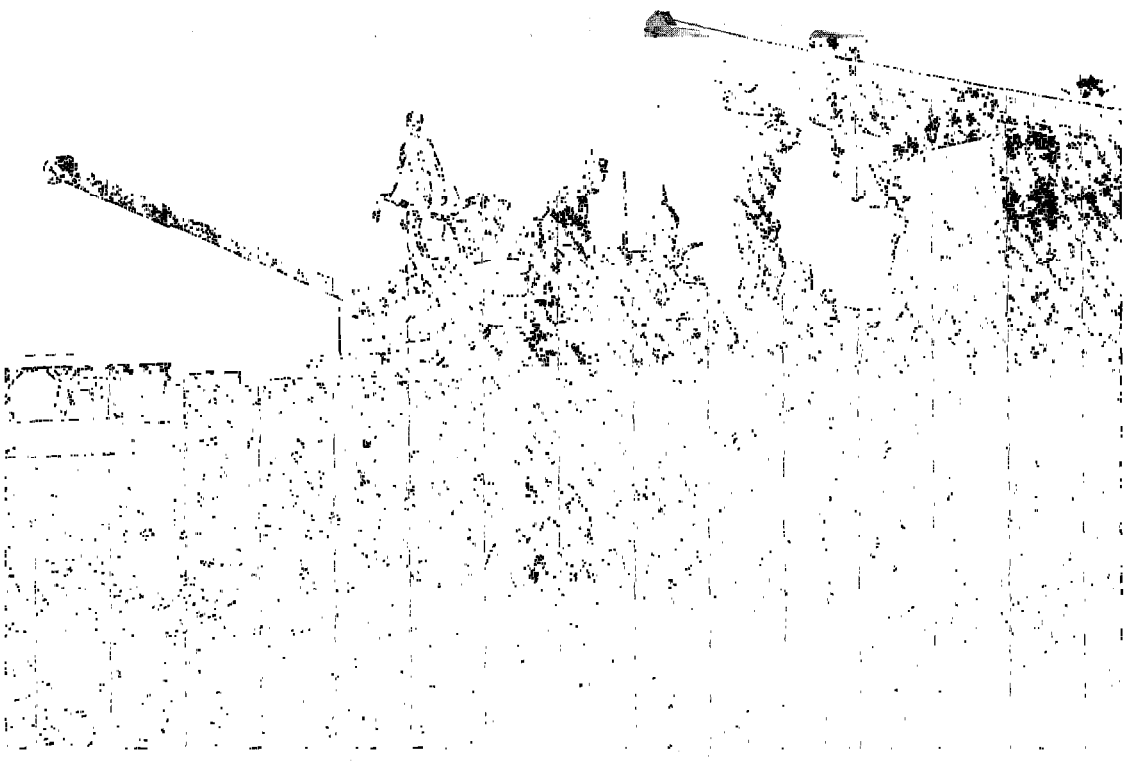
--failure to provide an organizational maintenance structure and program,

--failure to incorporate adequate maintenance training in the overall training program,

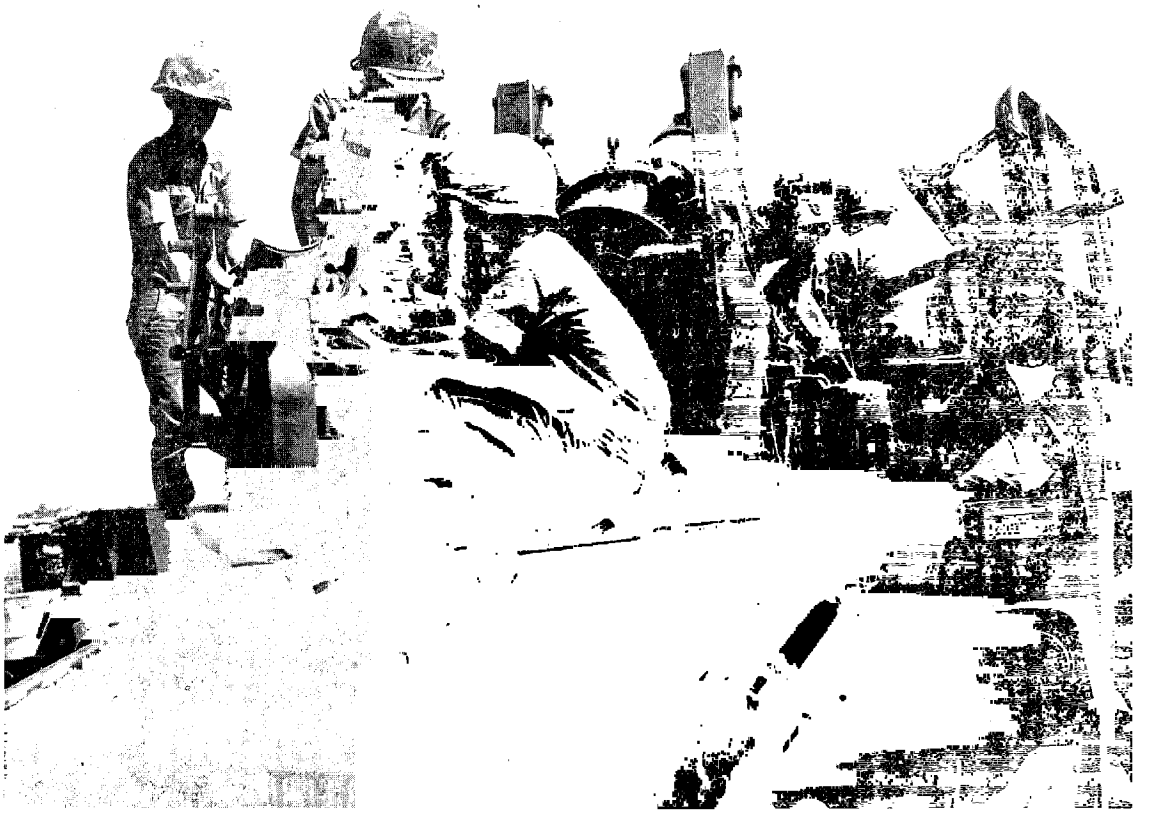
--misuse of the limited direct support maintenance capability available, and

--lack of command interest in maintenance and supply activities, problems, and training.

During the training period combat tactics were emphasized. We heard that there was little emphasis on development of an organizational maintenance structure or on training in preventive maintenance. During the training period the unit had an average of 15 to 20 percent of its vehicles inoperable because of maintenance problems.



Preventive maintenance in forward areas being performed by ARVN mechanics



Preventive maintenance for artillery

RVNAF logisticians are well aware of the importance of preventive maintenance. The main problems, insofar as we could identify them, are a lack of understanding of the importance of preventive maintenance and therefore poor command emphasis on preventive maintenance by the tactical division commanders. Logistics personnel--U.S. and RVNAF--were engaged in various programs emphasizing to the tactical commanders the importance of maintenance to accomplishment of their missions.

FACILITIES ACQUISITION AND MAINTENANCE

ARVN's ability to become self-sufficient in the logistical field hinges, to a great degree, on whether it has the necessary facilities and installations to perform logistical-type operations. To assist ARVN in obtaining the necessary facilities and installations, the U.S. forces have transferred excess U.S. facilities and have provided funds for the construction of new facilities. In addition, the United States has provided funds and material for the maintenance of ARVN facilities.

Transfer of excess U.S. facilities

MACV transferred to the Vietnamese facilities that were excess to the needs of U.S. and Free World Forces in Vietnam. MACV policies required that priority be given to transferring excess facilities to RVNAF. If they did not need the facilities, other organizations within Vietnam were notified of their availability, such as civil agencies and U.S. non-DOD agencies. Abandonment and destruction of facilities was authorized only when there were no other alternatives or to prevent their use by the enemy. The ultimate decision on the disposition of the facilities was made by MACV after coordination with the Vietnamese Joint General Staff. U.S. forces had transferred to ARVN 306 facilities that had an acquisition value of about $408 million.

Disposition of facilities not needed by the Army of South Vietnam

A number of excess U.S. facilities for which there were no operational requirements or which were unsuitable for Vietnamese occupancy were turned over to ARVN. Instead of abandoning the facilities ARVN dismantled them and salvaged the material.

The following schedule lists examples of the types of excess U.S. facilities dismantled by the ARVN.

Name	Type of facility	Acquisition cost
Camp Humper	Maintenance compound	$ 1,272,000
USA Depot, Long My	Logistics area	2,423,000
86th Maintenance Battalion complex	Logistics area	2,457,000
Phu Hiep	Airfield	3,831,000
Camp Radcliff	Combat base	15,029,000
Ammunition Supply Point No. 1 - Qui Nhon	Ammunition supply point	760,000

Construction of new facilities

The U.S. Army has funded $28 million for the construction of new facilities including $18 million for "nation building" type projects such as hospitals, highways, and bridges. The following schedule shows some of the approved construction projects.

Project	Funds (in millions)
Army Arsenal Foundry	$0.192
Improvement of Phu Quoc water system	0.060
Boat maintenance facility	0.295
450-bed military hospital, Saigon	2.387
30th POL Storage Base Depot	0.101

Dependent shelter program

The Secretary of Defense has approved a dependent shelter program to provide 100,000 shelters, of which the ARVN will receive 84,000 shelters. Since this program is essentially a self-help program, ARVN is receiving valuable experience in the logistical areas of receiving, storing, and delivering construction materials, as well as in shelter building and maintenance after construction.

MACV reported that, as of September 30, 1972, 20,890 Army and 3,200 RF shelters were completed. It can be expected, however, that the recent combat operations will have an adverse impact on the progress of this program.

Another program assisting ARVN to achieve self-sufficiency is the road building program in Vietnam. The purpose of this program is to facilitate the movement of military supplies and increase the flexibility of tactical maneuvers. When completed, this massive construction project will bring together the population centers of the country with 3,030 miles of modern high-speed highways.

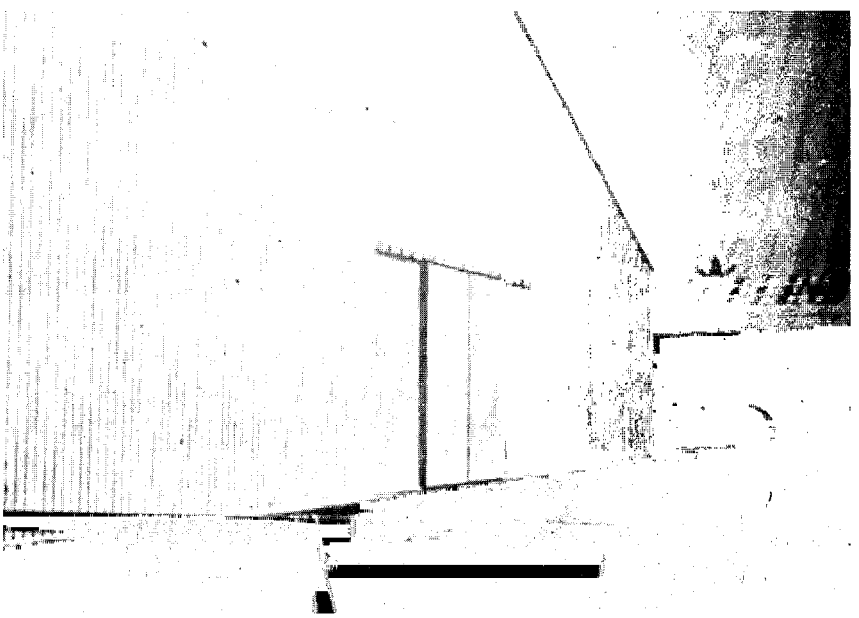
Maintenance of facilities

Normally, after a facility has been turned over to the Vietnamese, U.S. contractors, during the transition period, will provide maintenance and operation assistance. The fiscal year 1972 costs for maintenance and repair of installations which were turned over to ARVN were as follows.

Contractor	$1,642,000
Contractor-furnished facilities engineering training	52,000
Total	1,694,000

RVNAF requested about 1.1 billion piasters ($2.6 million) for maintenance of facilities in the 1972 national defense budget submission. But, only 327 million piasters ($769,000), less than 30 percent, were approved. The amount of funds set aside for the Army is not known because funds are not allocated specifically for each service but are distributed directly to the Army units responsible for base maintenance within each of the five ALCs. The United States expended millions of dollars annually to maintain its military installations and facilities in Vietnam but the Vietnamese have been unable to provide this level of support. Consequently, unless the U.S. Government provides base maintenance support, expensive repairs may later be required or irreparable damage to some of the facilities may result.

ARVN warehouse before being reconstructed



ARVN warehouse after reconstruction

CHAPTER 4

THE VIETNAMESE NAVY

SUMMARY

In 1969 VNN consisted of about 18,000 people assigned to about 700 ships and craft, primarily small boats used to patrol the rivers.

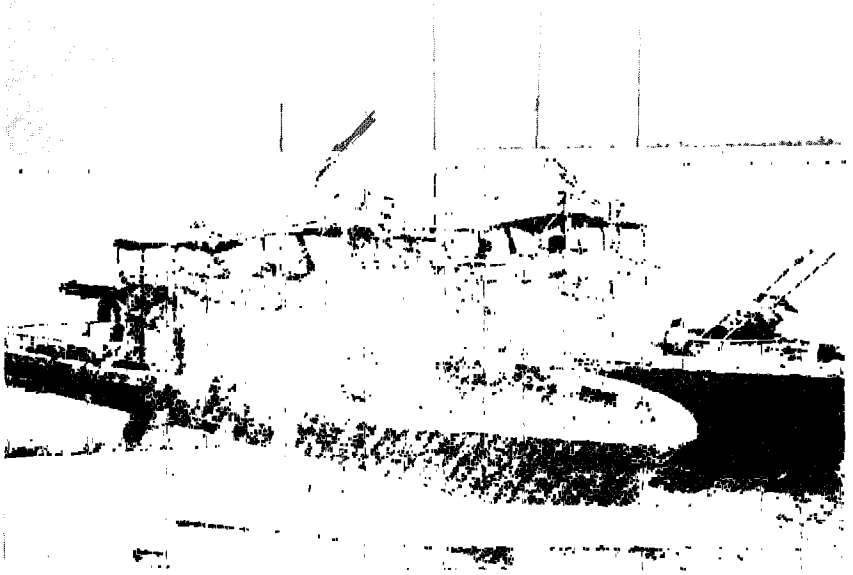
Supply operations were manual, there were no standard procedures or practices, and storage procedures and practices were unsatisfactory. The warehouses were choked with stocks--many were obsolete French and Japanese items. Management information was not available on either supply performance or financial affairs. By early 1971 the logistical system of VNN could not keep pace with the rapid expansion of the fleet. As noted later a supply improvement program corrected this problem.

The VNN maintenance capability was extremely limited since its fleet consisted primarily of small boats with relatively little, if any, sophisticated equipment. No preventive maintenance system existed within VNN.

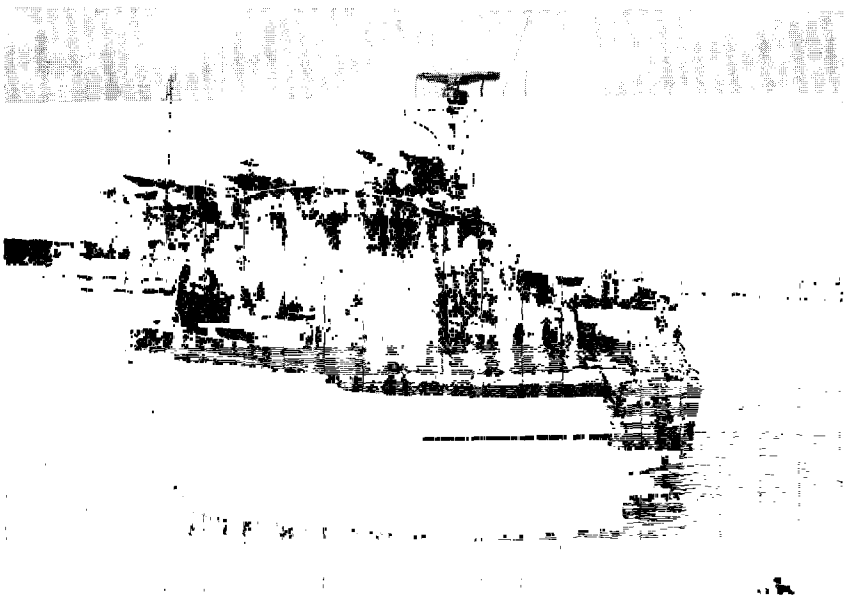
In 1969 VNN had limited responsibilities for operating or maintaining coastal surveillance to detect the infiltration of both men and supplies into South Vietnam. The U.S. Navy and Coast Guard provided most of the coastal surveillance.

In-country training centers existed at Nha Trang and Saigon. Generally the curriculum at the training centers consisted of elementary courses because VNN had little, if any, equipment that required advanced training.

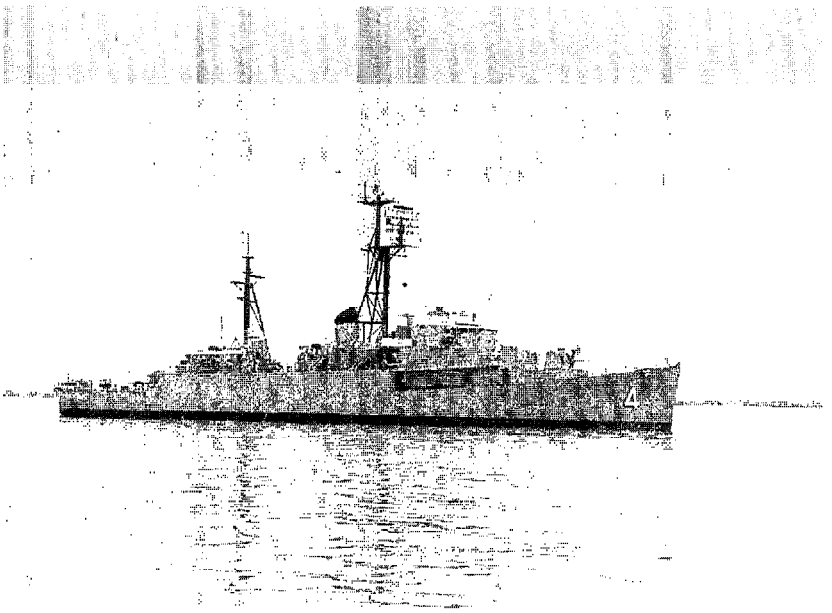
By 1972, the VNN fleet had increased to about 1,650 ships and craft, more than double its 1969 size. The majority of its fleet consisted of small craft such as river patrol boats and fast patrol craft. The VNN also had large ships such as destroyer escorts and high-endurance cutters with relatively sophisticated equipment. In order to adequately man and maintain the increased fleet VNN had to expand accordingly. By 1972 VNN had grown to about 43,000 personnel.



VNN river patrol boats



VNN fast patrol craft



VNN destroyer escort

The supply system at the Navy Supply Center was completely mechanized. Standard procedures for all supply bases had been developed; physical inventories had been completed or were in process; inventories were being purged of obsolete and slow-moving items; storage facilities had been improved; and the system was providing information so management personnel could evaluate the effectiveness of the system.

Inspection teams had been created to regularly inspect the effectiveness of the supply improvements at the supply bases. By September most of the bases had been inspected five times. Supply performances, as measured by inspection grades, were gradually improving.

The maintenance capability of VNN had improved. For example, at the 17 logistic and intermediate support bases VNN is performing all maintenance for the rivercraft (referred to as the "riverine" force, or the "brown water" Navy) and some bases can perform major repair and maintenance for the ocean going ships and craft (referred to as the "blue water" Navy). At the Naval Shipyard, which provides major repair and overhaul for the blue water fleet, maintenance capabilities had improved enough to permit a cutback in the number of ships required to be repaired out of country.

Before the shipyard's maintenance capability reached its present level, major improvements were necessary in two areas. Since most of the shipyard's resources in 1968 were devoted to repairing small craft which had wooden hulls, major facilities and equipment improvements had to be made because VNN had to repair and overhaul large steel-hulled ships, such as destroyers and cutters. The other major problem that impaired the effectiveness of the shipyard was the shortage of qualified personnel.

To solve these problems, the United States, by 1972, had provided facilities and industrial plant equipment. The manpower situation has improved because VNN has gotten permission to hire 17-year-old trainees.

These young men are exempt from the military draft as long as they undergo basic skill training in one of the disciplines needed at the shipyard. Currently there are 700 17-year-old trainees at the shipyard. This program, coupled with the recruitment of South Vietnamese personnel laid off by U.S. contractors as a result of the U.S. drawdown, had increased the shipyard's personnel from about 2,000 in late 1971 to over 3,500 as of September 1972.

Both VNN shipyard and U.S. Navy personnel are optimistic that, with the current training programs turning out more graduates, with the skills of the shipyard continuing to improve, and with the management system continuing to develop, self-sufficiency at the shipyard can be achieved.

Although VNN can maintain and rebuild most of its assets, there are some types of equipment for which it will, for a limited time, require contractor support. VNN also has some equipment it will not be able to maintain in the future.

Since 1969 the in-country training capabilities have improved considerably. This improvement should continue since VNN is constantly adding new and more advanced courses to its existing curriculum. By November 1972 the training facilities at Nha Trang and Saigon had been expanded and additional VNN training centers had been established at Cat Lai and Cam Ranh Bay. In addition, a special school was established at the Naval Shipyard for civilian workers at the yard. The training at in-country facilities originally was

limited to elementary courses. Today these facilities provide advanced petty officer courses relating to engines, radios, radars, and electronics.

VNN has assumed command authority for the coastal surveillance radar network which provides coverage of the entire South Vietnamese coastline. The surveillance system includes coastal radar stations, surveillance centers, and numerous patrol craft and ships.

VIETNAMESE NAVY ACTIVITIES DURING THE 1972 INVASION

We were told by senior U.S. Navy personnel that during the 1972 invasion VNN ships supported the Vietnamese ground forces by shelling enemy positions in the northern provinces. In addition, U.S. advisors told us that the coastal surveillance system operated by VNN has been effective in detecting and preventing enemy infiltration. For example, on April 24, 1972, a VNN ship successfully detected and sank an enemy trawler off the southwest coast of South Vietnam.

It was evident during the 1972 invasion that VNN had an improved supply system. During this period the supply center processed and filled more requisitions than ever before. Equally important is the fact that these requisitions were being filled in a shorter period than ever before.

The maintenance capabilities of VNN have reportedly improved since early 1972. During the first 3 months of 1972, reports disclosed that VNN overhauled 58 percent of the boats and craft scheduled for overhaul at the logistic and intermediate support bases. During the first 6 months of the invasion, it actually overhauled 89 percent of the scheduled workload. This increase is noteworthy since it took place during the invasion, when a substantial number of unscheduled repairs were necessary in addition to the scheduled overhauls.

Improvements made in the VNN logistics system aided VNN in performing its missions during the latest offensive. Although continuing progress has been made, VNN requires improvement in logistics, transportation, base maintenance, ship and craft maintenance, and supply. These areas will be discussed in greater detail in other sections of this chapter.

FACILITIES AND EQUIPMENT TRANSFERRED TO THE VIETNAMESE NAVY

The main objective of the Vietnamization program was to train and equip the Vietnamese so that they could eventually perform their missions without U.S. assistance. In October 1968, to help achieve that goal, the Navy initiated a program to accelerate the turnover of assets to VNN. It was completed on August 1, 1972, when all naval ships and craft authorized for transfer were turned over to VNN. The acquisition cost of these ships and craft was about $2 billion. The major combatant ships transferred were two destroyer escorts and seven high-endurance cutters.

During fiscal years 1970, 1971, and 1972 the United States provided, from appropriated funds, material and services valued at about $215 million. This does not include the value of equipment and facilities for which funds were not appropriated, such as the ships, craft, and bases transferred to VNN. By November 1972, all the U.S. Navy and Marine Corps bases scheduled to be turned over to RVNAF had been transferred. These bases had an acquisition cost of about $45 million.

U.S. POLICY FOR TRANSFER OF FACILITIES AND EQUIPMENT TO THE VIETNAMESE NAVY

The transfer of facilities and equipment to VNN was sequential in the sense that as Vietnamese personnel were trained and assumed the management of the assets, U.S. personnal were withdrawn. The U.S. Navy found that combined command was the most successful management arrangement to assist VNN in developing a repair capability at a repair base. An American commanding officer, a Vietnamese deputy, an American repair officer, and a Vietnamese assistant repair officer formed the combined commands. Vietnamese officers assumed other designated positions with Americans as advisors.

For a time, U.S. Navy personnel operated the bases and the auxiliary, repair, and support ships. As the Vietnamese gained the necessary experience, bases and ships were transferred to them and American sailors stepped down, leaving small groups of advisors.

The combined manning arrangement was not implemented at operational and advanced tactical support bases, which were transferred when construction was completed and all U.S. Navy craft had been transferred. U.S. advisors were assigned to these bases to assist in the operation and preventive maintenance of their utilities.

Phasing-in of personnel was planned so as not to interfere with continued employment of the combat craft.

MAINTENANCE ORGANIZATION AND ACTIVITIES

To cope with the increased size of the Vietnamese naval fleet, an expanded and improved logistical structure capable of supporting this fleet became a necessity. The major VNN maintenance facility is the Naval Shipyard, Saigon, which is responsible for the major overhaul of all ships and seagoing craft. In addition, a complex of 17 bases, separated according to geographical considerations, has been developed to provide limited overhaul for all ships and seagoing craft as well as the maintenance for all intracoastal and rivercraft. They are grouped into seven clusters, each headed by a logistics support base.

Four types of support bases make up the logistics system:

1. A logistic support base (LSB) provides major repair, including depot maintenance and rebuild and off-base maintenance service and is a major stock point providing supply support for all activities in its support cluster. It also serves as a transportation and freight-staging point and as homeport for operational craft.

2. An intermediate support base (ISB) provides craft maintenance beyond operator skills, including minor hull work and installation and repair of rotatable items. It maintains rotatable spares and selected repair parts and consumables and provides transportation. It serves as homeport for operational craft.

3. An operational base serves as homeport for afloat units. It provides facilities for general housekeeping and routine preventive maintenance functions; it also supplies POL and stores.

4. An advanced tactical support base provides the barest of necessities for berthing crewmen and for refueling and rearming craft. It is used by patrol and assault units for conducting nonpermanent operations.

Vietnamese Naval Shipyard

The repair and maintenance capabilities at the Vietnamese Naval Shipyard have improved enough to permit a cutback in the number of ships required to be repaired out of country. U.S. advisors believe that out-of-country assistance will not be required in the near future.

The 57-acre shipyard is one of the largest industrial complexes in Southeast Asia. It was built by the French in 1863 as their major repair and resupply base in Indochina. The Japanese took over the yard during World War II but it was returned to the French when the war ended. The Vietnamese assumed control in September 1956. The United States has never had direct control over the shipyard, although American advisors have been present since 1957.

Previously, the Vietnamese did not have large, steel-hulled ships, such as destroyer escorts and cutters. Therefore, most of the shipyard's resources were devoted to repairing smaller craft, many of which had wooden hulls.

Before 1972 the effectiveness of the shipyard was impaired due to a number of problems. As a result major repair and overhaul of many of the blue water ships was performed out of country. Two of the most prevalent problems were inadequate facilities and shortage of qualified personnel. To solve the facilities problem the United States provided facilities and industrial plant equipment valued at $10 million.

The manpower situation continues to be a problem, but it has improved since VNN got permission to hire 17-year-olds. These young men are exempt from the military draft as long as they undergo basic skill training in one of the disciplines needed at the shipyard. The U.S. Navy has provided a technical assistance team to assist the Vietnamese train these young men. Currently there are 700 17-year-old trainees at the shipyard. This program, coupled with the recruitment of South Vietnamese personnel laid off by U.S. contractors

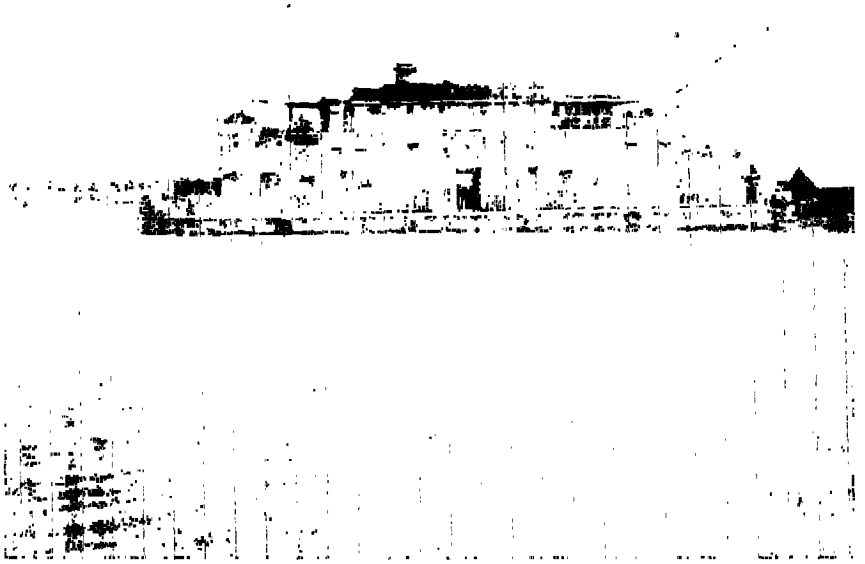
as a result of the U.S. drawdown, increased the shipyard's personnel from about 2,000 in late 1971 to over 3,500 by September 1972.

Both VNN shipyard and U.S. Navy personnel are optimistic that, with the current training programs turning out more graduates, with the skills of the shipyard continuing to improve, and with the management system continuing to develop, self-sufficiency at the shipyard could be achieved in the near future.

The importance of developing an effective management system cannot be overemphasized. The key elements of the system, such as programing and scheduling and a comprehensive cost accounting system, are being developed currently.

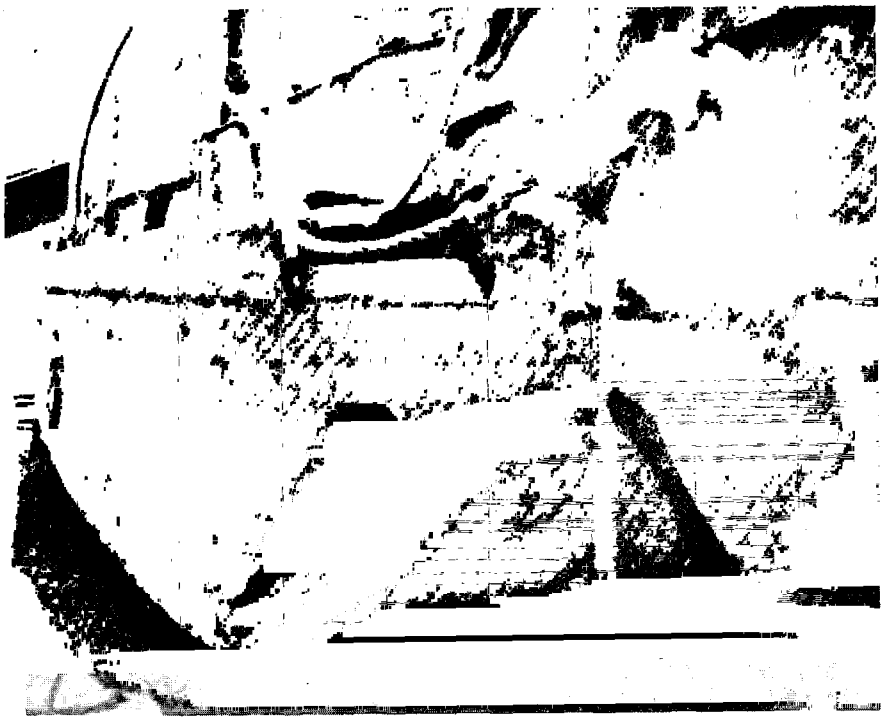
Maintenance capabilities at logistics and intermediate support bases

The maintenance personnel at LSBs and ISBs are responsible for the repair and overhaul of the riverine force up to fourth-echelon maintenance for oceangoing ships and craft.

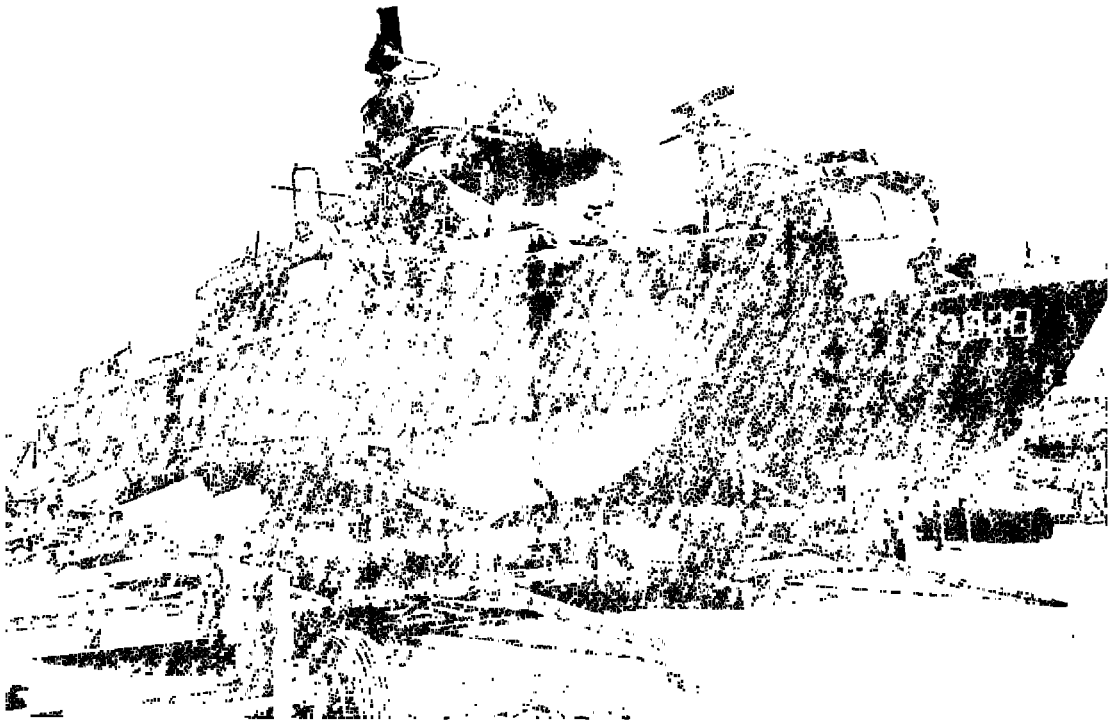


VNN repair ship

Major repair of river patrol boat



Mine damage to VNN craft



Two fast patrol craft--one awaiting repair; one completed

As training programs have expanded, the maintenance capabilities at these bases reportedly have improved. The U.S. Navy provided us with statistics showing that, during the first 3 months of 1972, VNN overhauled 58 percent of the boats and craft scheduled for overhaul but that during the next 6 months they overhauled 89 percent.

This improvement occurred during the North Vietnam invasion when a substantial number of unscheduled repairs, in addition to the scheduled overhauls, were necessary.

Before the 1972 invasion, the LSB/ISB workload was divided almost equally between overhaul and repair. Subsequently, the workload shifted to 60 percent repair and 40 percent scheduled overhaul. By October 1972 about 70 percent of the ships which sustained battle damage had been repaired in-country.

Maintenance capabilities not possessed by the Vietnamese Navy

In general, VNN has the capability to maintain and rebuild most of its assets. But there are some types of equipment which will, for a limited time require contractor support. There are also some types of equipment which the Vietnamese will not be able to maintain.

The following types of equipment will require some contractor assistance to maintain or overhaul.

--More than 40 percent of the total material-handling equipment is peculiar to the Navy and will require local Vietnamese contractor assistance for both maintenance and overhaul until it is replaced by ARVN--common equipment through normal attrition.

--U.S. Army contractors will provide maintenance support and training for large air-conditioning systems until December 31, 1972. By then, VNN should be able to support this equipment if they have access to U.S.-manufactured parts for this equipment.

--Contractor assistance for the overhaul of large electrical generators is scheduled through June 1973. At that time ARVN should be able to assume support of these generators.

--A portion of the VNN Single Integrated Military (Telecommunications) System will require contractor maintenance assistance through December 1972. VNN will assume maintenance responsibility after December 1972.

--A floating crane will require drydocking about every 5 years.

Preventive maintenance

Preventive maintenance is particularly important in a country such as Vietnam where there are not enough experienced maintenance personnel to cope with major repairs and breakdowns of equipment. Proper preventive maintenance, such as lubrication, adjustments, and cleaning enhances the likelihood that parts will achieve their design life and reduces premature failure.

In May 1971 a planned maintenance system (PMS) had not been established by VNN. PMS is intended to assist Navy operational and technical commanders attain and maintain optimum fleet readiness. Specific objectives of the system are, in part, to (1) define and achieve uniform maintenance standards, criteria, and procedures and (2) improve maintainability and reliability of equipment and systems through uniform maintenance disciplines. Methods of improving engineering practices and identification of essential design changes to existing equipment and systems also are provided for.

To accomplish the goals of PMS, the Commander, U.S. Naval Forces, Vietnam, in May 1971 established a PMS project office that was assigned the responsibility for instituting PMS within VNN.

To accelerate the development and implementation of PMS, the U.S. Naval Advisory Group and VNN PMS functions were consolidated under the control of an advisory group PMS project manager and maximum use was made of previously proven U.S. Navy PMS procedures and materials.

Individual PMS packages were developed for each type of ship and craft in both English and Vietnamese. The Navy Maintenance Management field office in San Diego was tasked with the coding, printing, production, and assembly of these packages for subsequent implementation within the Vietnamese fleet. This program is essentially complete; approximately 95 percent of the PMS software (schedules and manuals) and hardware (schedule holders and manual containers) has been produced or received in Vietnam.

Initial installation of PMS packages and training VNN personnel in their use was accomplished by 14 U.S. Navy mobile PMS teams located throughout Vietnam. These teams were phased out in conjunction with the Naval Advisory Group drawdown in April 1972. As Vietnamese naval personnel entered the PMS program, the effectiveness of training and implementation increased significantly.

A combined VNN-U.S. Navy PMS support office was established at VNN headquarters in February 1972. This office combined the functions of the clerical staff with those of inspectors throughout VNN. By September 1972 the number of VNN personnel assigned to this office had grown to 23, with a projected number of 35 required.

Along with the installation of the PMS packages, an extensive training program was undertaken, complete with a variety of training aids. Training material for the naval training centers and the VNN Naval Academy was provided in March 1972 and all schools are presently teaching PMS courses. The VNN Inspector General began conducting formal PMS inspections throughout the Navy in June 1972.

There was a need for specialized tools and equipment to perform PMS. For this reason, PMS toolrooms were established and PMS normally not performed due to the lack of tools, testing kits, or gauging devices is being accomplished.

Since November 1971 about 96 percent of the VNN ships and craft reportedly have received PMS; the remaining ships and craft are scheduled for PMS by December 1972. PMS training has been provided at all coastal radar stations. Some communications stations have received initial PMS documentation and training. Due to extensive changes in equipment at these sites, however, additional documentation will have to be provided.

Industrial plant equipment is the last group of equipment requiring the development and installation of PMS. Due to time, funding, and the quantity of equipment, PMS will be developed only for the more costly items, basic items such as cranes and lifts, and the types of equipment that are important to the overall operation of the base.

As discussed previously, the support bases reported an increase in productivity from April through September 1972. We have not shown any correlation between this increase and the implementation of PMS; however, it is conceivable that part of the increase is directly attributable to better PMS by boat crews.

PMS can be an important factor in reducing equipment failures and improving operational readiness. However, it requires the interest and effort of the people whom it will most directly benefit, the officers and men of VNN. PMS is not a permissive system; the key to its success is active command attention and aggressive supervision at all levels, from the operational commander to the work center supervisor.

FERRO-CEMENT CONSTRUCTION PROJECT

It was determined that VNN at the Vietnamese Naval Shipyard could construct a ferro-cement craft meeting VNN coastal patrol operational requirements if U.S. sources using U.S. funds provided the materials.

Early research, design, and testing were the joint effort of the shipyard, the U.S. Naval Advisory Group, the Vietnamese Naval Research and Development Unit, and the MACV science advisor staff. In 1969 and 1970 several ferro-cement patrol craft were constructed, tested, and determined to be satisfactory. In late 1971 it became evident that the shipyard was self-sufficient in the management and production of the craft and active U.S. advisor participation in these phases of the project was terminated. During 1972, advisors periodically monitored construction practices, craft quality, and the purchase of all project material. By October of 1972 the shipyard had constructed 48 ferro-cement vessels.

SUPPLY SYSTEM OF THE VIETNAMESE NAVY

Supply support for VNN is provided either from VNN--for equipment peculiar to the Navy--or from ARVN for equipment common to the Army but held by the Navy Supply Center. Army support to Navy units is provided for common equipment if the equipment is registered with the appropriate Army support depot.

The system for supporting field units is based on a cluster concept. This area support system provides decentralized support through a centrally located supply center and seven strategically located LSBs. The Supply Center supports these support bases, the Fleet Command, the Naval Shipyard, and organizations in the Saigon area. It is also the inventory control point for items peculiar to the Navy. Each LSB heads a support cluster and is responsible for all repair, supply, transportation, base maintenance, and administration of its ISBs.

Common support

Regional logistical organizations controlled by ALCs furnish common-item repair support within each military region.

For the Army to program for common-item repair support, the Navy must notify the applicable Army field support units when common items are received directly from the U.S. Navy. This notification process, known as registration, is necessary for the Navy to receive common equipment support, whether the support is ammunition for .50-caliber machine guns or fourth-echelon repair by the ARVN ordnance service.

Support for items peculiar to the Navy

During 1971, U.S. Navy supply experts, DOD auditors, and MACV/Joint General Staff Inspector Generals all concluded that the VNN logistical system was not responsive and therefore could not support the fleet. Ships and craft were remaining in port due to lack of repair parts. River patrol craft frequently went on combat patrol with 50 percent of their communication equipment inoperable with one of two main engines not functioning.

The reasons for the system breakdown were that the Supply Center lacked supply procedures and practices, adequate stock records, and inventory controls. Each support base operated independently because standard procedures had not been developed. Management information on supply performance or financial affairs was not available. The supply system was choked by excessive stockage objectives, excess stock, and unsatisfactory storage procedures and practices.

In July 1971, therefore, the Naval Advisory Group initiated a supply improvement program. To accomplish the objectives of the improvement program, the U.S. Navy had to take over the management of the Supply Center. U.S. advisors designed an inventory control system and rewarehoused inventories. Initial plans called for establishing a system capable of supporting the operating forces by July 1972.

At the time of our visit in October of 1972, the Supply Center was meeting its support mission, and VNN personnel were completing their training in supply management. U.S. advisors estimated that VNN personnel could manage their own system in the near future.

Navy Supply Center

In 1970 the Navy Supply Center was operating under an antiquated French system. Supply operations were not mechanized. Inventory accuracy was less than 10 percent. Control over documents did not exist. And the warehouses were choked with stocks--many were obsolete items.

Since all customer requisitions were submitted to the Supply Center it was considered the key to the supply system. Therefore, the mechanization of the inventory records at the center was a necessity.

The Vietnamese Supply Center was therefore mechanized with the installation of the IBM 360/20 computer. The system was designed for turnover to VNN for eventual operation without U.S. Navy advisor or contractor assistance. The mechanized supply system was designed to be as simple as possible. It is an electric accounting machine card-oriented system but the computer prepares documents and updates records. The only keypunch needed is the initial requisition and certain record adjustments. Status of requisitions, financial cards, reorders for stock, issue documents, and updated records are all machine products.

VNN is developing a backup tape system compatible with the computer installation at the National Material Management Agency. This backup system will permit services to continue if the VNN computer operation fails. Programs to support the backup tape system have been written and are being tested. The issue, receipt, and stock record maintenance system also can be demechanized and performed manually for short periods of time.

In addition to the excess stocks in the warehouse, stocks for both the blue water and brown water Navy were commingled. U.S. personnel were assigned to eliminate the excesses and segregate the blue water and brown water stocks.

U.S. personnel designated a warehouse at the shipyard for the blue water assets; the brown water assets were to be stored at the Newport facility. As of November 1972 both U.S. and VNN personnel were still eliminating the excesses and rewarehousing the stocks. This was expected to be

completed by December 31, 1972. Plans had also been approved for expanding the Newport facility with demountable buildings salvaged by the Central Logistics Command from surplus U.S. facilities.

Since the installation of the automated supply system and the development of standard supply procedures, the number of active items being managed has almost doubled. The number of monthly requisitions being processed has increased from 9,000 to 16,600. The requisition-processing time has been reduced from 35 to 6.7 days. The net availability of assets increased from 59 percent in January 1972 to 85 percent in September 1972. By the end of the year, the VNN expected a 90-percent net availability.

If the system is to continue, experienced logisticians will have to be available. The current strength of the Supply Center is about 750 men but 76 percent of them are military. This military-to-civilian ratio creates problems since the military personnel are subject to reassignment to other duties. There is no reservoir of experienced logisticians in VNN from which to receive trained replacements when the present contingent leaves. Also, because of the sparse civilian labor market and the low wages paid by the defense ministry, it is difficult to hire high caliber staff.

Severe shortages exist at the critical middle-management positions. This problem will be solved with time, training, and experience.

VNN is well aware of the problem and has been attempting to build a cadre of young, capable, and experienced logisticians. The Vietnamese Joint General Staff has approved the establishment of a VNN supply corps which will insure the career progression of logisticians and which therefore should make the logistics field more appealing to career personnel.

Fleet supply

When the U.S. Navy transferred blue water ships to VNN, lists of assets to be maintained aboard these ships were not provided or were incomplete. As a result, some ships had unauthorized items and others did not have all their authorized assets.

Subsequently, U.S. personnel have developed stockage lists for each type of ship. The authorized items have been requisitioned from the Navy Supply Center, Oakland, California, and have been shipped to Vietnam.

One problem adversely affecting fleet supply operations was the fact that VNN had not authorized blue water ships to have a supply officer and there were few trained, enlisted storekeepers. As a result, other officers aboard the ship were assigned to be supply officers in addition to their regular positions. But these officers spent most of their time on their primary assignment.

At the time of our study, trained storekeepers had been assigned to the larger vessels, and U.S. Navy advisors were optimistic that the creation of a supply corps would eventually alleviate the shortage of shipboard supply officers.

Support bases

The major problems affecting the operations of the LSBs and ISBs were the lack of standard procedures and warehouses filled with excess stock.

U.S. personnel established standard procedures for the support bases. These procedures were translated into Vietnamese and then back into English to insure that nothing was lost in the translation. Once the procedures were established, a team of U.S. personnel went to each base to train VNN to apply these procedures.

To provide some assurance that the system at the support bases would continue to operate effectively, joint U.S. Navy-VNN inspection teams were created. The inspections, which are required every 60 to 120 days, measure compliance with established procedures and provide a management check on the adequacy of material and document accuracy.

By September most of the bases had been inspected five times. Supply performance measured by inspection grades had steadily improved.

In summary, standard procedures have been established for all support bases and their supported activities.

Each of the LSBs and ISBs has had a complete supply overhaul and excess material has been removed and returned to the United States. Material deficiencies have been filled and all material has been rewarehoused, inventoried, and recorded on the stock records.

Although considerable progress had been achieved at these bases, conditions fluctuate when VNN personnel rotate; there are primarily not enough trained supply personnel. The U.S. Navy advisors believe that this problem will disappear when sufficient personnel are trained.

TRAINING

In June 1969 VNN had only a limited number of skilled personnel. They lacked the expertise in many of the disciplines to operate and maintain the assets they were to receive. For example, they had few personnel with electronic capabilities. To achieve the goals of Vietnamization it was necessary to expand the training centers at Nha Trang and Saigon and provide for additional training centers.

The U.S. Navy's training objectives were threefold: (1) train as quickly as possible the large numbers of personnel required to man the assets to be turned over, (2) increase VNN's combat readiness by expanding the range, depth, and quality of training, and finally (3) insure a well-trained, self-sufficient training organization.

To achieve the first goal it was necessary to train a large number of personnel in a short period of time. This was accomplished through formal classroom and on-the-job training conducted both in-country and offshore. As personnel were trained they replaced U.S. Navy personnel on the job.

Current in-country training facilities are located in Nha Trang, Saigon, Cat Lai, and Cam Ranh Bay. Also, a special school has been established at the Naval Shipyard, Saigon, for civilian workers at the yard.

The training center at Nha Trang teaches both elementary courses and advanced petty officer courses on engines, radios, radars, and electronics. It is also the site of the

Vietnamese Naval Academy. The center at Nha Trang has been expanded to accommodate the increased curriculum offered.

Recruit training is conducted exclusively at Cam Ranh Bay. Officer training is done at Saigon. The training center at Cat Lai is essentially a RF river patrol force training center with a department that teaches both elementary and petty officer courses for commissary personnel, storekeepers, and disbursing clerks.

The VNN shipyard training program is designed to improve the skill level of shipyard civilian personnel by training 17-year-old apprentices under a special national draft deferment program.

The number of personnel trained at the in-country training facilities from 1969 to 1972 are shown below.

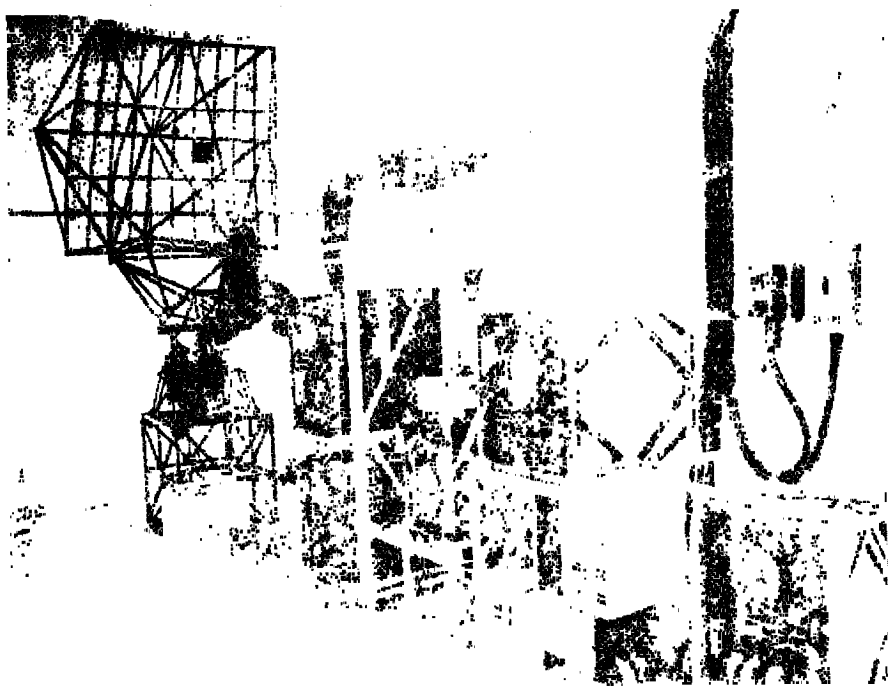
	1969	1970	1971	1972
Personnel trained	18,158	17,399	11,605	6,469

During 1973 it is estimated that 5,500 more people will be trained at these facilities.

Offshore training during fiscal years 1970 through 1972 was as follows.

	Fiscal year		
	1970	1971	1972
Number of courses	144	97	85
Number of personnel	2,676	3,150	865
Cost (in millions)	$2.63	$3.70	$0.80

About 300 personnel are to receive offshore training during fiscal year 1973 at an estimated cost of $0.81 million. Through fiscal year 1971 the Navy was heavily involved in training new personnel to operate and maintain the assets being provided to them. Many of the people sent offshore for training attended short courses. Starting in fiscal year 1972, the training needs shifted from elementary level courses to the more advanced, technical courses and courses in managerial training.



Radar equipment at VNN training school

Since 1969 the in-country training capabilities have improved considerably. This improvement should continue since VNN is constantly adding new courses to its curriculum. For example, recently VNN introduced an engineering officer training course at Nha Trang and a weapons-deck officer course at Cam Ranh Bay. These courses are designed to further the professional development of the VNN junior officers, improve the maintenance and operational readiness of Navy ships, and reduce offshore training requirements.

The U.S. advisory training effort has been significantly reduced since the VNN training capability has increased and further reductions are planned as increased in-country capability is attained. By January 1973 all advisors are scheduled to be withdrawn from the training centers.

BASE MAINTENANCE

The U.S. Navy has transferred to VNN land bases and radar sites consisting of LSBs and ISBs, operations bases, and shore-based radar sites. Full public works departments are established at 12 of these bases and at the Naval Shipyard and a public works center that services the other naval activities in Saigon.

These 14 public works departments maintain facilities and support the bases at which they are located as well as smaller bases not equipped with public works departments, in accordance with the cluster concept. The departments are staffed with VNN personnel. Civilian positions were authorized only for the Shipyard Public Works Department and the Capital Military District Public Works Center. By September 1972, training programs to provide these personnel with the technical skills to assume base maintenance and operation responsibilities reportedly were almost completed.

ARVN has to provide common-item logistic support which includes major facilities maintenance which is beyond the capability of the VNN public works departments.

The United States has helped the Vietnamese meet their base maintenance needs by providing supplementary facilities maintenance materials. ARVN is responsible for routing materials to the field bases along with Vietnam-funded materials.

The ARVN Corps of Engineers does the major maintenance and repair for the VNN bases. The Corps' performance is limited by its capability and by Vietnamese funding.

While VNN has been given equipment and training necessary to accomplish its mission in base maintenance, sufficient funding and materials are not available. The Vietnamese budget for 1972 falls far short in funding the VNN maintenance material requirements. If the budget is not supplemented, maintenance may therefore be insufficient to prevent deterioration of facilities.

TRANSPORTATION SUPPORT

ARVN is responsible for providing land transportation to the Navy. But the Navy currently uses contractor assistance to supplement ARVN's support.

The U.S. Navy has contracted with the Vietnamese National Railway to furnish on-call trucking services during fiscal year 1973. Contractor trucks supplement services provided by the ARVN Common User Transportation System only when ARVN assets are not available to provide quick transportation support or to move priority cargo over routes not served by ARVN.

CHAPTER 5

THE VIETNAMESE AIR FORCE

SUMMARY

In June 1969 VNAF had 29,000 assigned personnel including 12,000 in training programs. They operated 428 aircraft organized into 20 squadrons, and there were 12 different types of aircraft or weapons systems in the inventory.

The inventory included 35 transports--18 World War II vintage, propellor-driven, twin-engined, C-47 aircraft and 17 twin-engined C-119 "Flying Boxcars." These aircraft could hold 5,000 pounds of cargo or 27 troops and 10,000 pounds of cargo or 60 troops, respectively. There were 85 UH-1 and 25 H-34 helicopters available either for combat support of troops or for transporting a small number of troops and supplies. With this equipment it is apparent that VNAF was not equipped to provide air mobility for ARVN's men and materiel even in 1969.

VNAF had no organized air distribution system. It could not perform depot maintenance (major repair, overhaul, or rebuild) of its equipment. Lower echelon maintenance--the type usually performed at air bases--was being centrally performed at the Air Logistics Command at Bien Hoa Air Base and its depot level maintenance was being performed by, and within, the U.S. Air Force system.

The VNAF inventory system was manually operated, asset management and visibility was poor, and warehouse stocks were cluttered with unusable parts and supplies for obsolete or nonexistent French equipment.

VNAF operating six aircraft squadrons from six bases or airports did have some minor flight and base operations experience before the American involvement. But in terms of managing the large bases and the numbers and varieties of weapons systems necessary to support the objectives of Vietnamization, VNAF had virtually no experience. It had limited experience in air traffic control. It had not managed communications; water supply systems; power-generating equipment; fuel storage, management, and testing; and all the support facilities for a modern air base and system of bases.

By November 1972--some 3 years and 4 months later--VNAF had almost doubled its personnel strength. About 42,000 men were assigned to duty, and over 10,000 more were being trained. They were organized into 49 squadrons. There were about 2,000 planes in the inventory comprising over 22 different types of aircraft or weapons systems.

C-123 aircraft had been added to the fleet. Faster than C-119s, these aircraft can carry about 12,000 pounds of supplies or 60 troops.

To provide better air delivery to forward areas, VNAF had received C-7 Caribou aircraft. C-7s can take off and land in about one-fourth the ground length and on less hardened runways than can the larger C-119s and 123s. C-7s carry about 4,500 pounds of cargo or 32 troops.

Following the 1972 invasion, RVNAF forces required even more air transport capability, so C-130 A Hercules aircraft were introduced to VNAF. A much larger aircraft, the four-engine turbo-prop Hercules can carry over 30,000 pounds of cargo or about 100 troops.

The 25 H-34 helicopters had been returned to U.S. forces, but the number of UH-1 helicopters had been expanded. In addition, CH-47 Chinook heavy-lift helicopters had been introduced into the system. These aircraft can carry 33 troops or about 8,000 pounds of cargo. They can also carry bulky items suspended underneath the aircraft, which enables them to deliver and retrieve such items from the battlefield.

VNAF had an air distribution network to resupply its air bases from a centralized depot at Bien Hoa. It was transporting large quantities of men and supplies for ARVN and it was transporting practically all of ARVN's medical evacuation patients.

The inventory system for the primary depot at the Air Logistics Command had been automated, major items and critical components throughout the system were managed through the control computer, physical inventories were completed at most bases, and obsolete or slow-moving items had been purged. Less critical items--25,000 to 35,000 separate line items at some bases--were still manually controlled, but there were

plans for adding these items to the automatic data processing inventory control system.

VNAF was successfully and completely operating some air bases. For instance, at the 2d Air Division at Nha Trang and the 4th Air Division at Binh Thuy and Soc Trang, VNAF was managing all flight operations and base operations and maintenance. American advisors have left Soc Trang and said they could leave Nha Trang and Binh Thuy without an adverse impact on performance. Other bases continue to require varying degrees of assistance, but VNAF's ability to manage sophisticated air base complexes has been demonstrated.

The responsibility for base level maintenance and repair had been shifted from Bien Hoa to the air bases, and a depot level maintenance capability was being developed at Bien Hoa.

VNAF had progressed to the point where it was capable of repairing some of its sophisticated equipment. For example, it was repairing battle damage, overhauling, and rebuilding for UH-1 helicopters. The U.S. Army can do this for UH-1s only at selected locations in the United States.

As with the other services, VNAF personnel, equipment, and weapons systems have expanded so rapidly that its top managerial and technical talents have been stretched thin.

VNAF has a completely equipped jet engine overhaul plant, but it has been operational only since December 1972. Contractors will have to operate it while the Vietnamese are being trained. Contractors will also have to support selected items of VNAF equipment. VNAF will not be given maintenance capability either because the cost would be prohibitive, the skill is so rare, or, in some cases, the manufacturer's proprietary rights prohibit it.

In summary, there is evidence that VNAF has taken great strides since Vietnamization began in 1969. It would be a mistake, however, to conclude that VNAF approaches self-sufficiency in effectively maintaining and using all the equipment and facilities provided to them in so short a time. Much more remains to be done in developing personnel skills--particularly in the noncommissioned officer or middle management echelons. Extensive training programs conducted in Vietnam and abroad are making some inroads into

skilled-personnel shortages; however, it will be some time before shortfalls are scheduled for elimination in some areas. In the meantime, advisory assistance and offshore maintenance will be needed.

VIETNAMESE AIR FORCE LOGISTICAL SUPPORT DURING THE 1972 OFFENSIVE

When called upon in the spring of 1972, VNAF played a major role in repelling the massive offensive staged by the North Vietnamese. VNAF's transports carried more cargo and troops than ever before; the fighters, attack gunships, and the helicopters were invaluable in providing combat support to the ARVN.

Since the offensive VNAF has been flying over 75,000 operational missions a month, compared to about 20,000 a month in 1969. Operational missions include close air support, combat assault, medical evacuation (see chapter 6 for details), airborne alert, reconnaissance, gunship, aerial resupply, airlift, and other special missions.

That offensive dramatized the improvements and the accomplishments attained through Vietnamization. In a broader sense, it identified the limits of VNAF's capability to react to escalated warfare. It provided the experience factors needed by tactical planners and logisticians to analyze the needs and shortfalls of the growing Air Force and the additional actions which had to be taken if VNAF was to become fully viable even in the more limited insurgencies it would be expected to repel.

Airlift capability

In 1969 VNAF transported only 30 percent of the total passengers flown. VNAF now is the major supplier of in-country air transportation. In the first 10 months of 1972, VNAF transports hauled over 450,000 passengers which represent 66 percent of all passengers transported in-country. U.S. Air Force made up the shortfall.

In March 1972, just prior to the current offensive,VNAF was hauling over 80 percent of the total RVNAF cargo requirements, compared to 30 percent in 1969. When the offensive hit, VNAF was able to increase its lift up to 3,600 tons a

month, more than the VNAF-U.S. Air Force total combined monthly tonnages for the months immediately preceding the offensive. However, it had insufficient surge capacity to meet the requirements of the offensive. In April the percent of RVNAF cargo hauled by VNAF was reduced to about 31 percent, even though the tonnage hauled by VNAF increased. The following chart shows the total airlift required and the tonnage lifted by VNAF for the period January through October 1972.

	1972		
	Total airlift (tons)	VNAF airlift (tons)	VNAF airlift (percent)
January	1,652	1,252	76
February	2,205	1,830	83
March	2,436	2,085	86
April	10,908	3,388	31
May	11,411	3,593	31
June	10,318	2,700	27
July	5,552	2,990	54
August	4,940	2,889	58
September	5,038	2,982	58
October	6,105	3,439	56

The foregoing indicates that VNAF was not equipped with sufficient transport aircraft to support the airlift requirements generated by a major offensive. They were, however, approaching the capability to satisfy passenger and cargo airlift requirements at the levels existing between the 1968 Tet offensive and the 1972 offensive.

There are indications that VNAF may not have been loading their transport aircraft to full capacity. The following table shows the percentage of the total lift capacity in C-119 and C-123 aircraft that VNAF was realizing in 1972.

	January	April	May	October
C-119	56%	53%	59%	63%
C-123	44%	52%	54%	56%

Too many factors--such as cargo bulk, emergency lift, and cargo availability--enter into an evaluation of whether or not the percentages shown in the table could be improved

upon. The percentages are merely symptomatic of a problem requiring further management analysis.

Before the offensive the U.S. Air Force had supplied an average of one operational C-130 daily to augment the VNAF passenger-cargo airlift. However, to meet the offensive; to transport up to full division-sized contingents from one military region to another; and to resupply large, surrounded units, such as those at Kontum, the U.S. Air Force augmented VNAF with additional C-130 aircraft.

In short, the United States had provided VNAF with an airlift capacity which appeared nearly adequate to meet the type of combat conditions prevailing before the 1972 offensive. However, if South Vietnam was to successfully resist a similar invasion in the future, VNAF would require increased air transport capability. In October 1972, C-130 Hercules air transports were transferred to VNAF.

Adding the C-130s to the existing air transport force placed more strain on the already strained maintenance, supply, and training activities of VNAF; the effectiveness of the increased air capability cannot be evaluated until after the C-130 squadrons are equipped with trained personnel and adequate supply and maintenance support.

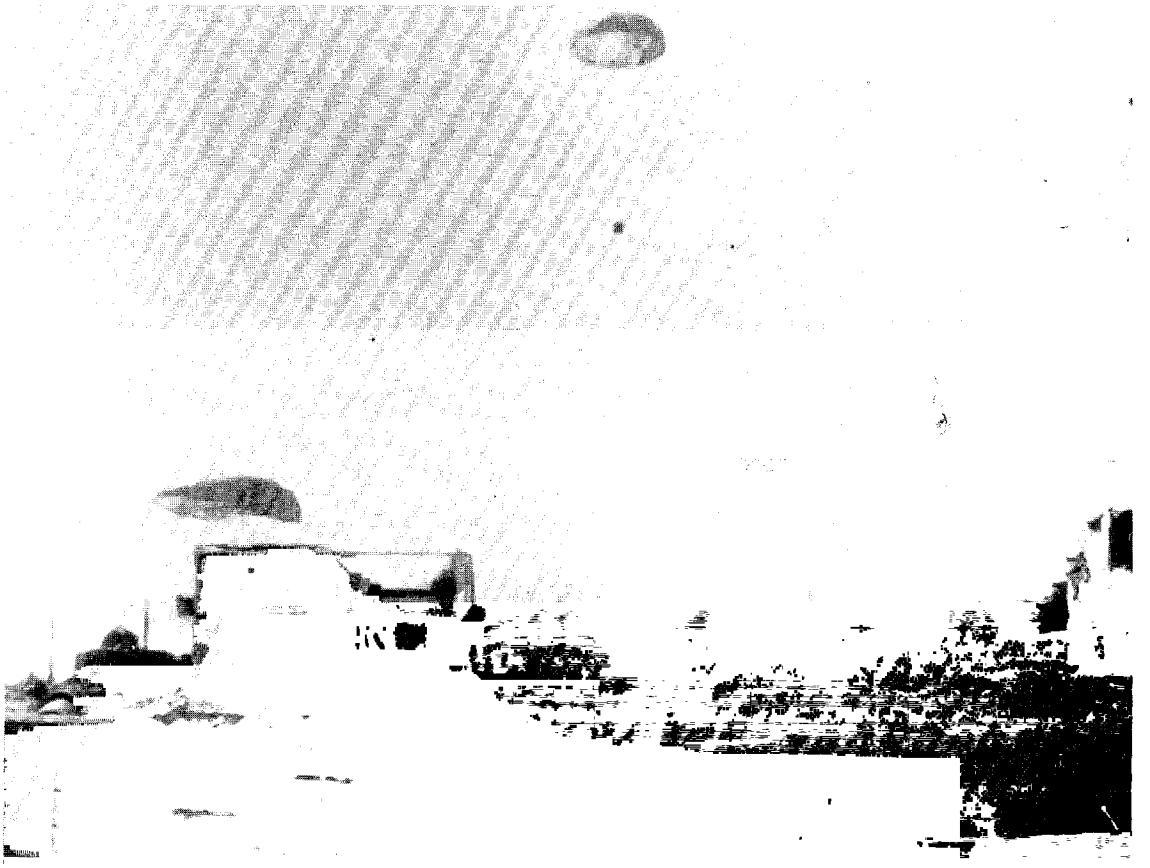
As we have indicated above, VNAF with its present numbers and types of transports has the capacity to meet the peak airlift requirements placed on it in the past by RVNAF. However, because the different types of transports with their differing maintenance requirements have strained its maintenance capability and pilot resources, VNAF may consider eliminating its older transport aircraft. If VNAF should phase out its older aircraft without compensating increases in the numbers of its newer aircraft, it could have a possible shortfall in its lift capacity.

Impact of antiaircraft weaponry on logistics

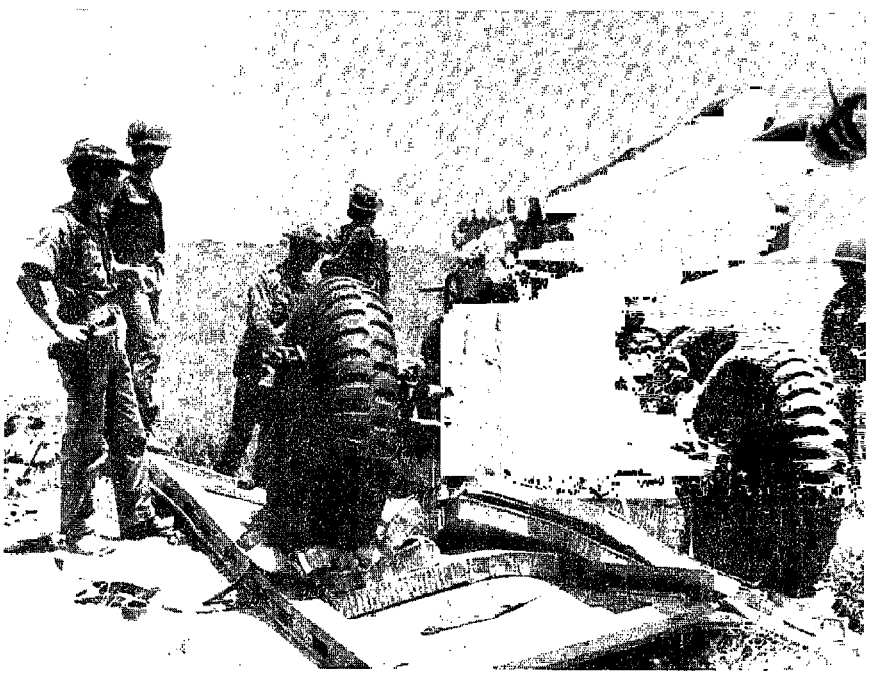
North Vietnam's introduction of antiaircraft weapons and missiles into South Vietnam is another factor to be considered in evaluating the capability of the VNAF transport fleet to meet its mission under difficult combat conditions. For example, during the siege of Kontum by North Vietnam forces, the U.S. Air Force and VNAF jointly decided that U.S. Air

Force C-130 aircraft would resupply Kontum because the C-130 was faster than the C-119 and the C-123 and was therefore less vulnerable to antiaircraft fire. And since it carries almost three times as much cargo (up to 35,000 lbs.) as the smaller craft, it requires fewer sorties to accomplish the same resupply mission, thus exposing it less frequently to antiaircraft fire.

Because fire at Kontum was intense, some aircraft were damaged, and the C-130s resorted to high altitude air drops. Nevertheless, the C-130s did keep Kontum resupplied.



Supplies air dropped in battleground



Howitzer delivered by air drop

The ubiquitous helicopter

The helicopter serves a wide variety of tactical and logistical functions in every tactical corps in Vietnam. The UH-1 is an attack gunship, an air mobility vehicle for tactical placement of troops, supply and resupply craft, and a medical evacuation (medevac) craft. When the CH-47 was introduced, the helicopter's troop and cargo carrying capabilities increased and downed aircraft and other damaged or endangered equipment could be removed from the battlefield.

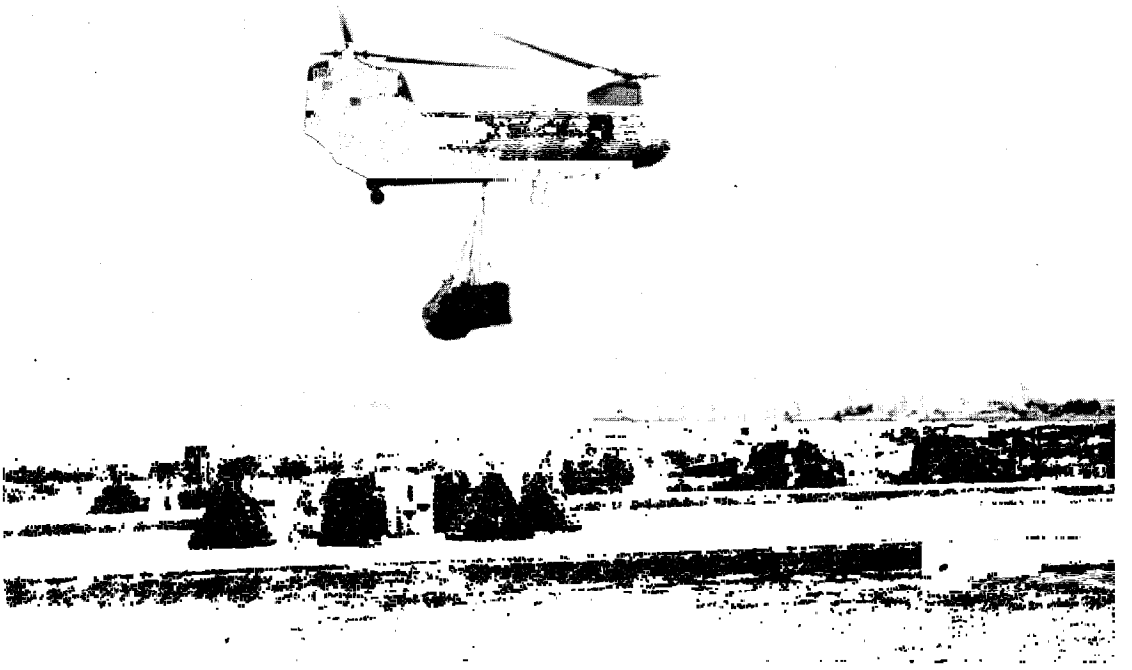
We were told that VNAF has developed expertise in the operating of the helicopter, and there is evidence that it had developed exceptional skill in maintenance, repair and overhaul. Over 75 percent of the helicopters were damaged during the offensive and had been repaired in South Vietnam as of October 1972. The CH-47 helicopter is a complex vehicle, difficult to maintain even by U.S. forces. U.S. advisors told us, however, that South Vietnamese maintenance of the CH-47 compares favorably with that of the U.S. forces.

The battle damage to VNAF helicopters is indicative of the level of combat support activities of VNAF. Our study showed that VNAF helicopters airlifted about 400,000 troops

and 21,000 tons of cargo during the offensive. The chart on the following page shows the number of combat assault and support operations of the UH-1 and CH-47 helicopters and the number and amounts of troops and cargo carried in 1971 and 1972.

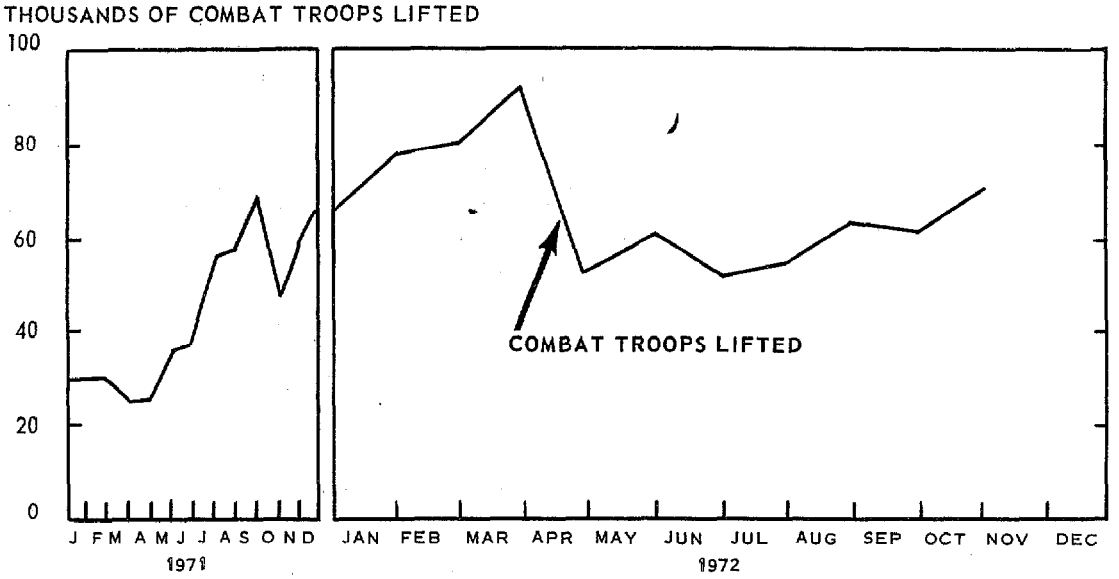
While the above statistics are impressive, the multipurpose characteristics of the helicopter make it difficult to evaluate the VNAF fleet solely in terms of its logistical mission. But a comparison of U.S. use of the helicopter with VNAF use of the helicopter can help in evaluating the VNAF fleet in terms of its capability to meet its requirements without outside assistance.

At the height of the troop strength in 1969 and 1970, the United States had over 3,200 helicopters supporting its tactical and logistics operations, and U.S. ground tactics were designed around this level of helicopter support.



Helicopter providing logistical support in forward area

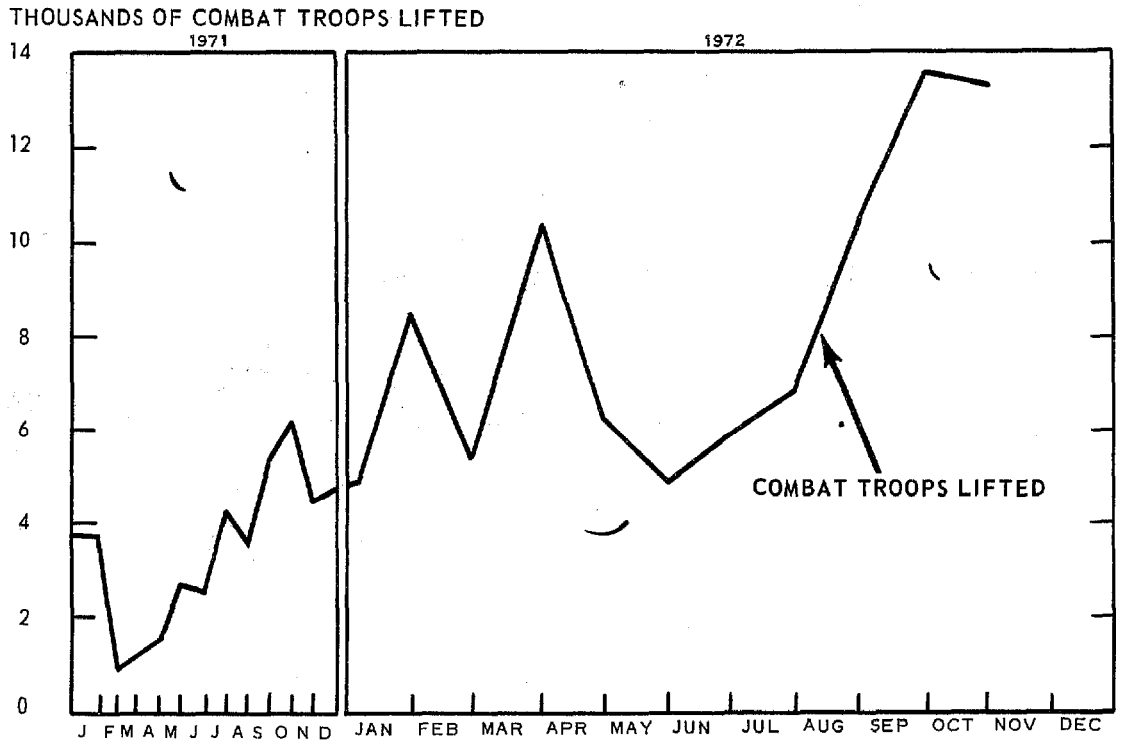
COMBAT ASSAULT OPERATIONS (UH-1)



COMBAT TROOPS LIFTED	79771	80097	93115	55223	60730	52674	56071	63463	63397	72078
COMBAT ASSAULT SORTIES (UH-1)	35338	33964	43734	34470	34738	31789	32201	36488	33768	(1)
CARGO LIFTED (TONS)	738	769	1213	977	1375	1326	1440	1600	1504	1671
TOTAL PAX/TROOPS LIFTED	104347	98786	116572	77877	86257	77354	75964	89190	91112	103655

(1) NOT AVAILABLE

COMBAT SUPPORT OPERATIONS (CH-47)



COMBAT TROOPS LIFTED	8507	5673	10351	6123	5173	6064	6939	10389	13501	13290
COMBAT SUPPORT SORTIES (CH-47)	967	915	1329	928	542	816	918	1320	1428	(1)
CARGO LIFTED (TONS)	1659	1386	2843	2360	799	2244	1125	3217	3250	3746

(1) NOT AVAILABLE

As U.S. forces were drawn down the number of U.S. helicopters and helicopter units were also reduced. However, some U.S. Army helicopter units are among the last operational units scheduled to leave Vietnam.

Even before the 1972 offensive, U.S. helicopters were engaged in a variety of activities supporting RVNAF.

During the period April through September, VNAF, in contrast, had between 550 and 600 UH-1 helicopters available, and at the start of the offensive, a number of the VNAF squadrons were new and untested.

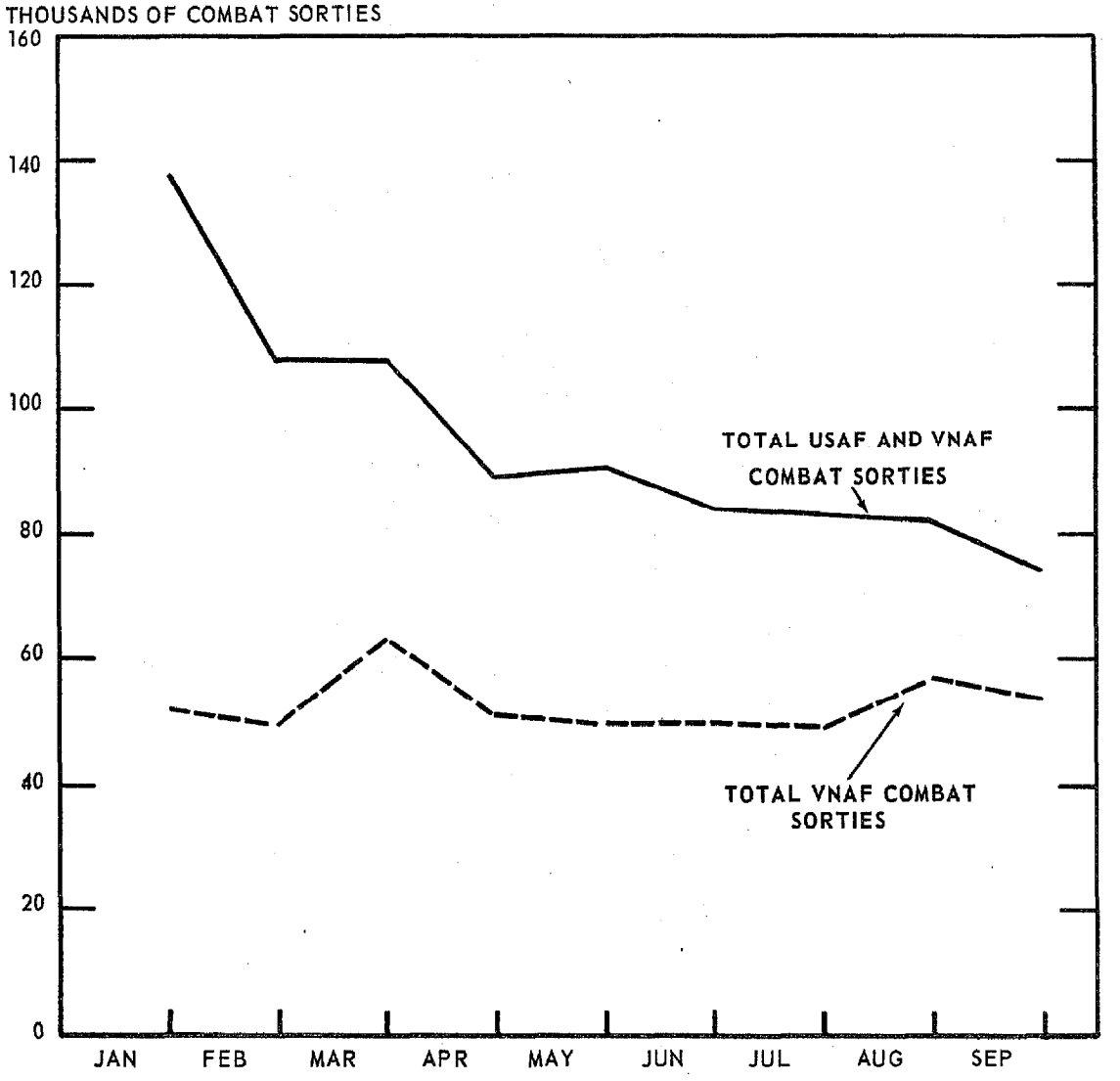
No doubt these new units resulted in a requirement for more U.S. augmentation than would be required if all VNAF squadrons had been fully trained and experienced. Therefore more U.S. augmentation than normal was required. Only in April and May, however, did U.S. augmentation exceed 40 percent of the total combat sorties; and as shown on the chart on the next page, U.S. participation declined steadily thereafter. (There is no data available to show the types or duration of the individual sorties or what part of the sorties were flown in support of U.S. troops.) U.S. ground combat ended in August 1972.

On the basis of our talks with MACV, VNAF, and ARVN officials and with U.S. advisors, we got the impression that RVNAF had attempted to use its helicopters to fulfill the same role as the larger U.S. helicopter fleet had filled for approximately the same size ground force.

Although it seems clear that VNAF and U.S. forces used much less than the 3,200 U.S. helicopters to stem the 1972 invasion, we cannot determine that the VNAF helicopters used by fully trained and experienced pilots would be adequate to fill the roles of all VNAF and U.S. helicopters existing at the height of the 1972 invasion.

DOD officials believe the VNAF helicopter fleet is now adequate to meet any anticipated requirements placed upon it.

U.S. AIR FORCE AND VIETNAMESE AIR FORCE
UH-1 HELICOPTER COMBAT SORTIES
(INCLUDING TROOP LIFT AND RESUPPLY)
1972



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
VNAF-TOTAL UH-1 SORTIES	57412	54287	69206	54403	54075	53839	54070	62571	58874
COMBAT UH-1 SORTIES	51922	49759	63232	50831	50125	49588	49084	57435	53745
% COMBAT	90	92	91	93	93	92	91	92	91
USAF-TOTAL UH-1 SORTIES	120753	85166	72281	63066	66850	56723	55461	45950	41244
COMBAT UH-1 SORTIES	86157	58521	45283	38541	41488	34345	34128	24748	20882
% COMBAT	71	69	63	61	62	61	62	54	51

Vietnamese Air Force reaction to major explosion damage

On September 10, 1972, the munitions holding point of the 3d Air Division at Bien Hoa Air Base was detonated by enemy rocket, by accident, or was sabotaged. Major damage resulted. The cause has still not been determined.

Bien Hoa is a VNAF base with a capability to perform depot level maintenence of aircraft, their components, and the supporting equipment. Except for limited available capability of Air Vietnam, there is no redundancy in the South Vietnamese industrial base; therefore, the industrial plant facilities in the Air Logistics Command at Bien Hoa are important to South Vietnam's ability to maintain, repair, overhaul, or rebuild VNAF equipment.

Since the ability to recover from such extensive damage should indicate progress in Vietnamization, we monitored the reaction to the damage.

Immediately following the explosion, VNAF, supported by an ARVN engineer company began to clean up the debris and raze the destroyed buildings. Surplus buildings at Long Binh Army Base were dismantled and rebuilt at Bien Hoa. As of the end of September, only 20 days after the explosion, over half of the damaged aircraft had been repaired and were back in the air. Repairs to the remaining reparable aircraft were to be completed by January 1973.

At the Air Logistics Command, which was recovering from another recent rocket attack, the communications and vehicle repair facilities were damaged. By the end of September, damage had been cleared, communications and other equipment had been salvaged, and operations for both the communications and vehicles repair activities had resumed in temporary facilities.

VNAF, supported by ARVN, will carry out all repair, relocation, and erection of the air base facilities. At the Air Logistics Command a contractor will repair and reconstruct facilities.

ORGANIZATION

VNAF is composed of six air divisions, an Air Logistics Command, an Air Training Command, and other supporting elements. Five divisions are combat units, dispersed throughout Vietnam and equipped with fighters, observation aircraft, and helicopters; the other is an air transport division which provides logistics support to RVNAF.

Each air division has a maintenance and supply wing which performs field level repair of its aircraft and operates the supply account. A civil engineer group assigned to the air division operates and maintains each air base. The chart on the following page shows the organization of VNAF.

VIETNAMESE AIR FORCE STRUCTURE

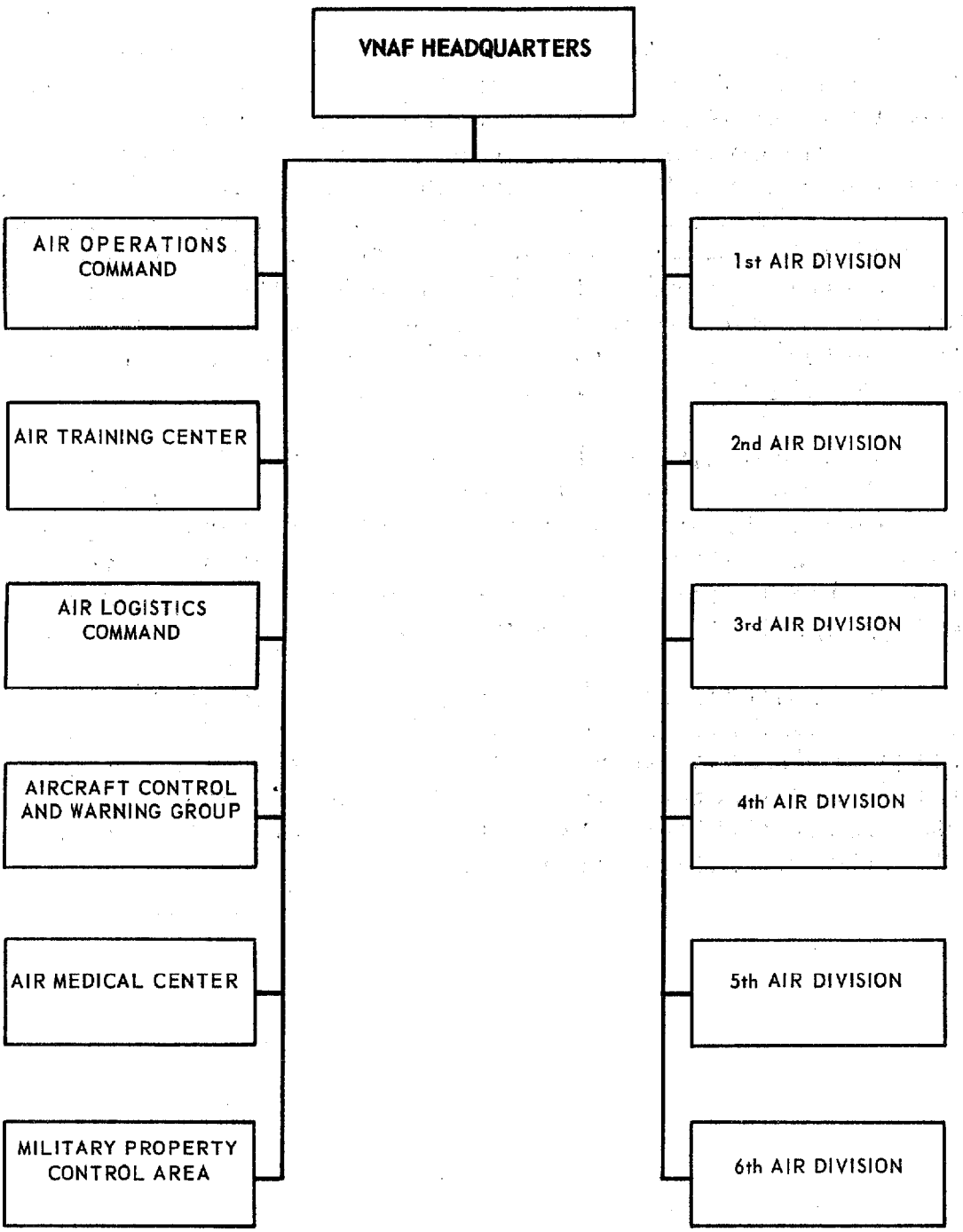
Since July 1969 VNAF's force structure has been substantially increased--both by the accelerated deliveries of a wide range of military aircraft and supporting material and by assigning, training, and placing additional personnel needed to operate, maintain, and supply the enlarged Air Force.

Aircraft

In 1969 VNAF had 20 squadrons composed of 12 different types of aircraft or weapons systems. By the end of November 1972 there were 49 squadrons and over 2,000 aircraft in the inventory and about 20 different types of aircraft or weapons systems.

The most significant increase in the VNAF fleet was the delivery of over 800 helicopters, mostly UH-1Hs, commonly called "Hueys." Operated by the U.S. Army during its involvement in Vietnam, the Huey has become one of the workhorses of the VNAF fleet since it is versatile and well-adapted for counterinsurgency hostilities. Used primarily to support ARVN, the Huey is an attack gunship--providing aerial support of ground operations; an evacuation craft--removing injured and war dead from the battlegrounds; a troop tranport--positioning combat troops in tactical locations; a supply craft--shuttling needed military supplies and equipment to the ARVN troops. The Huey performs various other utility functions such as command and control of battlefronts.

VNAF ORGANIZATION CHART



Another, much larger, helicopter in the VNAF fleet is the CH-47. The CH-47 is a transport helicopter designed to deliver cargo and troops to the battle areas. The CH-47 has the important and unique mission of recovering downed aircraft, quite often in ememy-held territory, returning those aircraft to bases or the depot maintenance facility where they are repaired and made ready for future missions.

The A-1 is a conventional piston-engined fighter of 1945 vintage and was active in the U.S. Navy in the 1960's. Designed to stay aloft for long periods of time, it can maneuver slowly over enemy supply lines and deliver a large destructive payload. The same qualities that make the A-1 effective will also contribute to its eventual demise. Because of its slow maneuverability, the aircraft is vulnerable to enemy attack. The VNAF also has the A-37 jet fighter. The A-37 has much greater speed and maneuverability. It is supplemented by the more sophisticated F-5A jet fighter which has high speed and maneuverability.

The World War II vintage C-47 and the 20-year-old C-119 transports played a major role in the expanding VNAF. Used along with C-7 and C-123 aircraft as transports, several C-47 and C-119 aircraft have been adapted to other missions. Armed with automatic weapons the AC-47 and AC-119G gunships provide fire support for ARVN.

The remainder of the VNAF fleet is made up of liaison aircraft--small single-engine craft used for forward air control and reconnaissance, utility aircraft, and training aircraft. The activation of a training squadron is significant because it illustrates the steps being taken to provide VNAF with the training tools it needs.

BIANK DAGE

AIR LOGISTICS COMMAND

The Air Logistics Command was organized to provide centralized logistics management and depot level maintenance support for the nine VNAF air bases and their varied weapon systems. The Air Logistics Command is being equipped to provide major overhaul and repair of most items in the VNAF inventory and to maintain a centralized supply system. The maintenance program is still in its infancy but is being developed rapidly with the help of U.S. Air Force and contractor augmentees. The supply system is in full operation and is partly computerized.

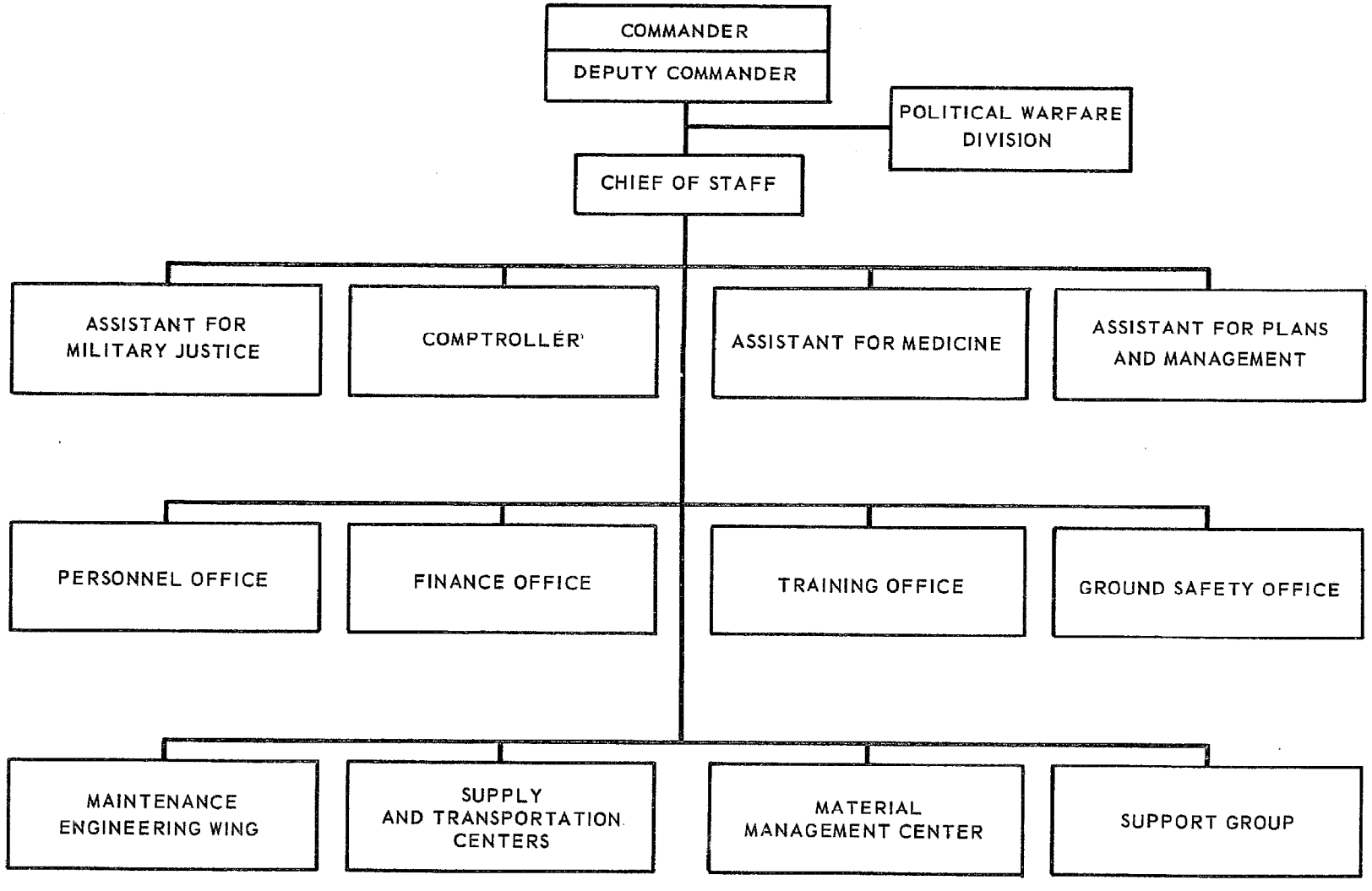
The air depot at Bien Hoa dates back to 1955 when the French Air Force vacated the facilities. In 1969 it was patterned after a typical U.S. Air Force Air Materiel Area. That same year, the VNAF improvement and modernization program began and the Air Logistics Command began rapidly expanding in both facilities and repair capabilities. In 1969 only about 1,500 people were assigned to the Air Logistic Command. Today the assigned strength is over 3,000 but this is only about half of the authorized strength.

The Air Logistics Command is organized in three major divisions to provide maintenance of equipment, management of resources, and storage and distribution of supplies. On the following page is the organization chart of the Air Logistics Command.

Vietnamese Air Force maintenance capability

In May 1970, the VNAF improvement and modernization program began developing repair capabilities at the Air Logistics Command for the aircraft and associated components belonging to VNAF. Capability for any depot level maintenance was virtually nonexistent at the command in 1969 and 1970. The command had been performing base level maintenance, the type of maintenance normally done by the U.S. Air Force at the operating bases from which the aircraft were launched. Depot level maintenance--major repair, overhaul, and rebuild--for VNAF assets had been routinely accomplished by the U.S. Air Force maintenance programs.

AIR LOGISTICS COMMAND



Two objectives of the program were:

1. To train and equip the VNAF divisions to perform their own base level maintenance.

2. To remove base level maintenance from the Air Logistics Command and train and equip the command to perform depot level maintenance.

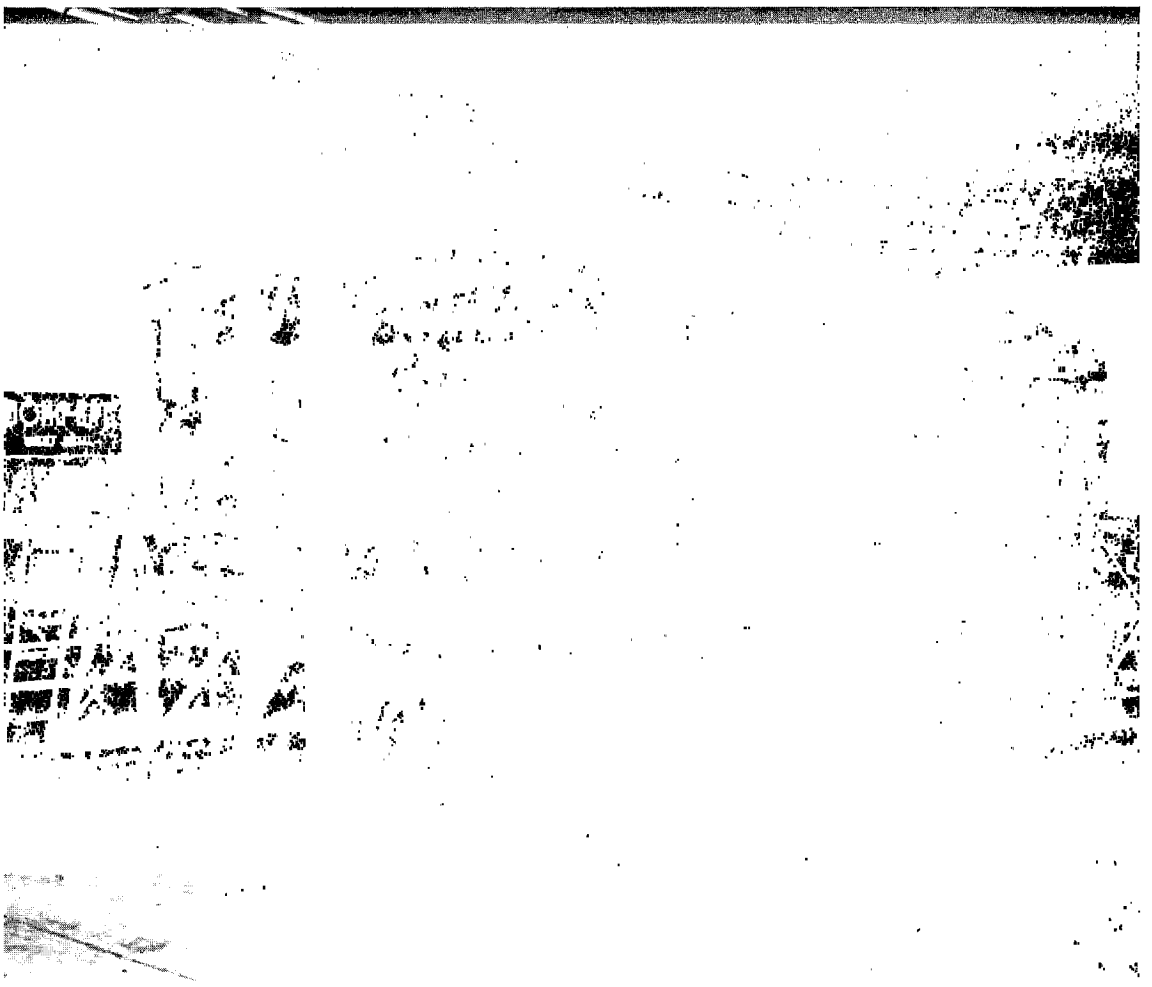
Depot level maintenance

The Maintenance Engineering Wing of the command now performs depot level maintenance on several aircraft in the VNAF fleet and is expanding its program to other aircraft as skills are developed. The repair shops operated by the maintenance organization also repair certain parts beyond the capability of the repair activities at the air bases. Shops have been equipped for repair of such items as jet engines, aircraft accessories, aircraft structures, landing gears, ejection seats, rotor blades, and electronic and communications equipment.

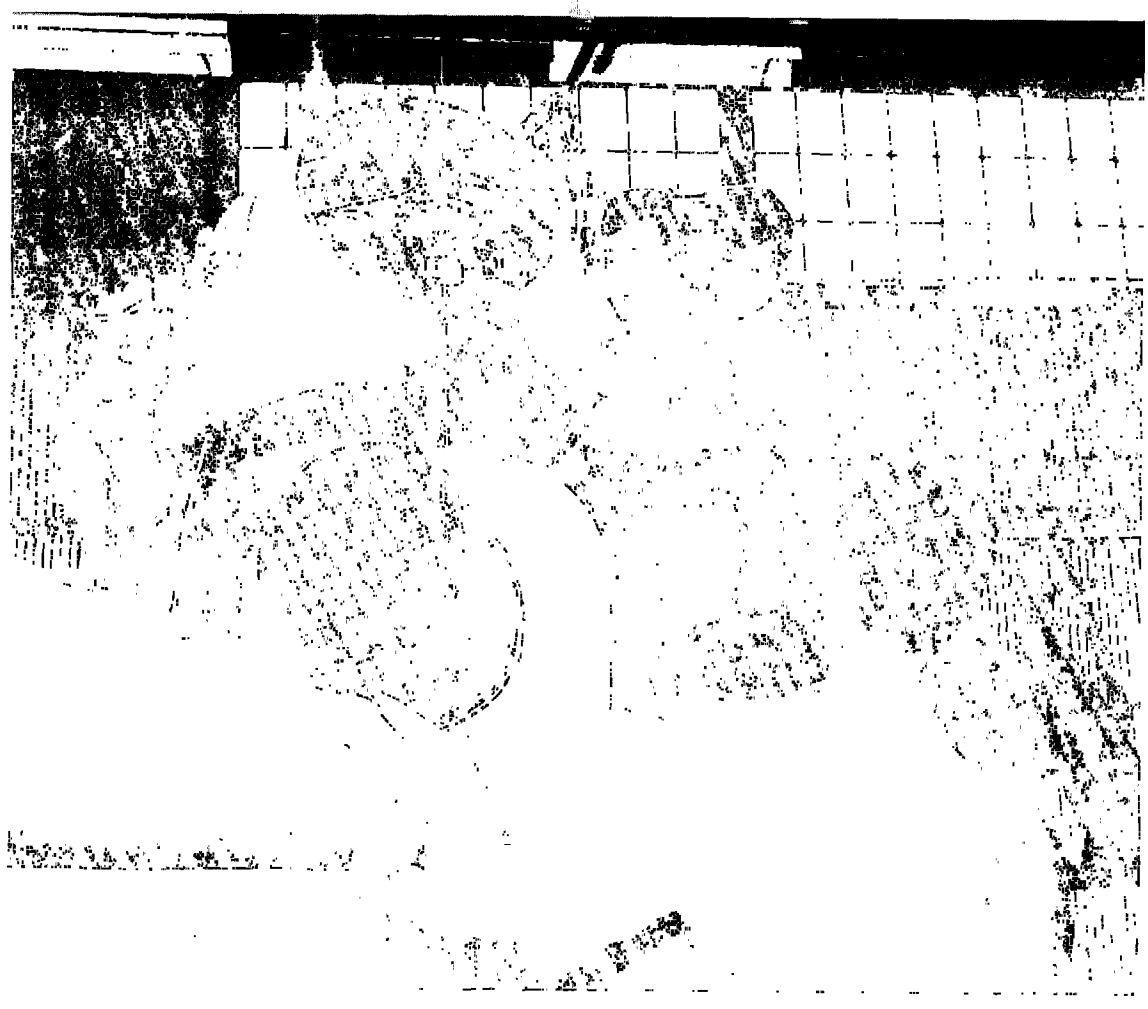
For many of the activities at the Air Logistics Command, VNAF requires no further training or augmentation, and depot level overhaul programs for several types of airframes are accomplished with minimal help. However, for other activities VNAF will require assistance.

Each aircraft contains a large number of components. We did not obtain statistical data showing the present capability of the command to provide depot level maintenance for these components. However, during our visit to the command we observed many of these items being repaired or rebuilt. Current plans call for VNAF to be able to repair or rebuild most of these aircraft components.

The effectiveness of the depot maintenance program can be indicated by comparing the number of actual flying hours with that which was programed for the aircraft. We examined this data for the month of September 1972 and found that some aircraft, specifically the C-119s and C-123s, were flying over 100 percent of their programed time while others were failing to meet their programed time. A similar analysis for the months preceding the April offensive showed a much greater percentage of aircraft exceeding their program flying hours.

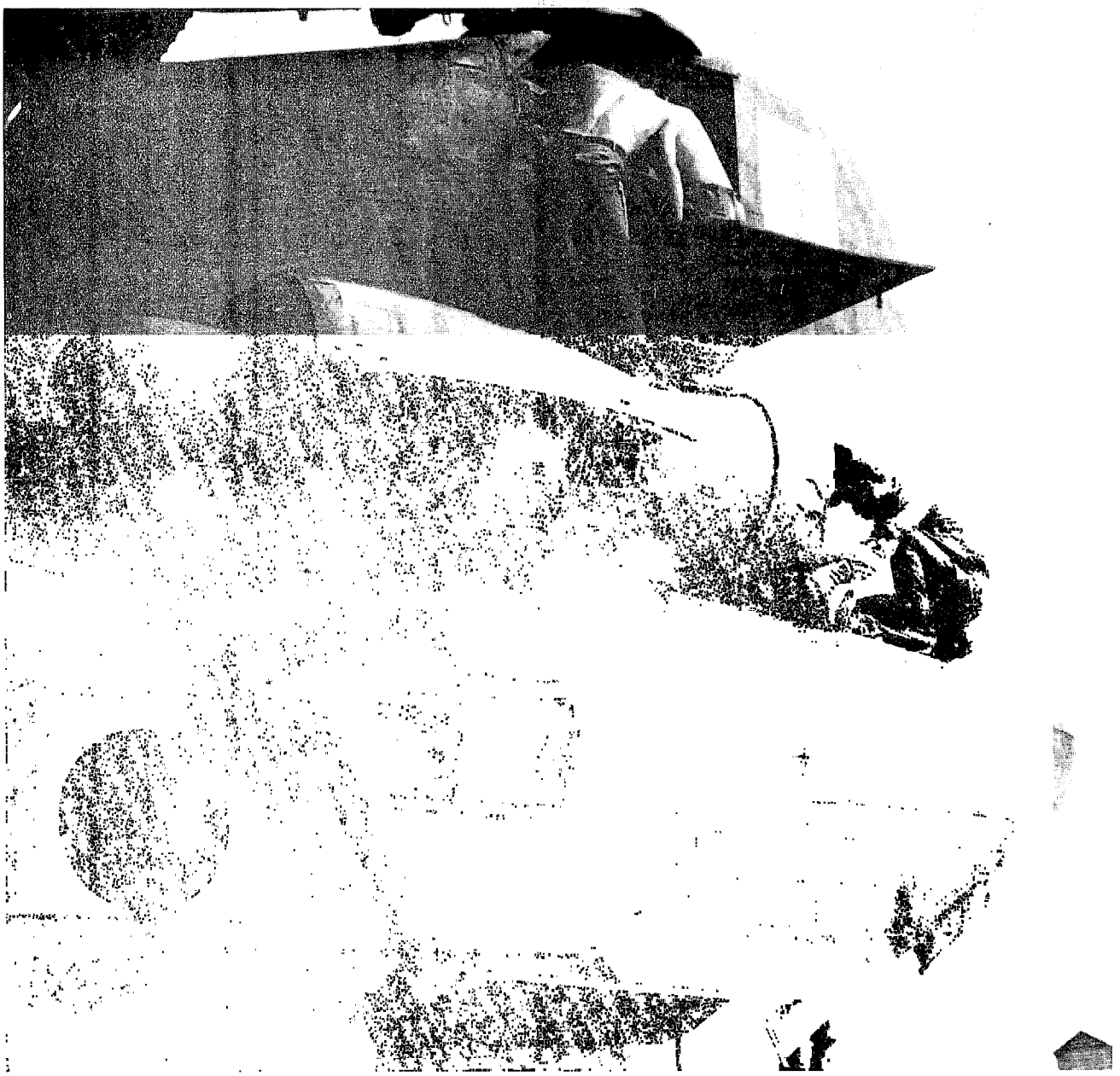


Structual repair on VNAF helicopters

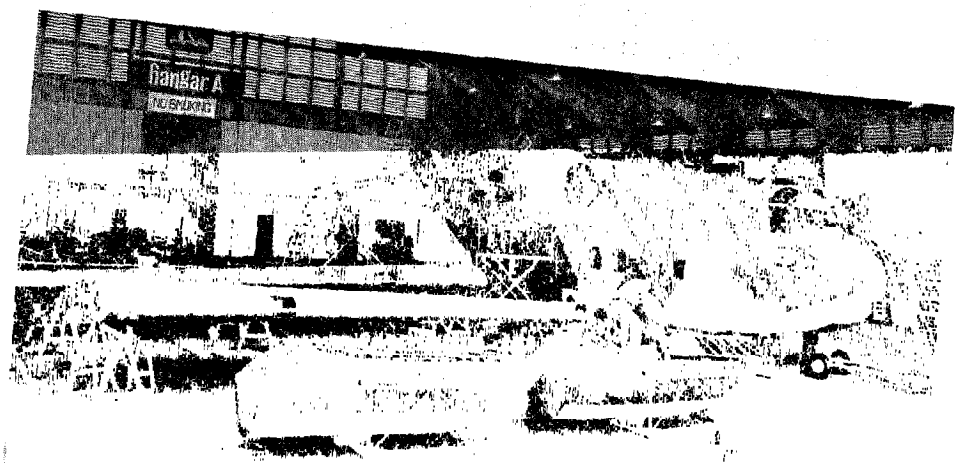


Exhaust manifold cowling being removed from VNAF helicopter

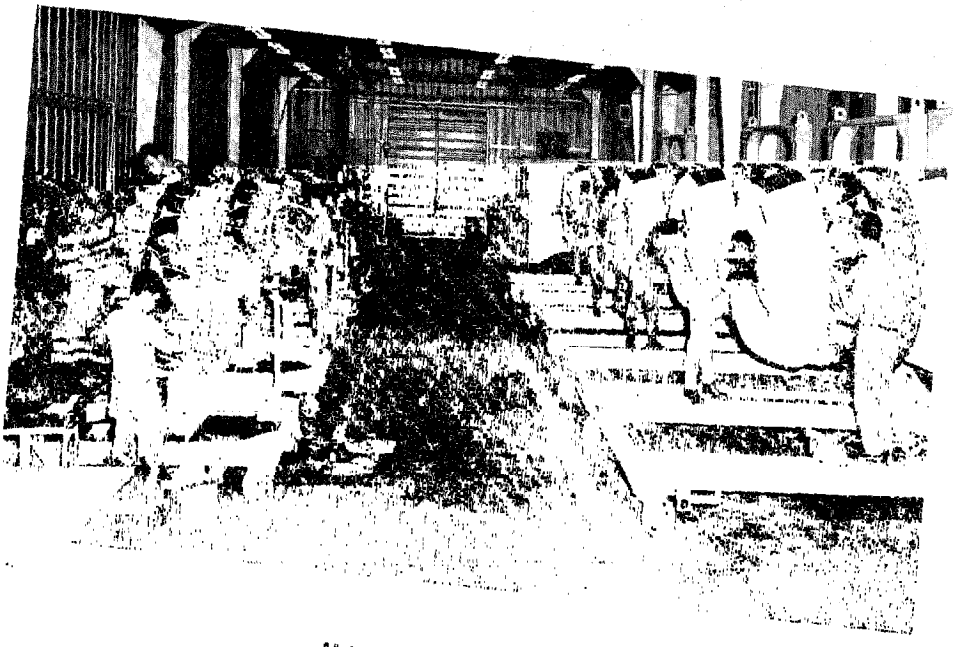
VNAF propeller overhaul facility



Preventive maintenance on CH-47 helicopter



C-123 being repaired by VNAF



Maintenance on large reciprocating engines

Although statistics on flying hour programs are indicative of aircraft usage, they do not necessarily indicate the condition of aircraft. Also, the reason for not meeting programed hours may be because of a tactical situation rather than equipment failures.

A more meaningful measure of the condition of aircraft is the operational readiness statistics reported by the various VNAF units. Operational readiness is expressed as a percentage of aircraft capable of accomplishing their primary mission. Aircraft that are not capable of performing are classified as either nonoperational ready because of maintenance deficiencies or nonoperational ready because of lack of parts or other supply items.

We examined the operational readiness statistics for the month of March 1972, the period before the start of the offensive. We found that for some types of aircraft the readiness standards were being met. For others, the number of aircraft not operationally ready was greater than the standards set by VNAF. Aircraft were shown as not ready because they were awaiting maintenance or spare parts.

The reasons for standard parts shortage rates were reported as (1) insufficient skills of flight crews and maintenance crews and (2) resultant accidental damage to parts which were not normally subject to damage and for which replacement stocks were not readily available. Reliance on continental United States (CONUS) for certain repair capability increased the repair time substantially, and a lack of adequate spare parts at the Air Logistics Command in March 1972 contributed to this high rate.

For the most part VNAF was able to maintain its flying hour program during the North Vietnamese offensive which began March 30, 1972. (See p. 84.) In comparing the March statistics to the statistics reported for the month of September, we noted few significant changes in readiness. The only aircraft with a significant reduction in its operational readiness rate was the UH-1 helicopter.

With the assistance of maintenance specialists from the U.S. Air Force and the U.S. Army, we inspected one each of the types of aircraft included in the operational readiness statistics. Each aircraft was listed as operationally

ready at the time we made the inspection. The maintenance specialist found all the aircraft to be operationally ready by U.S. Air Force standards or by U.S. Army standards in the case of helicopters. They considered all the aircraft to be in as good a condition as those being operated by U.S. forces in Vietnam.

In general, the items that will have to be rebuilt out-of-country even after VNAF capabilities are expanded should be categorized as items needing infrequent repair and/or items requiring repair by sophisticated precision machinery or techniques. For some components, we were told, the proprietary rights of manufacturers were involved. Usually the item manufacturers are the sole source of the repair needed and they provide the same services for the U.S. Air Force. For all items in this category, VNAF is provided with a larger supply in accordance with Vietnamization.

Contractor or technical representatives brought to Vietnam to assist VNAF in the depot maintenance functions have a dual mission in most cases. They have to use their industrial skills and knowledge to produce the workloads programed for the Air Logistics Command and to train the VNAF.

The following paragraphs illustrate the major areas in which contractor augmentation will be needed.

The jet engine shop, completed in February 1972, has been equipped with much equipment. VNAF must be trained to operate this equipment and to repair jet engines. Scheduled to begin in December of 1972, U.S. advisors have said that this facility will be geared to acomplish the majority of the repair required on the J-85, T-55 and T-53 jet engines. These engines are used on the F-5, A-37, C-123, UH-1, and CH-47 aircraft which make up a major portion of the VNAF weapon systems.

The Bien Hoa Air Logistics Command is also developing a depot level maintenance capability for the UH-1 main rotor blades. Again a contractor has been employed to provide this capability and to train VNAF to become self-sufficient in its depot level maintenance for the large fleet of UH-1s. VNAF is already producing depot level repair of UH-1 airframes and tail sections.

A main problem for VNAF is the maintenance required for the UH-1 "power train." This is the shaft, gears, etc., which run from the main rotor through the engine drive and the tail boom up to the tail rotor. The U.S. Army has always returned power trains to CONUS where they were either repaired by Bell Helicopter in California or by the Army in Corpus Christi, Texas. It would have been prohibitively expensive to make the same arrangements for VNAF. Besides the transportation expense, resupply requirements of the Vietnamization programs would require that complete power train components always be in-country in order that reparables could be sent to CONUS.

The U.S. Air Force, with the assistance of the contractor, Bell Helicopter, is setting up a power train repair shop. Labor skills will be contracted for and VNAF will work with and be trained by the contractor with the objective of total VNAF operation of the power train shop. The VNAF jet engine shop will be manned and equipped to repair CH-47 engines but repair of the CH-47 airframe will be contracted out to Air Vietnam. Capability for in-country repair of severe crash and battle damage to the CH-47 will not be achieved in the foreseeable future, nor will the capability to repair CH-47 rotor blades be achieved.

VNAF does not currently have a capability for the overhaul and major repair of some reciprocating engines. Companies in Taiwan and Thailand have been contracted to repair reciprocating engines for selected aircraft.

The U.S. Air Force currently plans to set up a capability within Vietnam to repair the small reciprocating engines of the O-1, U-17 liaison-type aircraft, the trainers, and the U-6 reconnaissance aircraft. VNAF performs field level maintenance on reciprocating engines but not depot level maintenance.

The VNAF facilities and the contractor and third country efforts will not have much significance unless aircraft are, in fact, maintained and kept flying. We have already discussed the rapid repair response of VNAF to the September 10 bomb explosions. We also analyzed data relating to all losses and damage to VNAF aircraft from the start of the 1972 offensive through October 1972. This analysis showed that over 75 percent of the damaged aircraft had been repaired and returned to service.

In addition to the support of its aircraft, VNAF is also developing other capabilities such as vehicle repair, computer operations, communications and electronics, etc.

VNAF has about 4,700 vehicles, mostly commercial-type pick-up trucks or specially designed airport vehicles. Neither are items commonly used by the Army and they are not maintained by ARVN. The U.S. Air Force has established a vehicle maintenance center at the Air Logistics Command for the repair and maintenance of U.S. Air Force vehicles, the rehabilitation of vehicles turned over to VNAF, and subsequent care of those vehicles and others which will become VNAF assets. The center is operated by Lear Sigler, Incorporated, who has the contract to maintain the VNAF vehicles and to train VNAF personnel to assume these responsibilities. This contract, referred to as Commando Wheels is fully operational.

Another related contract, called Copars has been let to provide vehicle parts and supplies. This contractor is provided with a building in which it stores its parts and supplies and issues them to Commando Wheels much as any auto parts outlet might do. This contractor must know the number, kinds, and models of VNAF vehicles and must compute their spare parts requirements.

Base level maintenance

VNAF has moved its base level maintenance from the Air Logistics Command to the bases at which the elements of the various air divisions are located. U.S. advisors told us that at some bases, such as Nha Trang and Binh Thuy, the maintenance is well-performed and prompt. At some other bases, particularly the bases at Phu Cat and Phan Rang--those most recently taken over by VNAF--there are insufficient trained personnel to assume the responsibility.

Asset management

The VNAF materiel and supply management systems are in many respects similar to the U.S. Air Force systems. The distribution system is centered on transportation from the Air Logistics Command in a more or less regular route pattern. The requisitioning system and supply forms and procedures are the U.S. Air Force's; the whole supply system is

integrated with the logistics system of the U.S. Air Force and is interconnected, through the U.S. Automatic Digital Network (Autodin), with the U.S. Air Force system at Clark Air Base in the Phillippines.

Material management

The Material Management Center of the Air Logistics Command manages VNAF assets from the smallest aircraft part to sophisticated weapon systems such as the F-5. The management center uses the standard U.S. Air Force systems for requisitioning, inventory control, and distribution of spares and supplies. Programs developed for the U.S. Air Force supply system have been tailored for VNAF use.

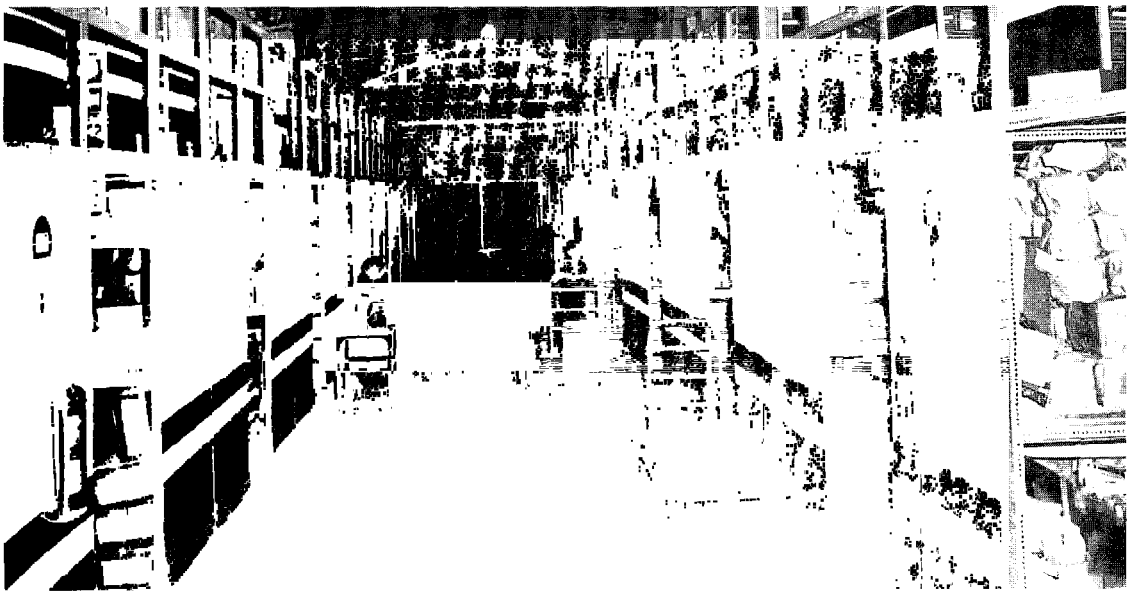
The center maintains and processes asset data for major and critical items in the VNAF inventory. This permits visibility over these items wherever they may be located in South Vietnam.

In 1969, when the Vietnamization program began, the VNAF supply system did not provide the responsiveness, accuracy, asset visibility, and managerial data required to sustain the sophisticated weapon systems that were being transferred to VNAF control. Warehouse stocks at all VNAF bases were cluttered with unusable parts and supplies, including many parts for obsolete and discarded French aircraft and equipment.

In July 1970 the Air Logistics Command supply system was modernized. The Command's supply system now encompasses the entire VNAF organization. All inventory at the Command, including depot stocks for the maintenance function and major items and reparable parts at each base, are supposed to be managed by the center.

All VNAF bases now submit requisitions to the asset managers at the command, where issues are directed to be made from depot stocks or from stocks of another airbase. The Command makes requisitions from CONUS through the U.S. communications system via Clark Air Base for items it is unable to fill from the depot or for stock replenishment. Shipments of supplies from CONUS are sent to the Air Logistics Command depot at Bien Hoa. One exception is shipments

of parts for out-of-service aircraft. The supplier sends such parts directly to the requisitioning airbase.



VNAF supply warehouse

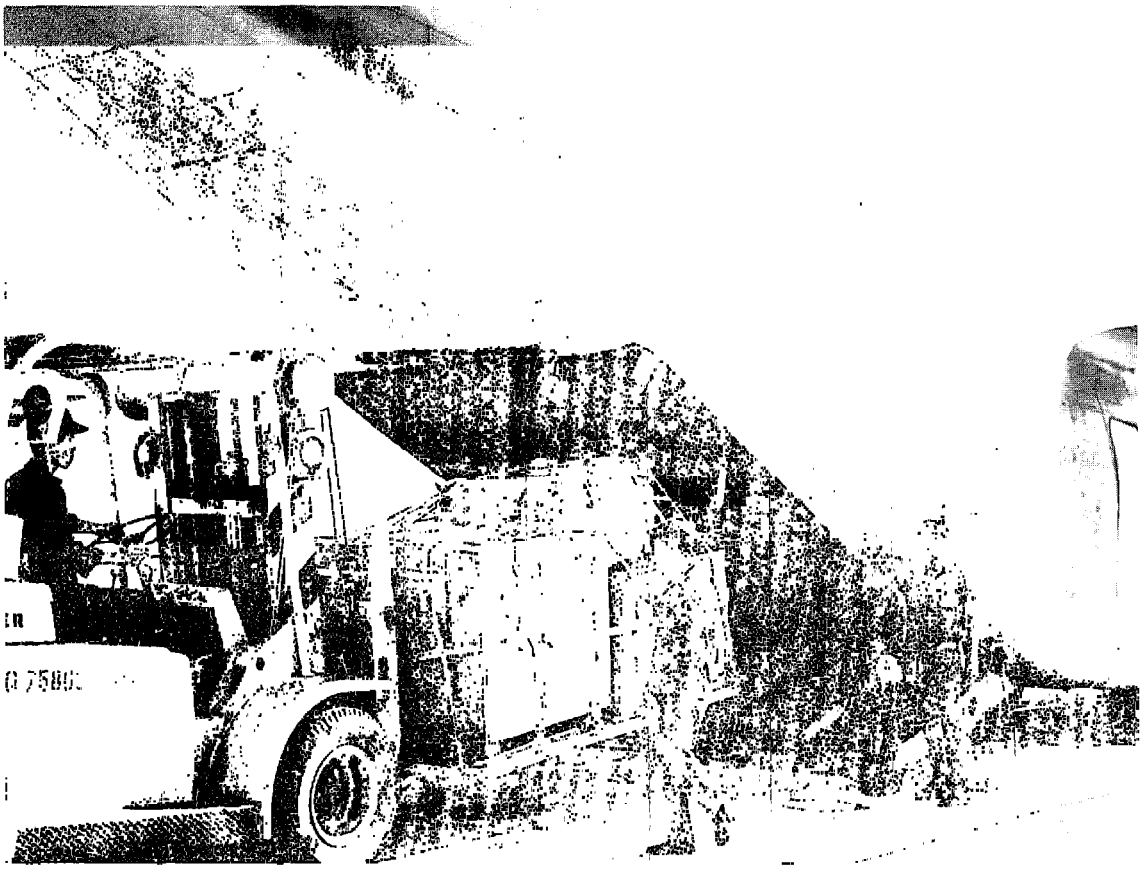
Distribution management

The Air Logistics Command Supply and Transportation Center manages the warehousing, packing, shipping, and receiving activities of the depot. The center processes materials used by VNAF, with the exception of items shipped directly to VNAF units. Twenty warehouses containing about 310,000 square feet are used to store VNAF assets. In addition, about 130,000 square feet of outside storage area is used for bulk items. The center operates the Bien Hoa air terminal, which handled about 380,000 pounds of inbound and outbound VNAF cargo and 4500 air passengers a month in late fiscal year 1972 and early fiscal year 1973.

The Material Management Center, after determining that the depot has sufficient stock on hand to fill an order, directs the requisition to the depot, identifies the bin location, and adjusts the inventory.

For major or critical items the center can place the requisition on any of the stocks located in the various air divisions. Today the Command controls about 160,000 line items. The Air Logistics Command requisition fill rate reportedly has increased from 32 percent in 1970 to 55 percent

in 1972. In addition, inventory accuracy, said to be about 35 percent in 1970, now is reported to be about 73 percent.



VNAF loadmasters at Air Freight Terminal

Movements control is exercised through the 5th Air Division at Ton Son Nhut. Except when its transport aircraft are diverted to engage in combat support operations, the division operates a route cargo transport airlift servicing all air bases in the system. New items are dropped off and reparables to be returned to the Air Logistics Command are picked up.

At the air bases most stocks--between 25,000 and 35,000 items--are controlled through an archaic manual system. Satisfactory control and management of this many items under this system is questionable and the Command has plans to ultimately automate all items in the base level inventory.

Except for Phu Cat and Phan Rang, all base and depot accounts have been purged of much obsolete and unusable equipment.

FACILITY TRANSFERS AND EQUIPMENT TURNOVER

Since July 1969, the U.S. Air Force has turned over to VNAF, or has programed to be turned over, all facilities, material, supplies, and related services.

The U.S. Air Force occupied 11 major air bases in the Republic of Vietnam. Six of these--Da Nang, Soc Trang, Tan Son Nhut, Binh Thuy, Bien Hoa and Nha Trang--were VNAF bases even before U.S. involvement in the Vietnamese conflicts. However, the United States either rebuilt or improved them. The United States constructed air bases at Cam Ranh Bay, Tuy Hoa, Phan Rang, and Phu Cat and also at the ARVN base at Pleiku.

VNAF now occupies nine of these bases, having operational control of six and sharing Da Nang, Bien Hoa, and Tan Son Nhut with the U.S. Air Force, VNAF will not use Cam Rang Bay and Tuy Hoa.

A wide range of facilities used by the U.S. Air Force at these air bases have been transferred for Vietnamese use. A partial listing of the variety of facilities turned over follows.

Dental clinics	Airmen dorms
Exchange stores	Operations facilities
Dispensaries	Warehouses
Chapel buildings	Training facilities
Swimming pools	Canine kennels
Master TV antenna	Runways
Water systems	Taxiways
Maintenance shops	Fuel storage
	Bachelor Officer's Quarters

A review of transfer records shows that, as of August 31, 1972, a total of 4,163 facilities, having a total value of $120,198,000 had been turned over to VNAF. Since then, the remaining 900 facilities under U.S. Air Force control have been turned over to VNAF.

PERSONNEL

The intensified expansion and development of VNAF has adversely affected the allocation of VNAF's managerial capabilities. Basically, the same people who in 1969 were responsible for managing an air force operating 428 airplanes in 20 squadrons manned by 17,000 personnel now were finding themselves responsible for a force over four times as large. This force operated more sophisticated weapon systems and was charged with increasing responsibilities in the logistical support activities of training, maintenance, distribution, and supply management.

In September 1972 about 20 percent of VNAF's 52,000 men were in training and not actually assigned to units. Another 6 percent were assigned to the air bases at Phu Cat and Phan Rang where no manning authorizations had yet been established. The Air Logistics Command had only about 50 percent of its allotted slots filled.

VNAF management talent was strained. The very capable and experienced top managers were spread throughout the nine air bases and some were attached to the Joint General Command level. Their subordinates in 1969 had not had time in the past 3 years to develop the middle management skills and techniques necessary to become an effective part of the management team. As a result, we observed an organization quite skilled at the highest levels, but, for the most part, requiring more experience at the middle levels of management, i.e., field level officers, junior officers, and noncommissioned officers. Since 1969 the major growth in VNAF was at the low skill levels, and in September 1972, of the approximatley 35,000 enlisted personnel and noncommissioned officers actively assigned, about 28,000 were in the lower skill levels.

Skill level	Authorized personnel	Actual personnel	Percentage
9	2,108	33	1.6
7	9,563	5,954	62.3
5	19,004	9,687	51.0
3	11,214	18,515	165.1
	41,889	34,189	

The maintenance and supply activities of the divisions we visited during an earlier review in March of 1972 were manned similarly to the VNAF as a whole. Each division had between 50 and 60 percent of its personnel in the lowest skilled category and each was short of personnel in the higher level skills.

Contractor and advisory assistance

Because of the shortage of managers and skilled technicians, U.S. Air Force personnel and contractors have been used to augment VNAF personnel strength. To effectively use VNAF's management and technical skills and to insure that all outside assistance would augment VNAF capabilities, a program was developed to encourage growth in the following sequential steps.

First priority was given to developing the air divisions' logistic functions, such as base supply, field and organizational maintenance, transportation, and associated capability to maintain each base both for personnel needs and industrial facilities. Second priority was given to developing a centralized logistic management command to support and manage those logistic functions beyond the base capability. The VNAF Air Logistics Command, as discussed earlier, was organized to provide depot level maintenance and materiel and distribution of VNAF assets.

Facilities, tooling, and equipment were provided to both the bases and the Air Logistics Command. The major constraint to VNAF then became numbers of people and skills available to utilize the existing industrial plants. Middle management people were not available and training time could not be compressed. VNAF manning priority was given to the Air Divisions to support their operational flying missions and base logistic development. The Air Logistics Command needs received a second priority and, as mentioned, were provided with only about 50 percent of their manpower requirements. Development of a trained workforce was further aggravated by adding two more bases not originally programed to be operated by VNAF. Phu Cat was added in October 1971 and Phan Rang in March 1972. Available VNAF skills had to be spread even thinner to man these two unprogramed bases with a cadre of trained people.

As previously indicated, facilities, tooling, and equipment for all VNAF bases, and particularly the Air Logistics Command, had or were in the final stages of completion but trained manpower to operate them was not available. In order to utilize the facilities and to avoid the continuing cost of retrograding items of repair to CONUS it was necessary to provide skilled contractors and advisors to operate the facilities and train the VNAF workforce as they became available.

The workforce was to be augmented by U.S. Air Force military personnel and civilians and by contracts with private firms. Contractual awards were made in the following order: available Vietnamese contractors, U.S. contractors in-country with a high density Vietnamese workforce, U.S. contractors in-country, offshore contractors of another oriental nation, and lastly U.S. contractors in CONUS. Because of limited sources, only a few Vietnamese contractors were selected, the principal one being Air Vietnam. U.S. Air Force augmentation was used where the need was first, a short term of about 3 months to 1 year; and second, where skills required were not readily available to contractors. Military advisors serve in such capacities as inventory managers, production supervisors, quality control experts, and logisticians.

Some contracts which have already been terminated or significantly reduced are summarized below.

1. In July 1972 the operation and maintenance of power plants and electrical distribution systems were transferred to VNAF at five air bases after 1 year of contractor support for training and maintenance.

2. Five fire departments at nine VNAF bases were determined to be self-sufficient during an 18-month contractor transfer and training period.

3. Three C-7 squadrons have been activated since March 15, 1972, with the help of over 200 advisors who were required to train maintenance technicians. By November 1, 1972, only 31 advisors remained.

4. Three C-123 squadrons were activated between April and December 1971. VNAF now provides field

maintenance on the C-123s without contractor augmentation, the last of which was terminated in March of 1972.

5. One VNAF base (Soc Trang) with its complement of UH-1 helicopters, is being operated and maintained without advisors.

The Nha Trang Air Base, site of the VNAF Air Training Center, operates and supports its missions without any type of augmentation. Advisors stationed at Nha Trang stated to us that their role was substantially completed. We were also informed that a similar situation exists at the Binh Thuy Air Base.

Other VNAF bases are in various stages of development but are not yet self-sufficient and are in need of considerable augmentation.

Emphasis is being placed on the development of the two newest air bases, Phan Rang and Phu Cat. Both bases possess limited capabilities, even in the most basic base operating functions.

Training

The increase of over 20,000 men in the past 3 years has placed a tremendous strain on the VNAF training system which is phasing down its reliance on CONUS training activities. In the past the Vietnamese have depended heavily on the United States for training in the technical areas in which they had no expertise. This covers both flying (fixed wing and rotary wing) and nonflying (maintenance, support, communications, etc.) training areas for officers and enlisted personnel. This dependence has decreased considerably since 1969. In July 1972 we compared fiscal year 1973 programed inputs for officer and enlisted training in CONUS with those for fiscal year 1971 and estimated that they had decreased about 58 percent.

All VNAF fixed-wing pilots, with the exception of liaison aircraft pilots trained at Nha Trang, receive undergraduate pilot training in CONUS. After completion of this training (about 2 years including language schools) a pilot will either (1) return to South Vietnam where he will be

assigned to a squadron and informally trained further or (2) remain in the United States to receive pilot training in the A-37, C-47, AC-119K, or F-5 aircraft. Training in the C-7, C-119 and C-123 is accomplished in Vietnam.

All helicopter pilot training had been conducted by the U.S. Army in CONUS. A VNAF training program has been implemented at Nha Trang.

The Air Training Center at Nha Trang is conducting formal training courses in general fields of command and staff training, English language, technical skills, general services, communications, electronics and military training in addition to flying training activities. In addition, military and/or technical training is being conducted at Tan Son Nhut, Da Nang, and Bien Hoa as well as some training offered to the VNAF by the ARVN.

As evidenced by the current manning deficiencies at the Air Logistics Command, a major need is for the technical training required for depot level repair activities. Formal training courses only provide a start toward satisfying that need. In general, they provide only indoctrination into the use of basic tools. More advanced training is acquired by working with the contractors and advisors in actual production, much the same as an apprentice-ship program.

The major indications of the success of the integration of formal training and on-the-job experience can be found at the air bases at Nha Trang and Binh Thuy, where general operations, field level maintenance, and general services have reached a high level of proficiency. At the Air Logistics Command where manning has been extremely limited and the facilities have been extensively upgraded, the time frame for successful completion of the total training function must be stretched out into the next 18 months to 2 years before results can realistically be evaluated.

Hire of 17 year old Vietnamese trainees

A program is presently being considered to overcome the manning deficiencies at the Air Logistics Command. The program, if approved, would allow for hiring and training 17 year old Vietnamese youngsters and would grant those satisfactorily progressing in their assignments an exemption from

the military service draft. (In Vietnam age is calculated from the day of conception, so by U.S. measurement 17 year old Vietnamese are actually 16 years old.)

Seventeen year olds have been successfully trained in various technical areas by the Vietnamese Army and Navy at their depot and shipyard, respectively, in Saigon. VNAF felt that the requirements at the aircraft repair facilities required higher level individuals who could be obtained through a selective recruitment and tcchncial training program. In addition, VNAF believed that the distance between Bien Hoa and the population center of Saigon would limit the availability of 17 year olds.

However, VNAF has agreed to participate in the program and has submitted a request to the RVNAF Joint General Staff for 544 17 year olds. VNAF would train these youngsters and employ them at the Air Logistics Command. The proposal requires waiver of the draft law and approval of the Vietnamese Minister of Defense, actions which were still pending when our study was completed.

CHAPTER 6

THE MEDICAL STORY

SUMMARY

Improvement of medical facilities and capabilities of RVNAF and of South Vietnam, generally, antedates the Vietnamization program. In the materiel areas of logistics, damaged or reparable items could be replaced or returned to rear areas in Vietnam or to the United States for repair. For specific items quick returns and rebuild were not essential to their individual return and rehabilitation. But in the case of wounded or injured servicemen or civilians, the adequacy and timeliness of in-country medical care was essential to the health, survival, and rehabilitation of the individuals involved. As a result, the medical arm of RVNAF was directed to early development of a high degree of medical capability. Medical care for the population generally has improved from advancements in military medicine.

The records of highly effective U.S. military medicine in Vietnam are almost legion. Because of rapid location and medical evacuation of wounded soldiers to forward medical units for treatment and return to well-equipped hospitals in South Vietnam and subsequently to the United States for more sophisticated care, the ratio of those killed in action to those wounded in action was dramatically reduced.

The purpose of this report is not to discuss the effectiveness of U.S.medical services. The point is that RVNAF emulated U.S. medical accomplishments.

Many South Vietnamese nationals were employed in the American hospitals, clinics, dispensaries, and service units. At first they were employed in low level medical functions, but gradually were trained in and elevated to more technical functions and became familiar and indoctrinated with the high standards of American medicine. These nationals, in addition to those medical technicians, nurses, doctors, and dentists who had received more formal training in U.S. schools and facilities, in third country schools, and in Vietnam itself, provided a medical base for the care of South Vietnamese military and the civilian population.

Hospital ward in Vietnamese hospital

By 1969 there were medical schools in South Vietnam and a fairly well-developed hospital system. There was a centralized military base depot in Saigon supporting five field depots, and tactical medical groups were well established in each of the corps areas.

The medical depots supported all hospitals, dispensaries, and tactical medical units and served the paramilitary forces and the civilian populous.

A medical equipment maintenance structure, under the Chief of Medical Maintenance in the Office of the RVNAF Surgeon General, was responsible for overall management of medical equipment requirements, repair, overhaul, and preventive maintenance programs. The medical depot system operated medical maintenance facilities in each military region.

MEDICAL SERVICES DURING THE 1972 OFFENSIVE

U.S. medical authorities said, in their opinion, RVNAF has a viable health care delivery system which is functioning well under the stresses of the North Vietnamese offensive

of 1972. To bolster their assessment, they cited the following factors.

--Leadership throughout RVNAF medical service has been responsive to the current situation.

--There have been no reported shortages of medical supplies.

--Professional medical specialty teams are being used to support areas of greatest need.

--Treatment facilities are making a maximum effort to identify and discharge those patients capable of being returned to duty.

--Medical groups are actively regulating and distributing patients throughout their respective areas.

--Large numbers of patients are now being moved by VNAF fixed-wing aircraft and by VNAF helicopters.

When the offensive started the RVNAF medical system had 22,456 hospital beds and 21,198 patients. By the end of September 1972, the system had 31,000 beds, serving an average of 29,000 patients daily. During the battle period through August 31 there were a total of 274,000 admissions, about 45 percent of which resulted from battle injuries. The mortality rate for patients was less than 2 percent, about 99,000 military patients were returned to duty. RVNAF medical facilties provided services to about 52,000 military dependents and other civilians during the offensive, and, of the 274,000 patients admitted, about 240,000 had been completely serviced by August 31. U.S. military medical authorities consider this to be a tremendous workload accomplishment for the RVNAF medical system.

Hospital support activities were equally impressive during the offensive. Blood, dental work, laboratory analysis, X-ray service, and outpatient treatment were furnished. For example, over 44,000 patients received blood and about 690,000 persons were treated as outpatients.

Medical evacuation

RVNAF place great importance on the rapid evacuation of wounded soldiers from the battlefield and timely treatment of their wounds. Although there have been occasional news accounts of abandoned wounded soldiers in the field, the total RVNAF's record of air medevac demonstrates both its dedication to and applications of the principle of rapid treatment of battle wounds and injuries. U.S. helicopter units were available to provide emergency medevac support, but RVNAF's use of U.S. units was minimal during the offensive. From April 1 through August 31, U.S. helicopters evacuated about 1,200 patients, while the VNAF evacuated about 31,600 patients.

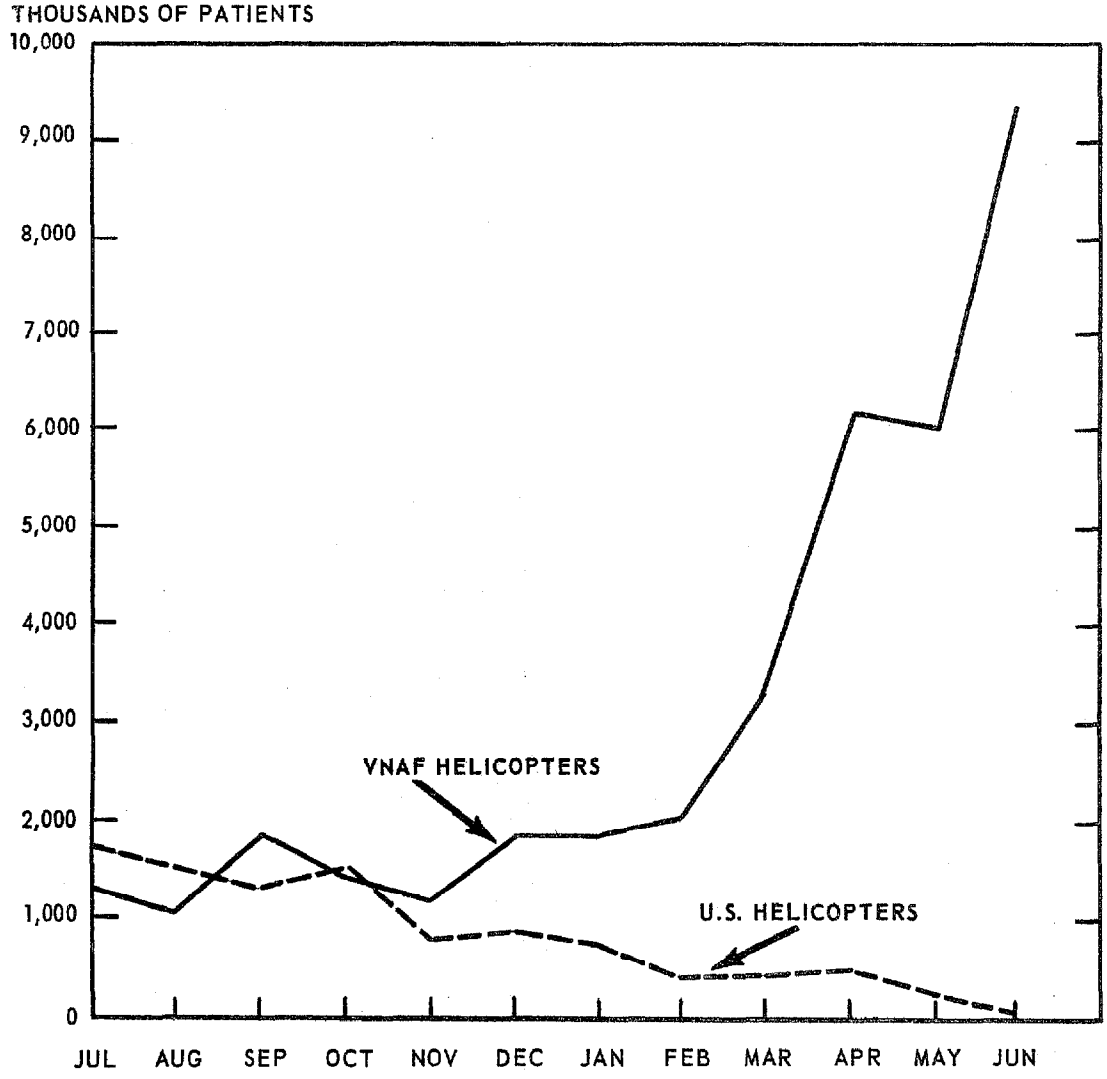
The chart on the following page shows the number of patients evacuated by U.S. and VNAF helicopters through June 10, 1972, when U.S. augmentation virtually ceased. As the need for medevac increased during the invasion, VNAF satisfied the requirement and the need for U.S. augmentation continued to decline.

Between March 1971 and January 1972, 83 VNAF helicopter pilots, 21 crew, and 28 medical specialists were trained by U.S. helicopter air ambulance units and were considered fully qualified. RVNAF now has the capability, using existing resources, to train additional crews in helicopter aeromedical evacuation and search and rescue procedures. Similar training is now a part of the RVNAF Military Medical School curriculum.

There had been negligible use of fixed-wing aircraft to carry patients until early April 1972 when VNAF moved significant numbers of patients wounded during the increased combat throughout Vietnam. The first known large scale fixed-wing evacuation occurred on April 5, 1972, when over 350 ambulatory and litter patients were evacuated from Hue to Da Nang using C-123 aircraft. Inflight medical crews were aboard each aircraft and the evacuation worked well. Subsequently, VNAF fixed-wing aircraft moved over 19,000 patients. This could be the impetus needed for refining the VNAF system and for establishing a formal fixed-wing aeromedical evacuation system.

VIETNAMESE ARMY PATIENTS EVACUATED BY HELICOPTER

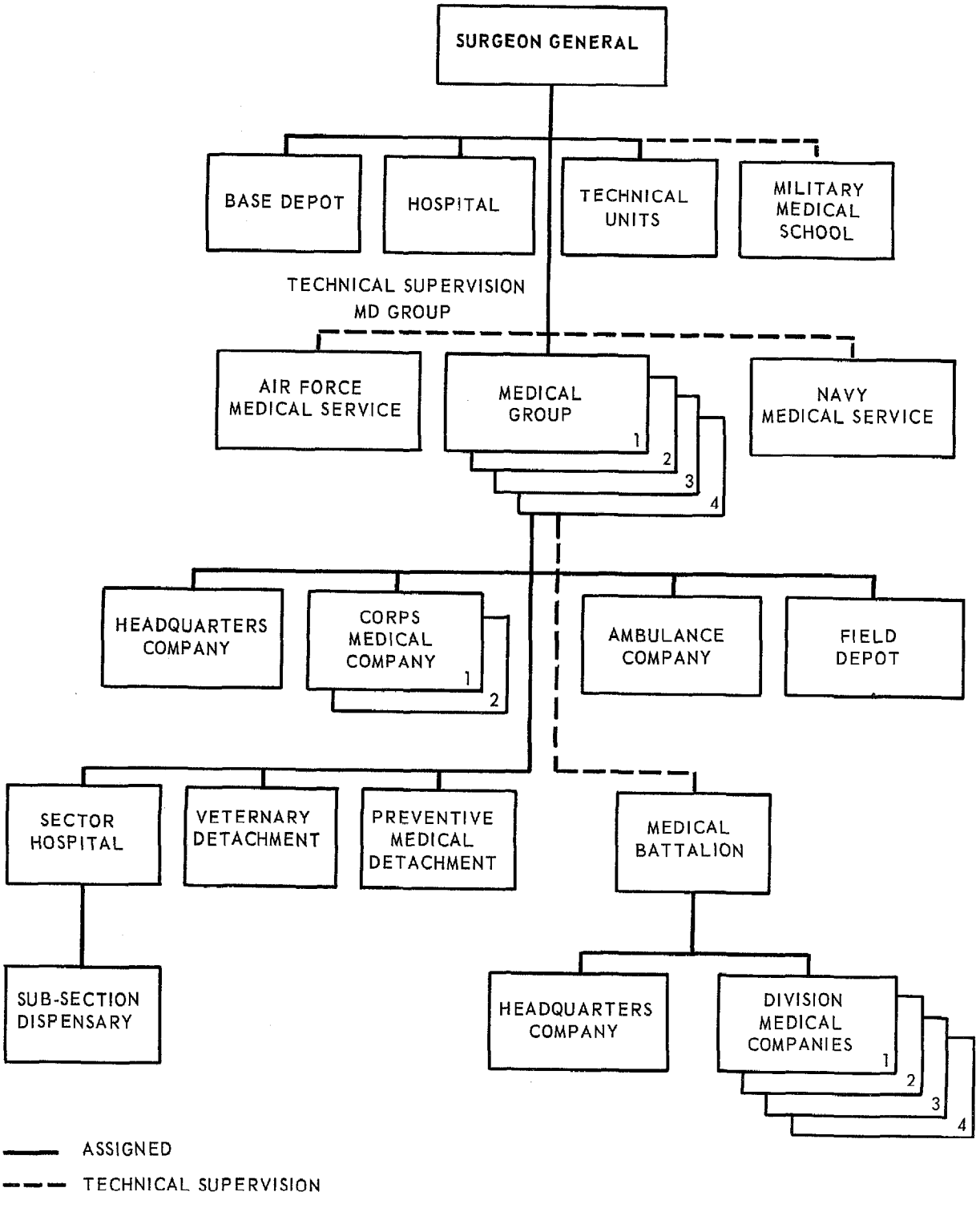
1 JULY 1971 – 10 JUNE 1972



THE MILITARY MEDICAL SYSTEM

Before March 23, 1972, there was a Surgeon General, under the general supervision of the Deputy Chief of Staff for Logistics, but commanders of the military tactical zones had control of their medical elements. But on March 23, all medical elements, with the exception of the Central Training Command's RVNAF Military Medical School, were placed in a unified medical service under control of the RVNAF Surgeon General. Assistant Surgeons General were designated for the Army, Navy, and the Air Force.

Each service has its own medical facilities, but the RVNAF Surgeon General manages all medical materiel and personnel. The chart below depicts the overall organization of the RVNAF medical service.



During the Vietnamization period about 25 U.S. facilities were transferred and over $2,000,000 was spent to construct new hospitals and to expand and rehabilitate existing facilities. All equipment needed by RVNAF was transferred also so that the facilities could be used immediately for patient care.

The higest level of RVNAF medical care is provided by the general hospitals located in the Saigon and Da Nang areas. Specialty hospitals include the tuberculosis hospital at Thu Duc and the paraplegic hospital at Vung Tau. Each military region has a convalescent center and both 600- and 400-bed station hospitals. Field hospitals located in each military region are not mobile, and, for all practical purposes, function as station hospitals.

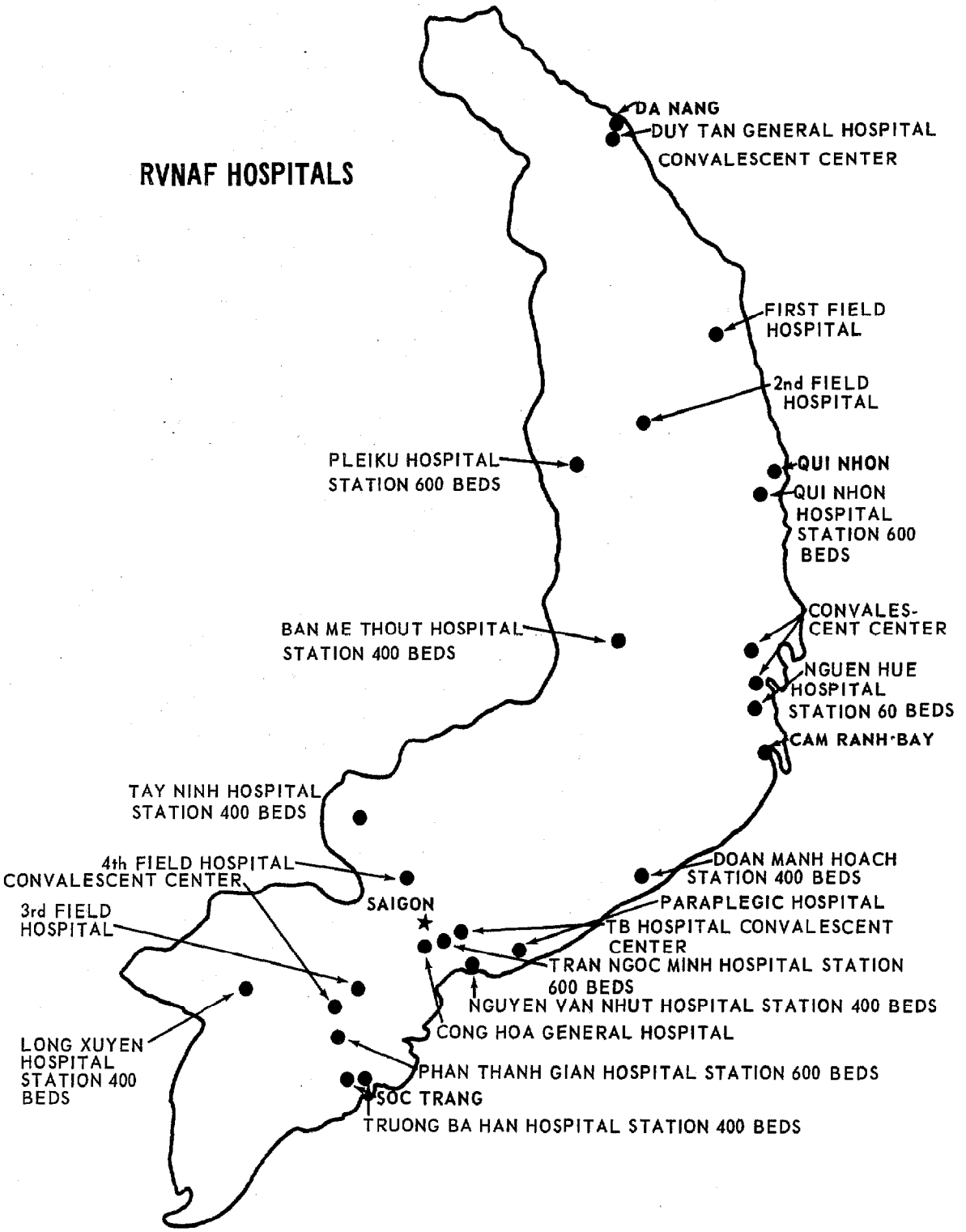
At the lowest level in the system are 193, 20-bed subsector dispensaries located in remote districts. The map on page 127 shows major RVNAF hospitals located throughout Vietnam.

VNAF operates a 50-bed hospital at Tan Son Nhut and nine 20-bed dispensaries throughout the country. Air medical divisions at VNAF bases provide medical support to VNAF personnel and dependents. They have a flight medical capability adequate to support assigned flying organizations. Inpatient and outpatient medical and dental care are provided to military personnel but only medical care to dependents.

On September 1, 1972, VNAF began operating a fully developed physiological training chamber. U.S. doctors say this accomplishment in physiological training points to VNAF's competence in aerospace medicine.

VNN operates a 100-bed Bach Dang Naval Hospital in Saigon and eight 20-bed dispensaries. There are 20-bed Navy dispensaries at the Naval Training Centers at Cam Ranh Bay and Nha Trang and a 20-bed Naval Dispensary at the Naval Shipyard in Saigon. There are also 35 sick bays providing emergency medical treatment support to VNN bases and stations.

The Marine Corps operates a 100-bed station hospital at Thu Duc to provide medical care for Marine Corps personnel and their dependents. The Vietnamese Marine Corps


RVNAF HOSPITALS
DA NANG
DUY TAN GENERAL HOSPITAL
CONVALESCENT CENTER
FIRST FIELD HOSPITAL
2nd FIELD HOSPITAL
PLEIKU HOSPITAL STATION 600 BEDS
QUI NHON
QUI NHON HOSPITAL STATION 600 BEDS
BAN ME THOUT HOSPITAL STATION 400 BEDS
CONVALES-CENT CENTER
NGUEN HUE HOSPITAL STATION 60 BEDS
CAM RANH BAY
TAY NINH HOSPITAL STATION 400 BEDS
4th FIELD HOSPITAL CONVALESCENT CENTER
DOAN MANH HOACH STATION 400 BEDS
SAIGON
PARAPLEGIC HOSPITAL
3rd FIELD HOSPITAL
TB HOSPITAL CONVALESCENT CENTER
TRAN NGOC MINH HOSPITAL STATION 600 BEDS
NGUYEN VAN NHUT HOSPITAL STATION 400 BEDS
CONG HOA GENERAL HOSPITAL
LONG XUYEN HOSPITAL STATION 400 BEDS
PHAN THANH GIAN HOSPITAL STATION 600 BEDS
SOC TRANG
TRUONG BA HAN HOSPITAL STATION 400 BEDS

operates 14 dispensaries of various sizes, including a 50-bed dispensary at Hue.

DEPOT SYSTEM

The RVNAF medical depot system consists of the 70th Medical Base Depot in Saigon and five field medical depots in Da Nang, Qui Nhon, Nha Trang, Can Tho, and Saigon. The field medical depots provide supplies for the military medical units and are in turn resupplied from the 70th Medical Base Depot. Needed stocks not available at the base depot are requisitioned from the U.S. Army Medical Materiel Agency, Pacific, in Okinawa.

In-country transportation of medical supplies is managed by the Movements Control Center of the Central Logistics Command. The 70th Medical Base Depot inventory of items is a manual system but is scheduled to be included in the RVNAF Automated Materiel Management System early in 1973. The Central Logistics Command estimates that the value of its medical inventory in September 1972 was about $27 million with over 5,000 different items.

MEDICAL AND DENTAL TRAINING

During 1968 and 1969 U.S. specialists were generally placed at local levels to provide medical care and to teach Vietnamese. Thereafter more formal training programs were established so that the trainees, in turn, could train their countrymen and evolve a self-sustaining program. Vietnamese personnel trained outside of the country augmented this activity. Internal medicine, general surgery, physiotherapy, and dentistry were emphasized.

Since 1958, 399 personnel have been sent out of the country for training in 24 fields of specialization for courses ranging in length from 2 months to university training of 2 years. Personnel have been trained in most of the medical and dental specialties and in administration and medical maintenance. Training out of country has now phased down to about half that of prior years and the Vietnamese training programs are reducing the RVNAF dependency on U.S. medical assistance.

Vietnamese physicians are now conducting 1-year courses at Cong Hoa General Hospital in such areas as anesthesiology,

general surgery and preventive medicine. Burn, recovery room, intensive care, and cardiac care units have recently been organized, and, according to U.S. military physicians in Vietnam, are functioning well.

A formal 4-year surgical residency program is being sponsored by the American Medical Association and U.S. Agency for International Development. This is the first training program in Vietnam to lead to a specialty certification. A heart surgery training program has also been started at Cong Hoa General Hospital and several successful operations have been performed.

The RVNAF Military Medical School from January 1, 1970 through September 30, 1972, trained almost 10,000 personnel in various categories of medical service. Orientation courses were provided to 1,556 newly commissioned physicians, dentists and pharmacists--all recent graduates of the Universities of Saigon and Hue.

The Cong Hoa General Hospital and the Central Medical Laboratory also play key roles in medical training. Through September 1972 Cong Hoa introduced 46 physicians and 103 enlisted specialists into training programs of various types. The laboratory has developed two 52-week courses in pathology, and 17 officers will have completed the training by the end of 1972.

U.S. military dentists have introduced training programs for RVNAF in oral surgery, repair of damaged oral and facial structures, and diseases of the gums. RVNAF oral surgeons and prosthodontists have been very successful with, and make extensive use of, bone and skin grafts in restoring the ability to eat and the appearance of individuals who have suffered head and neck wounds. They are also skillful at creating artificial substitutes for facial features which have been lost or damaged. U.S. medical officers have particular praise for Vietnamese fabrication of artificial eyes, the quality of which are considered the equivalent of the best produced in America.

THE BLOOD PROGRAM

The military hospitals in Vietnam have their own blood banks and the capability of collecting, processing, and storing whole blood. Requirements beyond their capability

are met by the Central Blood Bank in Saigon or its annexes in Da Nang, Nha Trang, and Can Tho.

The primary sources of blood donors are the various military training units. On the average 8,000 units of blood are collected every month. Some blood is used for making plasma.

As indicated on page 122 of this chapter, over 44,000 patients received blood from April 1 through August 31, 1972.

EYEGLASS MANUFACTURING

RVNAF was provided with the basic training and acquired fundamental skills necessary for making eyeglasses. In the spring of 1971 the equipment necessary to open a facility for making eyeglasses was obtained and installed at the 70th Medical Base Depot. During the first 2 weeks of operations, 200 pairs of eyeglasses were made and issued to RVNAF personnel. Since that time approximately 450 pairs have been produced each month.

MILITARY-CIVILIAN MEDICINE INTERRELATED

The military and civilian medical sectors in Vietnam are so intertwined and interrelated that one complements the other at every level and together they influence the total health care of the nation. The Ministry of Health and Ministry of Defense jointly staff facilities and medical civic action programs and the training provided to health professionals and nonprofessionals during their military service enables them to better serve the military and civilian medical sectors.

A further factor in the close relationship between the Vietnamese civilian and military health sectors is the actual supply of Vietnamese physicians. There are 2,036 Vietnamese physicians distributed as follows:

Ministry of Defense	1,300
Ministry of Health	436
Ministry of Education	136
Other agencies	14
Not affiliated with the Government	150
	2,036

Short supply, coupled with the plain economies of low RVNAF pay, force most military health professionals and some non-professionals to engage in private practice. Thus, they provide a service to the public which would otherwise be unavailable.

Civilian medical service

To assist the civilian ministry of health in developing the nation's health services, MACV and the U.S. Agency for International Development developed five programs. U.S. medical units became direct participants through the Civilian War Casualty Program, which provided hospitalization and evacuation, and through the Medical Civic Action Program which provided medical and dental assistance to the Vietnamese people. The remaining three programs, were directed toward a more advisory and logistical role. These programs were (1) the Joint Utilization Program, through which the ministry of Health and Ministry of Defense combined certain resources and jointly used medical facilities to support both the military and civilian population, (2) the Military Provincial Health Assistance Program, and (3) realignment of the logistical programs of the Agency for International Development and DOD.

VNAF helicopters evacuating wounded refugees

RVNAF medical team treating Vietnamese civilians

Military Provincial Health Assistance Program

The increase in military medical resources accompanied the buildup of U.S. combat troops in 1965 and was accompanied by U.S. efforts to improve health conditions of Vietnamese civilians. At the direction of the Secretary of Defense, the U.S. services initiated the Military Provincial Health Assistance Program to aid the civilian health effort. Its objectives were to provide direct medical care and health services to Vietnamese civilians and to work with Vietnamese medical and health personnel to augment, develop, and expand Vietnamese capabilities in clinical health care and public health programs. The contributions have been significant as the program originally bridged the gap created by the Government of Vietnam general mobilization decree of 1965. Approximately 82 percent of all eligible graduating professional, paramedical, and ancillary trained personnel in Vietnam were drafted into RVNAF.

Mobile medical teams furnished by the U.S. Armed Forces were used to accomplish the program objectives. Specific objectives were to develop the medical and surgical skills of Vietnamese physicians, train hospital staff members, and improve preventive medicine and public health activities in districts, villages, and hamlets.

The increasing annual school output of professional and auxiliary Vietnamese health workers, trained in U.S. supported schools and training centers, permitted the gradual phasing out of U.S. involvement with a corresponding increase in the levels of Ministry of Health responsibility. From 1964 to 1971 the number of new graduates of Vietnamese medical schools more than doubled. During 1971 the number of health personnel trained in certain other health disciplines was four to five times the number trained in 1964.

The following table shows the number of graduates of selected training programs for the years 1964 and 1971:

Category	1964	1971
Physician	122	226
Dentist	14	45
Pharmacist	57	270
Nurse technician (note a)	86	88
Assistant nurse (note b)	126	629
National midwife (note a)	64	77
Rural midwife (note b)	340	396

[a]3-year training program

[b]1-year training program

Since mid 1969 the ARVN medical corps has detached to full-time duty in civilian hospitals and health facilities over 2,000 military medical personnel, including over 200 physicians. During 1972 the Vietnamese plan to assign an additional 193 military physicians and other supporting health care personnel to district medical care facilties. More indigenous personnel were assigned to care for Vietnamese civilian patients than were provided by the U.S. under the Military Provincial Health Assistance Program.

Joint Utilization Program

The Joint Utilization Program was developed when both Ministries of Health and Defense determined that they could mutually improve their medical services by combining resources rather than by following individual construction and expansion programs. The plan approved in 1969, provided for merging 26 civilian hospitals with 26 military sector hospitals and for intergrating 193 civilian district and military subsector dispensaries.

Funding support for the program was provided by the U.S. Agency for International Development and DOD. Ministry of Defense assisted initially by staffing participating hospitals and dispensaries and by providing some military equipment.

The original plan called for 7,300 hospital beds of which 5,970 were available in existing facilities at the start of the program. By September 30, 1972, there were 6,486 beds in the Joint Utilization system.

About 70 to 80 percent of the patients admitted to these hospitals have been civilians. During calendar year 1971 military personnel accounted for 29.6 percent of the total admissions. The bed occupancy ratio represents approximately two civilians for each military patient.

Presently, the RVNAF Surgeon General has 1,797 personnel assigned to assist in staffing the 26 hospitals. These personnel comprise 42.6 percent of the total staff of the hospitals and more than 70 percent of their professional staff (physicians, dentists, and pharmacists).

The district (subsector) dispensaries are used primarily in support of the local population which includes civilians and the territorial (RF/PF) forces as well as nearby regular military medical units. Dispensaries are also authorized beds with some units having the capacity to accommodate up to 20 patients. The area of heaviest workolad is maternity care. However, under the program, dispensaries also have the additional responsibility for public health activities in the respective areas. During the time of increased ememy troop activity, the RF/PF personnel responsible for the hamlet and village security become the source of the dispensaries' more urgent workload.

The major contribution of the program is that it provides country-wide medical service which benefits both the military and civilian populations. Of the 245 districts in Vietnam, 193 now have a Joint Utilization medical facility. The program is unique because it provides national health care down to the district level through joint utilization of personnel and facilities in areas where previously medical care was nonexistent or limited.

Civilian War Casualty Program

Before 1966 the Ministry of Health was responsible for the treatment of civilian war casualties. But, fighting increased causing a civilian war casualty workload beyond its capability. In 1967 the Civilian War Casualty Program was approved by DOD as a U.S. program to supplement those capabilities and DOD directed the joint utilization of 1,100 U.S. hospital beds for both civilian war casualties and U.S. military patients. With the phasedown of U.S. forces and transfer of hospital facilities to RVNAF, direct U.S. participation in this program has been discontinued.

Medical Civic Action Program

The Medical Civic Action Program in Vietnam initiated in 1963 as part of a country-wide civic action program, was to establish and maintain a continuing spirit of mutual respect and cooperation between the RVNAF and the civilian population. This was to be accomplished through the use of Vietnamese military and paramilitary forces. Their objectives were to convince the people in the remote areas that the Government was vitally interested in their welfare, to encourage the Vietnamese public health agencies to cooperate with and include civic action in their rural health endeavors, and to provide instruction to village health workers. U.S. personnel were assigned to assist the Vietnamese medical personnel in initiating this program. Phaseout of U.S. participation was to be projected on the assumption that the RVNAF teams were capable of assuming full responsibility for executing the program. By 1965, U.S. participants had phased out and all Medical Civic Action Program activities were conducted by RVNAF.

As the village and hamlet public health programs of the Vietnam Ministry of Health increased, these activities decreased. However, from 1966 through the first 6 months of 1971, the last period for which statistics are available, over 30 million patients were treated through this program.

Use of Vietnamese civilian personnel in U.S. medical facilities

Vietnamese civilian personnel have been employed in every area of U.S. Armed Forces medical facilities in Vietnam. They have served as registered nurses, nurses aides, technicians, orderlies, secretaries, clerks, janitors, and maintenance personnel. In performing these jobs they have been involved in the operation of wards, laboratories, clinics, operating rooms, emergency rooms, and administrative support activities. Those working in a pharmacy, radiology services, food services, dental clinics, and recovery rooms have been required to meet and maintain the high standards demanded of all health workers in the U.S. Armed Forces. In many cases these standards were different from those under which they had previously worked.

By learning new standards and new methods of providing health care, these health care professionals and nonprofessionals are prepared to provide a higher level of health care to RVNAF and the civilian population than was previously possible. Many of those trained in U.S. facilities or influenced by working in a U.S. facility are now working for either the Vietnamese military or civilian health sector. As a result their employment in U.S. facilities is now having, and will continue to have, a direct effect on improving the overall health care in Vietnam.

CHAPTER 7

COMMUNICATIONS-ELECTRONICS

BACKGROUND

By July 1969 the total U.S. investment of fixed (non-tactical) communications-electronics (C-E) facilities in Vietnam was estimated to be about $350 million.

The facilities provided for four major activities or functions:

(1) The Vietnam-wide fixed telecommunications system. This was the Integrated Communications System (ICS), chiefly under U.S. Army management.

(2) The U.S. Air Force aircraft control and warning network, navigational aids, and air traffic control system at various locations, including airfields, such as Tan Son Nhut and DaNang.

(3) The U.S. Navy coastal surveillance radar system, consisting of radar sites and control centers and its communications station.

(4) The logistic depots, repair shops, and training facilities that supported the above facilities.

In September 1965 the Army awarded a contract for the fixed radio portion of the ICS. There were numerous additions and changes to the contract in its first year owing to the accelerated U.S. buildup. The contractor (Page Communications Engineers) provided most of the initial operation and maintenance (O&M) of ICS. Through July 1970 the Page contract totaled $193 million, of which about $24 million had been for O&M in fiscal years 1967 to 1970. In October 1970 the Federal Electric Corporation (ITT) was awarded O&M for ICS.

Beginning in 1968 the U.S. Army began to replace contractor personnel with military personnel. When military personnel began performing a greater share of the O&M for ICS, O&M contract costs steadily decreased as shown by the following chart.

Fiscal year	O&M costs (000 omitted)
1967	$ 5,243
1968	8,354
1969	6,329
1970	4,076[a]
Total	$24,002

[a] Included some non-ICS equipment

When the Army was forced to again hire contractor personnel because of the U.S. withdrawal, O&M costs increased. For example, in calendar year 1972 contractor O&M cost for ICS was about $20 million, or five times the fiscal year 1970 costs.

It is estimated that the investment cost of all Army-managed C-E facilities that have been, or will be, transferred to RVNAF was about $170 million. This includes residual ICS facilities, dial telephone exchanges and automatic telephone switching centers, post/base facilities, schools, and signal logistic facilities.

The Air Force aircraft control and warning network, navigational aids, air traffic control facilities, and base communications were installed by the Air Force Ground Electronics Engineering and Installation Agency. Operations and maintenance was performed by U.S. Air Force personnel prior to the Vietnamization program. The cost of these facilities was estimated at about $71 million, of which about $52 million was to be transferred to RVNAF as shown by the chart below:

Type of facility	Cost of facility	Cost of facilities to be transferred
	(millions)	
Aircraft control and warning radars	$13.8	$11.3
Navigational aids	28.2	12.4
Coastal cable and cable heads	28.75	28.75
Total	$70.75	$52.45

The navy coastal radar surveillance and control system consists of radar sites and control centers extending along the entire coast of Vietnam. These facilities were installed by U.S. Navy personnel beginning in March 1971 and completed in April 1972. The investment costs were estimated at about $12 million. The radars were surplus Marine Corps assets that the U.S. Navy rehabilitated for this project. The investment cost of the Navy communications station was about $18 million.

Logistic support of these facilities was provided to the extent practicable, by the three services through depots and repair facilities set up by them. Because of the non-standard nature of much of the contractor-installed C-E equipment, the Army established an Area Maintenance and Supply Facility to provide in-country support. The Area Maintenance and Supply Facility provided general and limited depot logistic support to designated C-E systems in Vietnam, to include ICS, dial exchanges, autodin, and selected tactical equipment.

Other logistic support generally followed Army, Navy, and Air Force channels and entities established for support of their respective tactical and fixed assets.

VIETNAMIZATION, PLANNING AND SCHEDULING

The master plan for the Vietnamization of all fixed C-E facilities was the Communications-Electronics Improvement and Modernization Program. This program which was developed by MACV was approved by the Joint Chiefs of Staff in June 1970. The most recent MACV revision was made on May 26, 1972.

Initially the program evisioned a large reduction of the ICS and other C-E facilities which would pare them to very austere capabilities. RVNAF training and takeover of the residual facilities was not scheduled to be completed until 1975. It also was envisioned that the Vietnamese would create an autonomous civilian organization called the Vietnam Telecommunications Organization which would manage and operate the residual communications to serve all governmental and national needs.

RVNAF specialist works telephone exchange switchboard

By March 1971, the Vietnamese had not approved the legislation necessary to create the Vietnam Telecommunications Organization so MACV, with the Joint Chiefs of Staff's approval, redirected its efforts toward developing an RVNAF single integrated military telecommunications system. This system was and is, for the interim at least, to be managed by the RVNAF Communications Management Agency, which performs functions similar to the U.S. Defense Communications Agency.

The turnover of C-E equipment created a tremendous impact on the training of RVNAF personnel. It became apparent that contractor support for communications, in nearly all areas--operations, maintenance, training, logistics, engineering, and management--would need to be increased pending RVNAF capabilities to assume these functions. Contractor support will gradually diminish over the next several years as the Vietnamese training will increase their capability to assume responsibility for the systems.

Facilities originally costing about $252 million have been transferred to the South Vietnamese, and 75 percent of the technical training requirement had been met.

We were advised that the RVNAF personnel are trained generally to the same standards and skill levels as are U.S. military personnel. By October 1972 all in-country RVNAF C-E courses were being taught by RVNAF instructors.

RETROGRADE PROGRAM

Some of the C-E equipment that is not to be transferred to the Vietnamese has been removed from Vietnam. The table below shows the status of the retrograde program as of the time of our study.

Items	Status of retrograde actions (in percentages)		
	Completed	In process	Scheduled
Multichannel radio systems	89	-	11
Dial telephone exchanges	93	7	-
Teletype centers	92	-	8
Autodin switches	50	50	-
Autodin terminals	69	-	31
Automatic Secure Voice Communication	48	-	52
Satellite terminals	50	-	50

Most of the equipment scheduled to be retrograded are still needed in support of U.S. operations in Vietnam.

THE OUTLOOK

The Vietnamization of communications, particularly since mid-1971, has proceeded at a pace and with a degree of success thought impossible by many of those who were earlier familiar with the problem. For a country devoid of a technological base, and in spite of difficult language barriers, RVNAF has demonstrated the ability to quickly learn and apply technical skills at levels of proficiency generally equal to the stringent standards of their U.S. military counterparts. Although this training process was not complete by the end of August 1972, 75 percent of the total requirement had been fulfilled with the prospect for completion in the near future.

RVNAF will require contractor assistance in certain skill areas though the scale of such assistance should progressively decline. The most notable RVNAF shortfall is in senior and middle management and in engineering skills. These shortfalls can be eased or overcome with time, but other highly specialized requirements will likely persist.

Much of the electronic equipment that was provided to the Vietnamese probably will require replacement parts for years to come. An end to hostilities would greatly lessen replacement parts dependency in the military area but, in our opinion, the Vietnamese dependency upon the fixed C-E facilities, for such matters as education, trade, safety of travel, and for nation rebuilding likely will not diminish, and could expand.

CHAPTER 8

REDEPLOYMENT OF U.S. FORCES AND DISPOSITION OF EQUIPMENT

REDEPLOYMENT OF U.S. FORCES

In June 1969 the President of the United States recommended, on the basis of improvements within RVNAF, that South Vietnamese forces begin to replace U.S. combat forces. The initial withdrawal of 25,000 U.S. personnel was to be completed by August 30. The President stated that further withdrawals would be made on the basis of continued improvements within RVNAF, of the status of negotiations in Paris, and of changes in the military situation in Southeast Asia. Since the initial withdrawal, 13 additional redeployment increments have been completed. The redeployment increments consisted of the following total forces.

Increment	Dates	Forces redeployed	Forces remaining
I	July to Aug. 1969	25,000	519,000
II	Sept. to Dec. 1969	35,000	484,000
III	Jan. to Apr. 1970	50,000	434,000
IV	July to Oct. 1970	50,000	384,000
V	Nov. to Dec. 1970	40,000	344,000
VI	Jan. to Apr. 1971	60,000	284,000
VII	May to June 1971	29,300	254,700
VIII	July to Aug. 1971	28,700	226,000
IX	Sept. to Nov. 1971	42,000	184,000
X	Dec. to Jan. 1972	45,000	139,000
XI	Feb. to Apr. 1972	70,000	69,000
XII	May to June 1972	20,000	49,000
XIII	July to Sept. 1972	10,000	39,000
XIV	Oct. to Nov. 1972	12,000	27,000

The reduction of U.S. forces from 544,000 in June 1969 to 27,000 in December 1972 included the withdrawal not only of U.S. personnel but their equipment; concurrently, U.S. forces were improving RVNAF capabilities to minimize the impact of the U.S. redeployments.

DISPOSITION OF DEPARTING UNITS' EQUIPMENT

The disposition of departing units' equipment varied by service. Generally equipment turned in by departing Army units was:

--Sent to another Army unit in Vietnam needing the equipment.

--Transferred to RVNAF to meet identified needs.

--Sent to Army installations elsewhere, as instructed by the Department of the Army in Washington or by Headquarters, U.S. Army, Pacific.

If not handled as above, the equipment was either placed in depots in Vietnam and retained to meet future requirements or screened for utilization in accordance with Army procedures for handling excesses. Useful equipment needing repair was sent to a maintenance facility and then redistributed as outlined above.

Marine Corps units redeploying to locations in the western Pacific retained their authorized equipment to maintain operational readiness. The equipment of Marine units being redeployed to other areas or being deactivated was made available for redistribution to RVNAF before the units left Vietnam.

Since 1968 the Navy has had a program aimed at turning over its facilities and vessels in Vietnam to the Vietnamese. The reduction in Navy strength usually did not make equipment available for redistribution because the Vietnamese assumed responsibility for the equipment and operation as the U.S. Navy personnel left.

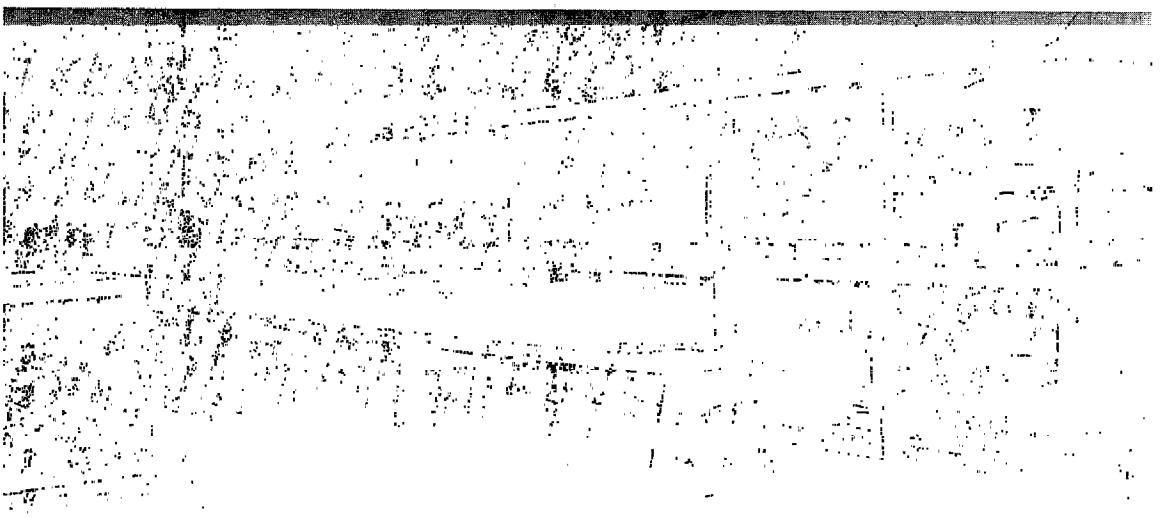
The Air Force's redeploying units generally retained their aircraft to maintain operational readiness. When aircraft and other equipment were transferred to the Vietnamese, however, the equipment of a U.S. unit was turned over to an equivalent Vietnamese unit.

Neither the Air Force nor Navy was faced with the large problem of piecemeal redistribution of equipment that was handled by the Army and, to a lesser extent, by the Marine Corps.

In July 1971 the Army determined that 650,000 short tons of materiel would be retrograded from Vietnam by December 1972. By June 30, 1972, 612,400 short tons had been shipped.

As of September 30, 1972, the Army estimated that only 31,400 short tons of equipment remained in Vietnam. This materiel is mostly Government-owned equipment held by contractors and scrap destined to be sold offshore through property disposal channels.

However, it is very likely that property disposal activities will continue. All military equipment supplied to RVNAF must be returned to U.S. custody when it is no longer useful to RVNAF. As a result millions of tons of equipment in Vietnam will still need to be disposed of through U.S. channels.



Property disposal breakdown and processing area

Scrap iron and aluminum at property disposal yard

In our report to the Congress, entitled "Second Review of Phasedown of U.S. Military Activities in Vietnam" (B-171579) dated August 9, 1971, we identified areas in which equipment could be redistributed more effectively. These areas were discussed with appropriate officials in DOD and the military services. In each instance prompt corrective action was taken or promised. We did not evaluate the effectiveness of DOD's actions.

PROPERTY DISPOSAL OPERATIONS

In 1969 RVNAF did not operate an activity to dispose of scrap and excess property originally provided by the United States. But the Vietnamese did operate collection and classification facilities and cannibalized and salvaged usable materiels from nonreparable military materiel. Residual scrap and excess was turned over to the United States for disposal.

The U.S. Army Vietnam Property Disposal Agency is responsible for managing the Defense disposal program in Vietnam and for insuring that all materiel is disposed of in a manner that will obtain maximum utilization through redistribution or transfer to authorized recipients and the highest dollar return from sales. During fiscal years 1969 to 1972, U.S. property disposal facilities in Vietnam processed about $2 billion worth of materiel.

In June 1972 we advised the Secretary of Defense that we had examined property disposal management at several locations. We advised the secretary that the Army has had difficulty in safeguarding and accounting for the materiel being turned in for disposal in Vietnam and that large quantities of usable materiel had been written off the records because it could not be located. In fiscal year 1971 the disposal facilities wrote off about $10.3 million of such materiel. We found that substantial additional quantities of materiel were missing. For example, at one facility, we could not locate property with a book value of $8.1 million which the records showed as being on hand.

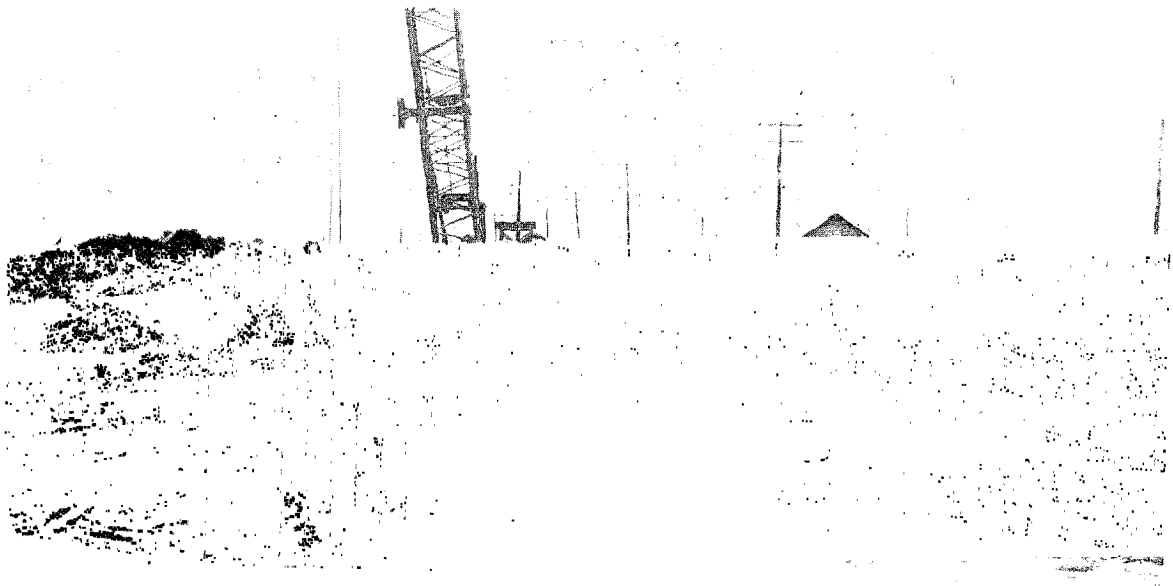
Property disposal officials showed us items to be demilitarized which were located near the perimeter of the facility adjacent to a road. The location of the items made them readily accessible for pilferage. The picture on page 149 shows gun tubes and other items located in the area awaiting demilitarization.

In order to improve security, these items were being relocated and secured in the interior of the disposal complex. The picture on page 149 shows gun tubes and armored personnel carriers awaiting demilitarization in the new, protected enclosure.

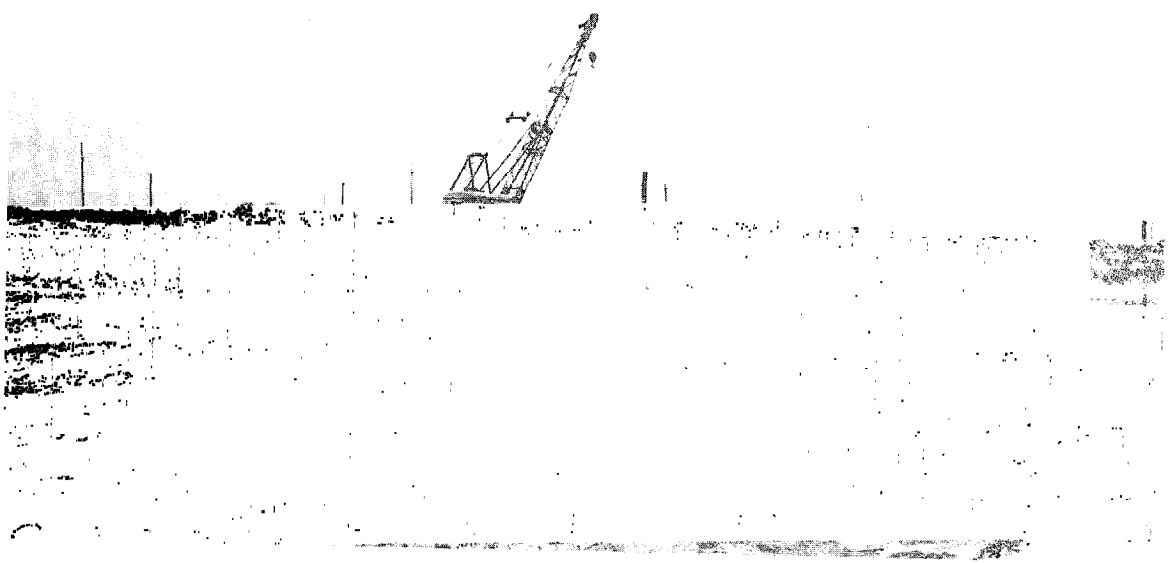
We did not examine into the disposal or demilitarization procedures. These matters will be the subject of a separate GAO review.

In May 1972 the Secretary of Defense approved a program designed to provide economic assistance to Vietnam by transferring excess scrap to the Vietnamese Government for sale by them. Proceeds from the sales were to revert to the Vietnamese Treasury solely for military use.

Scrap valued at $13.3 million was expected to be transferred to Vietnam in fiscal year 1973. The Department of the Army was to assist the Vietnamese to enable it to establish a capability to receive, segregate, process, and merchandise scrap; to inspect existing stockpiles of scrap; to develop procedures to insure an orderly transfer of scrap; and to transfer scrap to the Vietnamese through a series of no-cost contracts between the United States and the designated Vietnamese agency. All agreements and contracts include clauses



Gun tubes at unsecured demilitarization area

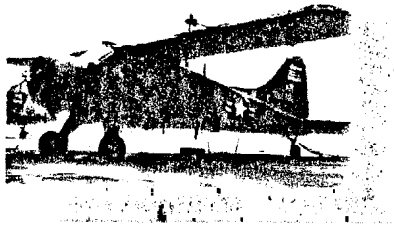


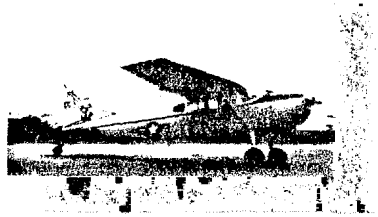
Gun tubes and armored personnel carriers awaiting demilitarization at new protected enclosure

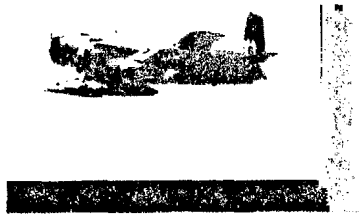
that clearly establish Vietnamese responsibilities for demilitarization and security of trade control requirements.

The transfer of scrap to the Vietnamese represents a substantial step forward in the Vietnamization of both the logistic and economic fronts. It provides an opportunity for the Vietnamese to build a qualified property disposal capability while providing assistance to alleviate deficiencies in the piaster budget for support of RVNAF.

VIETNAMESE AIR FORCE


U-6


U-17

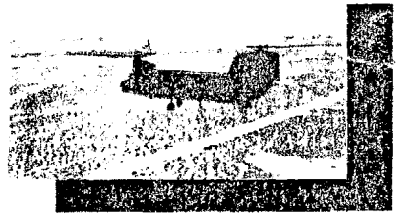

A-1

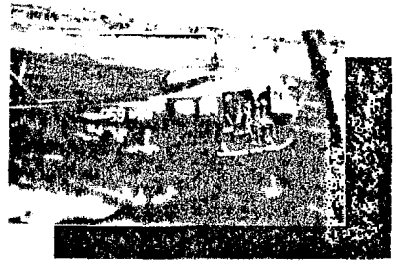

A-37

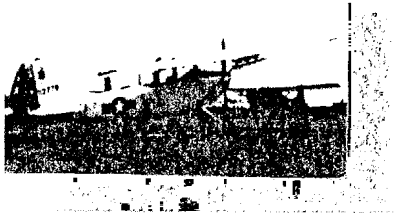

C-7

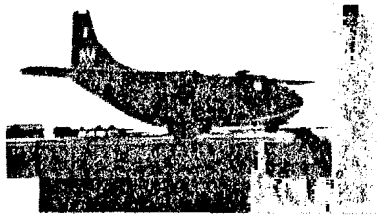

C-47

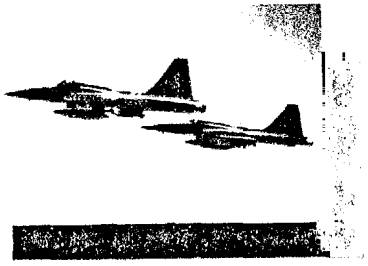

C-119

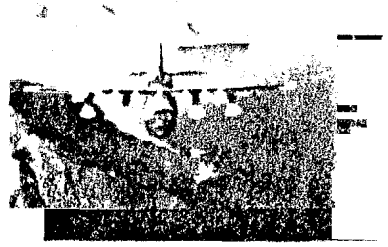

CH-47


UH-1


O-1


C-123


F-5A


C-130

Copies of this report are available from the U. S. General Accounting Office, Room 6417, 441 G Street, N W., Washington, D.C., 20548.

Copies are provided without charge to Members of Congress, congressional committee staff members, Government officials, members of the press, college libraries, faculty members and students. The price to the general public is $1.00 a copy. Orders should be accompanied by cash or check.