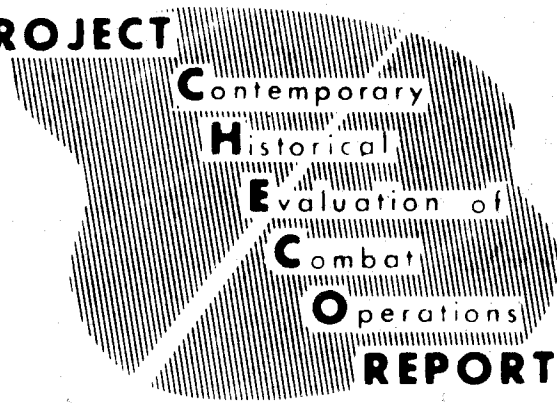


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INTERDICTION IN SEA 1965-1966

25 May 1967

HQ PACAF

Directorate, Tactical Evaluation
CHECO Division

Prepared by: Captain Melvin F. Porter
S.E. Asia Team

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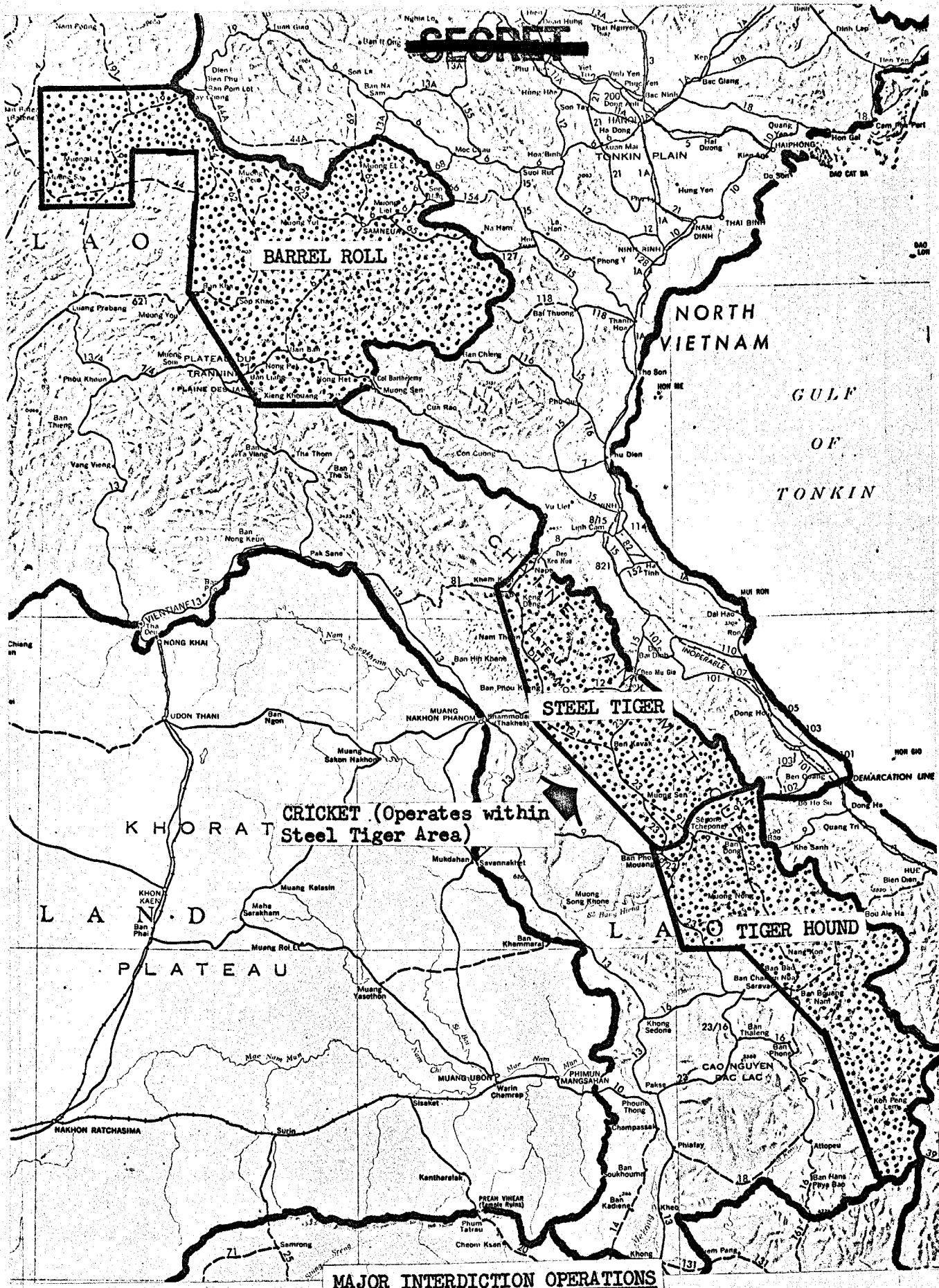
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FOREWORD

The following report examines the role of the U.S. Air Force in the interdiction campaign in Southeast Asia from its beginning in December 1964 through the early months of 1967. From the initial operations, involving few aircraft but much discussion, a series of ever-expanding programs were undertaken which, by spring of 1967, had grown into a concerted effort to inhibit enemy movement along the length of Laos and across the breadth of North Vietnam. Individual programs making up the overall interdiction effort have been reported in greater detail in separate CHECO studies (i.e., Tiger Hound, Night Interdiction in Southeast Asia, Tally Ho, and The War in the DMZ). This study outlines their relationship to each other and to the total campaign, and introduces other programs involved in the overall interdiction effort for Southeast Asia.

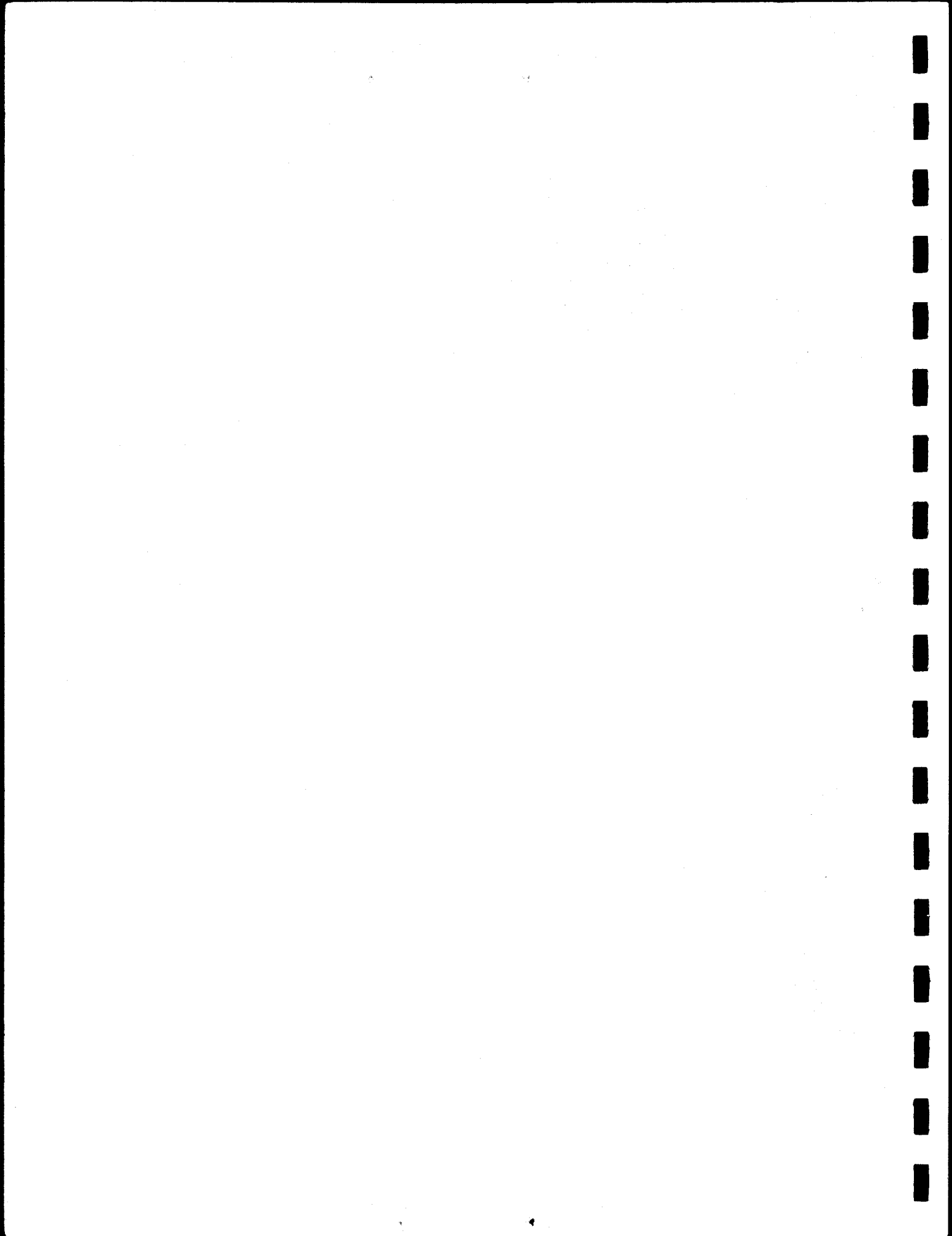
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MAJOR INTERDICTION OPERATIONS

Fig. 1

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TABLE OF CONTENTS

	<u>PAGE</u>
FOREWORD.....	iv
<u>CHAPTER I</u> Inception - 1964 --- Expansion 1965.....	1
I Introduction.....	1
II The Situation in 1964.....	2
III Barrel Roll.....	5
IV The Ban Ken Bridge.....	9
V Night Interdiction.....	11
VI Choke Point Concept.....	15
VII Steel Tiger.....	17
VIII The Routes.....	19
IX Restrictions of Operations.....	22
X Ineffectiveness of the Early Effort.....	25
XI Rolling Thunder Interdiction.....	28
XII The Thanh Hoa Bridge.....	30
XIII Expanding the Program.....	32
<u>CHAPTER II</u> The Integrated Interdiction Concept.....	39
I The Enemy Buildup.....	39
II Tiger Hound.....	43
III Cricket.....	51
IV Gate Guard And Tally Ho.....	59
V Summary.....	69

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FOOTNOTES

	<u>PAGE</u>
Chapter I.....	72
Chapter II.....	77

FIGURES

Follows
Page No.

Fig. 1, Major Interdiction Operations.....	iv
Fig. 2, Convoy Strike, Laos.....	18
Fig. 3, Communist Supply Routes.....	20
Fig. 4, Activity in Northern Tiger Hound.....	50
Figs. 5-6, Truck Park Strike.....	54
Fig. 7, Gate Guard Operational Area.....	60
Fig. 8, Tally Ho Operational Area.....	64
Fig. 9, Monthly Total of Vehicles Dest/Dmgd, Laos.....	68

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CHAPTER I

INCEPTION - 1964 ---- EXPANSION - 1965

I. Introduction

Of all its roles in the prosecution of the war in Southeast Asia, perhaps the most frustrating for the Air Force to define, defend, or judge - in terms of hard and fast effectiveness - was the role of interdiction. Since the first programmed interdiction strike of December, 1964, through the opening months of 1967, a staggering amount of sorties, ordnance and time had been spent in the overall interdiction program, and yet supplies and men continued to be infiltrated into South Vietnam over a complex network of enemy lines of communication. Opponents to the interdiction concept pointed to this as a prima facie denial of its effectiveness and urged that sorties allotted to interdiction programs be channeled back into close air support or direct air support of troops in South Vietnam. Proponents pressed for an increased interdiction program of even more latitude, citing confirmed "mountains" of supplies, ordnance, POL and enemy troops that failed to reach the battleground as ample proof of its worth; and further, arguing that the increased effort, time and men that Hanoi had to commit to keeping their LOCs open was alone worth the weight of the interdiction effort.

In the minds of some, the term "interdiction" lost specific meaning when it would be called for at the very gates of the battlefield - "... this is where the enemy is going to use his force next; this is where we

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want it interdicted." Others would call this direct air support. Some would ask for interdiction "at the source of supplies, before they get into the system." To others this would constitute strategic bombing.

Those convinced of the worth of interdiction brought out the classic example of Operation STRANGLE, the throttling of German supply lines in Italy in 1944 and 1945, as proof-positive of what interdiction could accomplish in drying up an enemy's logistics base. Those who doubted pointed out that this was not Italy, with its clearly defined road system; the enemy was not Germany, with its massed armies and heavy, road-bound equipment; and that any interdiction program directed against the sprawling jungle canopy of Southeast Asia was doomed to failure.

While none of these categorically opposite viewpoints was borne out in the first years of interdiction effort, it was against this background of conflicting opinion, amidst a welter of political constraints, and under the cloud of uncertainty as to just what could be accomplished, that the first interdiction program started.

II. The Situation in 1964

Officially, the traditional infiltration routes into and through Laos had been subject of U.S. military interest since May, 1964, when the Pathet Lao gave up any pretense of a tripartite coalition and attacked Neutralist forces on the Plaines des Jarres. ^{1/} On the 19th of that month, the USAF flew its first of a continuing series of photo reconnaissance flights (Yankee Team), one of whose objectives was to "substantiate, if possible,

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the extent and scope of war material, troops and resources being moved from the DRV via Laos into RVN." ^{2/} This program saw the first use of USAF jet firepower in Southeast Asia when eight F-100s struck antiaircraft positions at Xieng Khaouang on 9 June, 1964, in reprisal for the shoot-^{3/} down of two Navy reconnaissance and escort airplanes a few days earlier. By early July, as a result of photo intelligence generated by Yankee Team reconnaissance, there were discussions of other U.S. air operations, primarily combat strikes and interdiction campaigns, in Laos. One project concerned armed recce along Laotian Route 7, one of the Pathet Lao's and North Vietnamese' main infiltration routes in the northeast corner of Laos, and another in regard to night interdiction efforts along Routes 7, 71, 23, 9, 12, 121, and 8, a network which spanned Laos from the north down through the panhandle to the Cambodian border. ^{4/} Although these plans were not followed through at the time, evidence continued to mount showing increased enemy logistics flow and, in November, the Joint Chiefs of Staff were moved to request comments from CINCPAC as to possible courses of action. The Commander in Chief of Pacific Forces recommended air attacks on infiltration routes and targets in Laos as the first step in a systematic and gradual increase of military pressure against North Vietnam and as a method of severing these vital lines of enemy communications. ^{5/}

There were some complications needing resolution before any U.S. strikes could take place. Chief among these were Laotian approval, where the strikes would originate (e.g. from Thai bases, RVN bases or carriers), and who would control them. Ambassador Graham A. Martin in Bangkok had already elicited permission from Thai Defense Minister, Marshal Dawee,

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to use Thai-based USAF aircraft for photo reconnaissance, search and rescue, armed escort for both Yankee Team and SAR forces, with approval for hot pursuit across surrounding borders in the event of enemy incursion into Thai airspace, and total commitment in the event of direct Chinese Communist intervention. Dawee, however, did not place a stamp of approval upon USAF offensive strikes being launched from Thai soil and, until he did, any strikes in Laos would have to be carried out from carrier-based or South Vietnam-based aircraft. ^{6/}

The question of Laotian approval was resolved surprisingly easily, although with the inevitable strings attached. The Ambassador to Laos, William E. Sullivan, found Prince Souvanna Phouma quite willing to endorse U.S. combat air operations in Laos; however, there must be no public admission that the new air operation was anything other than aerial reconnaissance conducted at the request of the Royal Laotian Government. ^{7/} Souvanna was in fact quite eager for American assistance in the face of a deteriorating military situation against the Pathet Lao but, at the same time, he did not wish to announce to the world he had to ask for outright help from the U.S., nor to give propaganda fodder to the communists. In addition, in order to hold his shaky troika together, Souvanna could scarcely give evidence to the ICC (International Control Commission) of his own abrogation of the 1962 Geneva Accords upon which his position rested, regardless of the previous and continuing violations by the communists themselves.

Souvanna Phouma's agreement opened the door for the first true

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program of combat air operations outside South Vietnam and, on 11 December, the JCS alerted CINCPAC to a plan for two missions of four aircraft each against prebriefed targets, and for armed reconnaissance in the Laotian corridor. A few hours later, the execute message from CINCPAC specified that USAF forces, under command of COMUSMACV, would accomplish the first mission on 14 December, 1964. ^{8/} The operation was assigned the nickname "Barrel Roll."

III. Barrel Roll

The frag order for the first Barrel Roll strike was transmitted by 2nd Air Division on 13 December, directing four F-105s from the 80th Tactical Fighter Squadron at Da Nang, RVN (with two spare aircraft), to conduct armed reconnaissance against targets of opportunity along Routes 8 and 12 in Laos, the two roads leading from North Vietnam through Nape and Mu Gia passes, respectively. ^{9/} The strike aircraft were to be accompanied by four F-100s for MIGCAP, another four F-100s for RESCAP, plus two RF-101 aircraft for BDA photography, two F-105s for escort of the RF-101s five KC-135s for aerial refueling and an HU-16 as a rescue control aircraft in the event anyone went down. ^{10/}

This first Barrel Roll mission was flown as scheduled, the Thunderchiefs recce-ing the seven to 14-foot wide dirt road (Rt. 8) until they came to the Nape bridge. A small vehicle was observed on the bridge and one of the F-105s dropped his six 750 pound bombs, but they impacted in the water and on the shore with no appreciable damage to the bridge. The aircraft proceeded to their secondary target, a military strongpoint with

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several deserted gun positions, where they expended a total of 114 2.75 rockets, one Bullpup (AGM-12B) and 20mm cannon fire. The AGM-12 missed because low clouds made an extremely low angle delivery necessary. The BDA aircraft could not get good pictures of this strike, due to clouds and smoke and pictures of the remainder of the recce route showed no activity. 11/

There was little remarkable about the mission except that it was the first interdiction strike flown in the program. It did, however, bring out some shortcomings in the area of coordination which foreshadowed continuing difficulties if not corrected. On 18 December, Ambassador Sullivan sent a message to the Secretary of State in which he admitted being disturbed by a few of the aspects of Barrel Roll 1. 12/ It had been his understanding, he said, that the bridge was not to be struck as a target of opportunity unless there was activity of a military nature observed. Also, this was one of the numbered Royal Laotian Air Force targets and could have been fragged for strike by the RLAF T-28s that day. Further, photos of the target (RLAF Nr. 28) showed some houses destroyed on the east approach to the bridge which could have been civilian dwellings. 13/ He added:

"...Either I have a serious misunderstanding of (the) rules of the game for these Barrel Roll missions or else there has been a serious failure in coordination of a type which could cause us some significant headaches...."

CINCPAC agreed with the Ambassador, in a wire to the JCS, that the

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bridge, per se, was not a target of opportunity unless enemy forces were actually on it. As for the possibility of civilian dwellings being struck, CINCPAC felt that these houses appeared to be RLAF Target Number 25, which was a military installation. However, he also did not consider this a target of opportunity, inasmuch as there was no observed enemy activity. ^{14/}

To minimize any such future misunderstandings, CINCPAC reported he was instructing his operational commanders that targets of opportunity must be confined to those which showed unmistakable military activity of a transient or mobile nature. Fixed installations were to be struck only when prebriefed, or in connection with attacks on clearly identified military convoys and military personnel. ^{15/}

Following completion of the second Barrel Roll mission (flown by Naval aircraft from CTG 77.4), the program was extended by JCS for an additional two weeks during which four separate route recce missions, with fixed installations as secondary targets, were to be conducted. Each mission was to consist of one flight of four aircraft, armed with optimum conventional ordnance, excluding napalm. It was specified that no Thailand-based aircraft were authorized for use in these operations. The first two missions would be flown during the period 21-27 December, but it was required that the second of these missions would take place "not earlier than (the) third day following the first." ^{16/}

These various restrictions (i.e. no Thai-based aircraft, no napalm, a three day wait between missions) characterized the beginning of Barrel

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Roll, but were deemed necessary because of the touchiness of the operation. American aircraft bombing targets in a sovereign nation, launching these strikes from another sovereign state, to inflict damage upon the subjects of yet another sovereign power, was not a matter to be undertaken lightly. From the earliest stages of Barrel Roll operations there was a requirement for a "sterile" period, a delay between missions. These periods were, initially, three days and were intended to preclude giving an impression of a sudden escalation of air operations in Laos. ^{17/} Secondly, these delays gave time to study the effects of each mission, look for any indicators, and assess the progress (or lack of it) in the program. The sterile period was later reduced to 48 hours but there was a specified time, usually a week, in which two given missions must be executed. Weather and other factors sometimes caused repeated deferral of missions and, as the end of a "BR period" approached, there was profound uncertainty at nearly all command levels regarding the authority to execute a particular mission. Attempting to clarify the situation took the valuable time of high ranking staff officers and imposed additional burdens on the over-^{18/}loaded communications circuits. On 9 January, a decision was made that there would be no expiration date for the execution of any specific missions aborted because of weather or for other operational reasons. At the same time it was announced that the deferred missions would constitute a "bank" of approved tasks which could be executed as feasible. The JCS also authorized missions to be flown without regard for their numerical designations (i.e., BR 6 need not be flown before BR 7). ^{19/}

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Actual accomplishments during these first Barrel Roll missions were negligible, at least in terms of demonstrated damage to the enemy. Bomb damage assessment (BDA) photography showed little more than some buildings destroyed, several more severely damaged, and minor damage to others. The armed recce portions of the missions had spotted nothing of military value. Faced with the lack of valid moving targets, planners began to place more emphasis on those fixed targets which might improve the situation; for instance, choke points and bridges. ^{20/}

One such bridge had been recommended as a key and primary target with which to begin any interdiction program in Laos long before Barrel Roll started. This was the Ban Ken Bridge, and its eventual targeting and destruction provided an illustration of the difficulties and frustrations involved in interdiction; yet, at the same time, it proved the operational capabilities of tactical fighters in the interdiction role.

IV. The Ban Ken Bridge

The Ban Ken Bridge spanned the Nam Mat River, near the eastern end of strategic Route 7, a well-known infiltration route in northeast Laos. CINCPAC, in August 1964, had recommended it be the first interdiction target to be struck if such a campaign was launched. ^{21/} The Air Attache in Vientiane felt that the Ban Ken bridge, if dropped, would provide almost perfect interdiction along the route for, in his opinion, it would be almost impossible to by-pass that point. ^{22/} The RLAF had sent three unsuccessful T-28 missions against the bridge, losing one aircraft and

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having another damaged, but the ordnance carried by the T-28s was inadequate to drop the concrete span. ^{23/} COMUSMACV reiterated in October that the destruction of the bridge would certainly inhibit the flow of supplies to the Pathet Lao and Viet Minh forces in north Laos. ^{24/}

With such unanimous endorsement of its value as an interdiction target, it was mildly surprising that eight Barrel Roll missions were flown before JCS granted CINCPAC authority to conduct the strike. ^{25/} However, many factors undoubtedly were involved in the delay - it was the most heavily defended of the early Barrel Roll targets with some thirty-five 37 and 57mm AAA guns surrounding it, and was given refined planning both in terms of tactics and ordnance to be carried. Sixteen F-105s and eight F-100s were the strike force for the mission, the F-105s for target destruction and the F-100s for flak suppression. Of the F-105s, six were loaded with AGM-12B Bullpup missiles plus 750-pound bombs; the remaining ten carried only 750-pounders. ^{26/} On 13 January, 1965, an RF-101, with a pilot familiar with the area, led the way in and the first wave of eight F-105s dropped their 750-pound bombs from a loose trail formation. This first pass destroyed the bridge. The second eight aircraft then dropped their bombs, adding to the destruction. The six F-105s, carrying missiles, then made passes to expend their AGM-12s. Since destruction of the bridge had already been accomplished by the bombs, with resultant smoke and dust heavy over the target area, the effectiveness of the missiles could not be judged. Guidance of the AGMs was difficult because of the heavy pall of smoke, and few of the missiles appeared to impact on target. ^{27/} One of the F-105s making multiple passes was shot down.

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The F-100s, in the meantime, were making repeated passes, dropping CBU-2s and firing 20mm in an effort to suppress the heavy flak, and one of these aircraft was shot down. ^{28/} Four of the other aircraft also returned with battle damage.

Without question, the Ban Ken Bridge mission proved fighter-bombers capable of destroying well-defended and hard targets. Unfortunately, in the opinion of (then) Major General Joseph H. Moore, commander of 2nd Air Division, it also proved that the tactic of multiple passes against a heavily defended target was counterproductive. He felt that the loss of the two airplanes and the battle damage of the other four would have been avoided had all aircraft withdrawn after the destruction of the bridge on the first pass. He firmly believed that the number of passes should be restricted to the minimum necessary to accomplish the mission. Further, he felt that any ordnance mix requiring repeated passes was undesirable ^{29/} inasmuch as this unnecessarily increased exposure time to ground fire.

The ironic epilogue to the entire mission illustrated the frustrating nature of interdiction in Southeast Asia. After the lengthy planning, the dropping of the bridge in an area "impossible to by-pass," and the loss of two aircraft, a few hours later enemy vehicular traffic was observed crossing the river by driving across the top of a dam a few hundred yards away!

V. Night Interdiction

As the fledgling program entered January of 1965 it was apparent that,

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as an armed reconnaissance campaign, it was somewhat less than a glowing success. The targets simply were not there. It had, however, accomplished one thing, according to COMUSMACV, in that the reason the targets were not there in the daytime was that the communists had been limited to moving at night.^{30/} Although this, perhaps, disrupted the enemy's operations to an extent, it in no way stopped the communists' logistics flow.

On 8 January, the Joint Chiefs of Staff requested comments on how best to expand both day and night interdiction in Laos with minimum risk to U.S. aircraft. A night program had already been planned and the first mission was, in fact, scheduled for 4-10 January. It was flown (as Barrel Roll 7) on the night of 9 January. Although the JCS wanted both day and night operations discussed, it appeared their primary interest was in night operations. CINCPACAF's reply listed several problem areas which made interdiction difficult. Among them were:^{31/}

- a. Unfavorable weather.
- b. Sources of supply hidden in sanctuaries.
- c. Jungle cover.
- d. Unimproved LOCs.
- e. Rugged terrain.
- f. Darkness.

It was CINCPACAF's view that a balanced day/night program was necessary if constant pressure were to be maintained on the enemy's LOCs. It would require night route reconnaissance, in concert with the day armed recce mission, along with Yankee Team and RLA operations. CINCPACAF felt that one night armed reconnaissance job could be done either with relatively long range aircraft carrying their own flare capability, or with cargo

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type flare droppers and shorter range fighters accompanying them, or "on call," as the tactical situation dictated. He envisioned the use of IR/SLAR (Infra-red and Side Looking Aerial Radar) to improve the night detection capability for, in his opinion, night strike targets had to be clearly identifiable, with an absolute minimum chance of misidentification. CINCPACAF believed that area-denial weapons should be used in the program, such as MLU-10B aerial-laid land mines, time-delay fuzed bombs, tire-puncturing tetrahedrons and, in general, felt that the U.S. had everything needed to conduct an effective interdiction program in Laos, but that it must not be applied in bits and pieces. He stated: ^{32/}

"...To be effective in the present environment in Laos, the interdiction program must provide for frequent coverage of important routes and targets, and should be capable of immediate flexible reaction to the day-to-day intelligence and operational factors."

One of the things mentioned by CINCPACAF, the chance of misidentification and striking the wrong target, nearly resulted in the cancellation of the night interdiction campaign at its outset. A flight of Navy A1Hs, Barrel Roll 10, became disoriented over Laos on the night of 15 January and dropped their bombs on a friendly village, Ban Tang Vai. ^{33/} General Thao Ma, Commander of the Royal Laotian Air Force, graciously accepted U.S. apologies and offers of material help for the villagers but, nevertheless, clamped more restrictions on the operation. Barrel Roll missions could be resumed, he said, but only if - at least in the region south of Route 9 - they be confined to the area east of Muong Phine. ^{34/} This made Route 23 from Route 9 south the exclusive preserve of the RLAF. ^{35/} Also, night

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Barrel Roll operations were to be conducted without secondary targets. This meant that, if no targets of opportunity were sighted (vehicle or troop movements on or near roads), any ordnance carried had to be jettisoned at sea or returned to base. General Ma made a special point that campfires were not to be considered evidence of enemy presence. It was far more likely, he thought, that campfires would indicate friendly villagers or friendly forces rather than enemy. ^{36/}

Acceptance of these constraints, added to those already in existence, made the job doubly difficult but at least allowed the night interdiction effort to continue. The one restriction which most distressed the planners was that which prohibited secondary targets during night operations. The Joint Chiefs of Staff pointed out that armed recce missions at night would find targets of opportunity only by random chance and at odds less than even. These aircraft, returning to carriers and the crowded Southeast Asia air bases with unexpended ordnance aboard, presented unjustifiable hazards. Jettison of this ordnance at sea would endanger friendly watercraft unless under strict surveillance and control, would be wasteful, and would impose undue operational uncertainties. Assignment of secondary targets would also minimize the counterproductive aspects of mission flown with no targets attacked, the futility of which would be clearly evident to the enemy. ^{37/}

The JCS asked for a rationale and for potential targets which would provide ease of recognition, an easily noted relation to surrounding recognizable terrain features, and separation from friendly areas. ^{38/} The relaxation of this restriction in night operations was some months in coming.

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VI. The Choke Point Concept

Hampered as it was by restrictions, the addition of the night phase nonetheless laid the groundwork for a coherent interdiction program by allowing 24-hour coverage of the area. Unfortunately, the weight of effort was not great enough to take full advantage of it; and as bad if not worse, the "sterile" periods dictated a stereotyped frequency of operations which must have been readily apparent to the enemy. In any event, it would be next to impossible to interdict 91,500 square miles of jungle, using one day and one night mission every 48 hours. In addition, the enemy knew when the aircraft were coming and any realistic chance for military effectiveness by the Barrel Roll flights was lost. When the JCS sought further comments and recommendations regarding the expansion of the interdiction operations in Laos, CINCPAC replied that, in his belief, the resources and the capability for an effective program were available, but, to date, the effort had been piecemeal rather than comprehensive. One of CINCPAC's primary points was that the greatest damage to enemy lines of communications could be attained through strikes on fixed components of the enemy's logistics system, rather than solely armed reconnaissance in search of mobile targets. COMUSMACV sided with this view, in essence, and proposed a few modifications to further enhance interdiction effectiveness. He suggested that key "choke points" be selected along primary routes at locations where topographical features would make the roads easiest to cut and most difficult to by-pass. These, he said, should be periodically "reseeded" with delay-fuzed bombs and anti-disturbance devices to harass road-repair crews and add

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to the cratering. Armed reconnaissance could then be used to exploit traffic backed up behind the choke points. He further believed that the choke point program, if accepted, should not be subject to the 48-hour interval between flights but should be kept flexible enough to avoid any stereotyping of the operation. ^{40/}

In February Ambassador Sullivan, in Vientiane, also began to plug for the choke point concept. The Ambassador wanted "...a systematic choke point program, with regular reseeding follow up, to be complemented by saturation armed recce, especially at night, over well-defined infiltration road networks." ^{41/} The Ambassador even suggested that other targets in the Barrel Roll area be temporarily set aside until after these choke point-reseeding-armed recce procedures had been firmly established and were in being. COMUSMACV requested that 2AD develop a plan for creating four choke points near Sam Neua, on Routes 6 and 65, with the first strikes to be flown at the rate of one mission a day over a four day period. One typical choke point target, a hairpin turn at the bottom of two cliffs on Route 6, was given number one priority. ^{42/} It was hoped that bombs into the cliff face would create a slide over the road, completely blocking it; then reseeding could keep it closed to traffic. This was to develop into the classic choke point concept. The change in emphasis away from pure armed reconnaissance became firmly established in March. Seventeen choke point missions were flown against Routes 6, 7, and 8, with special emphasis on Ban Nape and Mu Gia passes, the two primary infiltration routes from North Vietnam into Laos. ^{43/} In contrast, only 12 armed recce missions were flown during the same period.

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VII. Steel Tiger

Coincident with this shift in target emphasis was a shift in interest toward the south of Laos. The weight of effort at the time appeared sufficient to maintain at least a status quo in the Plaines des Jarres and the routes used by the Pathet Lao in the north. However, south of Nape Pass increasing evidence of infiltration into the Panhandle prompted military planners to take a close look at the situation there. It became apparent that much of the Viet Cong logistical base and supply system depended upon men and materials entering Laos in the vicinity of Nape and Mu Gia passes, filtering down through an extensive (and improving) road and trail network to terminal points inside the South Vietnamese border. This was the much discussed Ho Chi Minh "trail", in reality a complete system of trails -- some all-weather roads, some merely foot-paths. Together they comprised an LOC net capable of supporting the major portion of communist logistics needs in South Vietnam if not impeded.

It was this evidence of increased infiltration into the southern part of Laos that prompted the JCS to ask CINCPAC to come up with an operations plan aimed to inhibit the logistics flow and infiltration there. The Joint Chiefs wanted a complete operation to be conducted under the same ground rules as Barrel Roll (one exception - napalm would be usable if approved by the Ambassador at Vientiane) and they wanted one which would provide a choke point reseeding program and special strikes against supply points, truck parks and other military installations. ^{44/} JCS directed that the new program - to be called Steel Tiger - would begin 3 April against routes

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and targets associated with infiltration through the Panhandle of Laos south of Ban Nape. Those strike operations providing support of FAR (Force Armee Royale) and Neutralist troops in the north of Laos would continue to be identified as Barrel Roll operations. ^{45/}

The separation of Laos operations into two programs provided several advantages. Not the least was that it provided for an increased weight of effort and allowed the Steel Tiger operations to concentrate almost solely on the interdiction effort. COMUSMACV submitted his concept for the initial Steel Tiger series. He envisioned coverage of the major infiltration routes with two day missions and two night missions each calendar day over six varied armed recce routes so as to avoid stereotyping of the missions. ^{46/} He suggested that it might be possible to reduce sortie requirements somewhat by combining the two day or two night missions for a given day and assigning them to AIEs. These reciprocal-engined fighters could fly the two missions as one, with an extended time over target. If tankers were available, the jet fighters could be used in a similar role. ^{47/}

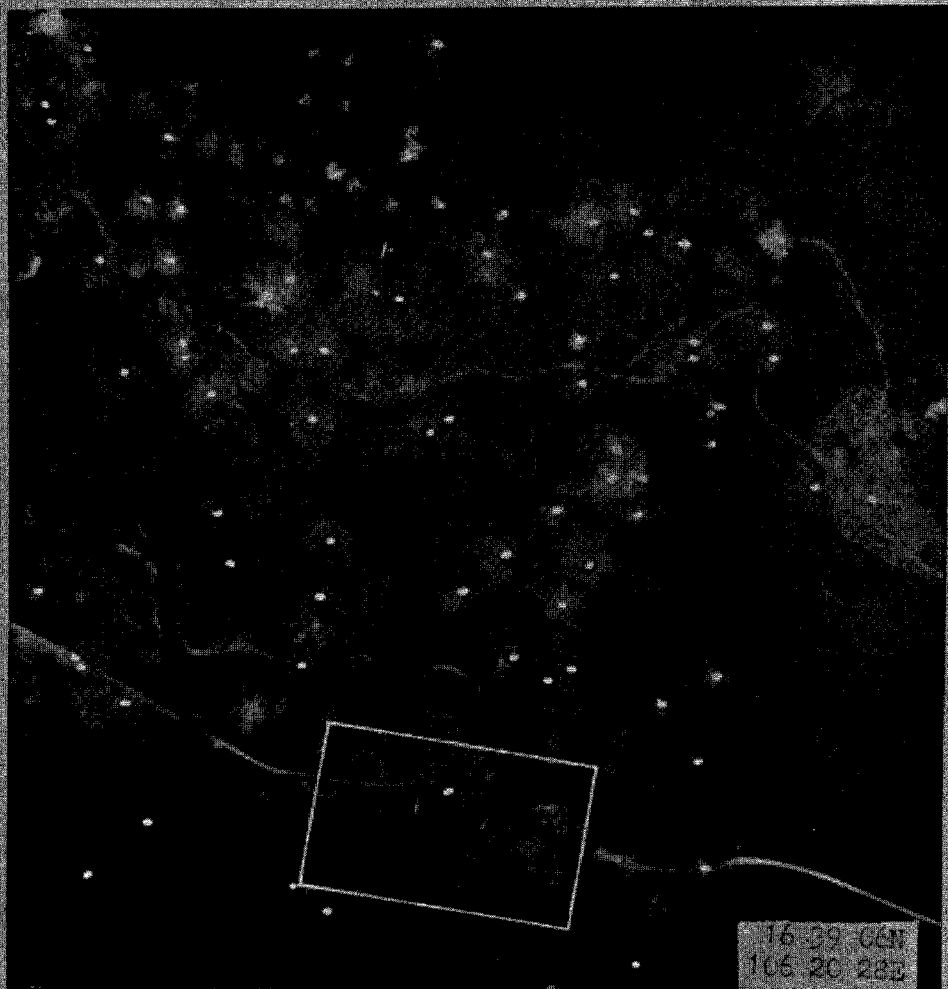
Shortage of lucrative secondary targets was a source of major concern to MACV, however. They suggested it could be partially alleviated by road cratering along selected routes in lieu of other secondary targets. This road cratering, MACV pointed out, would differ from choke point seeding in that use of delayed-action bombs was not intended nor would periodic restrike on a regular basis be undertaken. To avoid jettisoning of ordnance, choke points would be assigned as secondary targets for some armed recce missions. (No secondary targets would be assigned for night missions

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PROBABLE CONVOY

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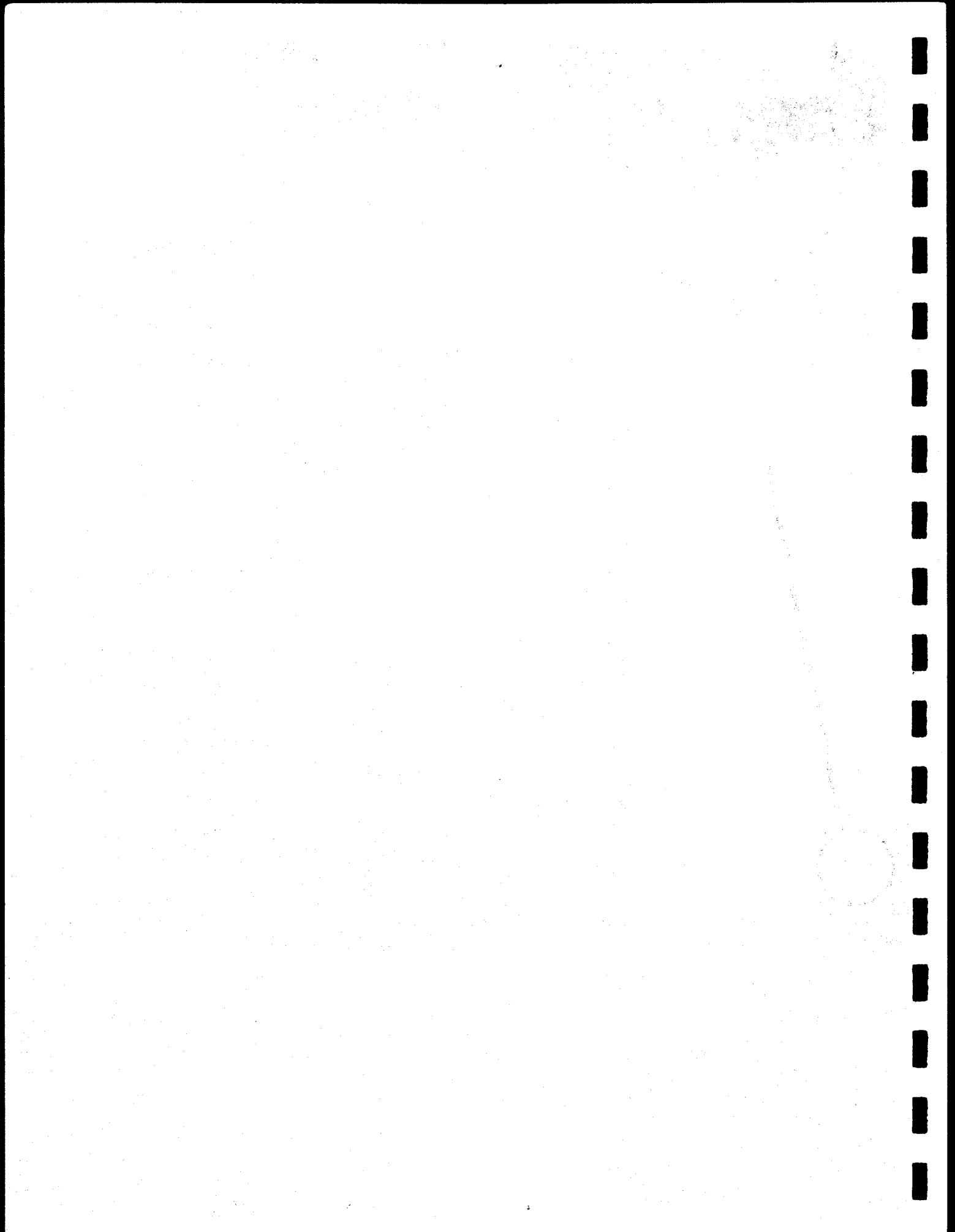


16 39 06N
106 20 28E



Fig. 2

Ban D AREA 2



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since none, to that date, had been validated by Vientiane.) MACV considered that existing choke points were adequate in number for the present, but felt that additional points might have to be established if AAA effectiveness made relocation along designated route segments impractical. They also felt that anti-disturbance bombs would be a valuable addition to re-seeding ordnance in order to further discourage the repair of roads. ^{48/}

The operations order for Steel Tiger was promulgated on 31 March 1965, basically following the guidelines laid down in the Barrel Roll plan. Those operations in northern Laos would continue to be called Barrel Roll, while Steel Tiger concentrated on portions of the Laotian panhandle south of Ban Nape pass. The RLAF would retain responsibility of Route 23 south of Route 9, ^{49/} and all that area west of Route 23 below Route 9.

The anticipated upsurge in sorties began to take place almost immediately. From the start of Barrel Roll, only a total of 53 strike missions had been flown but from 3 April, when the first Steel Tiger mission flew, until the end of the month, 74 Steel Tiger flights were launched. Of these 30 were armed recce, 27 missions went against choke points and road segments, and the remainder were attacks on fixed military installations, supply points and bridges. ^{50/}

VIII. The Routes

It was estimated in 1965 that the predominant portion of logistical support for the Viet Cong, along with infiltrating NVA (North Vietnamese Army) troops, came through Laos by one of two route systems. Personnel,

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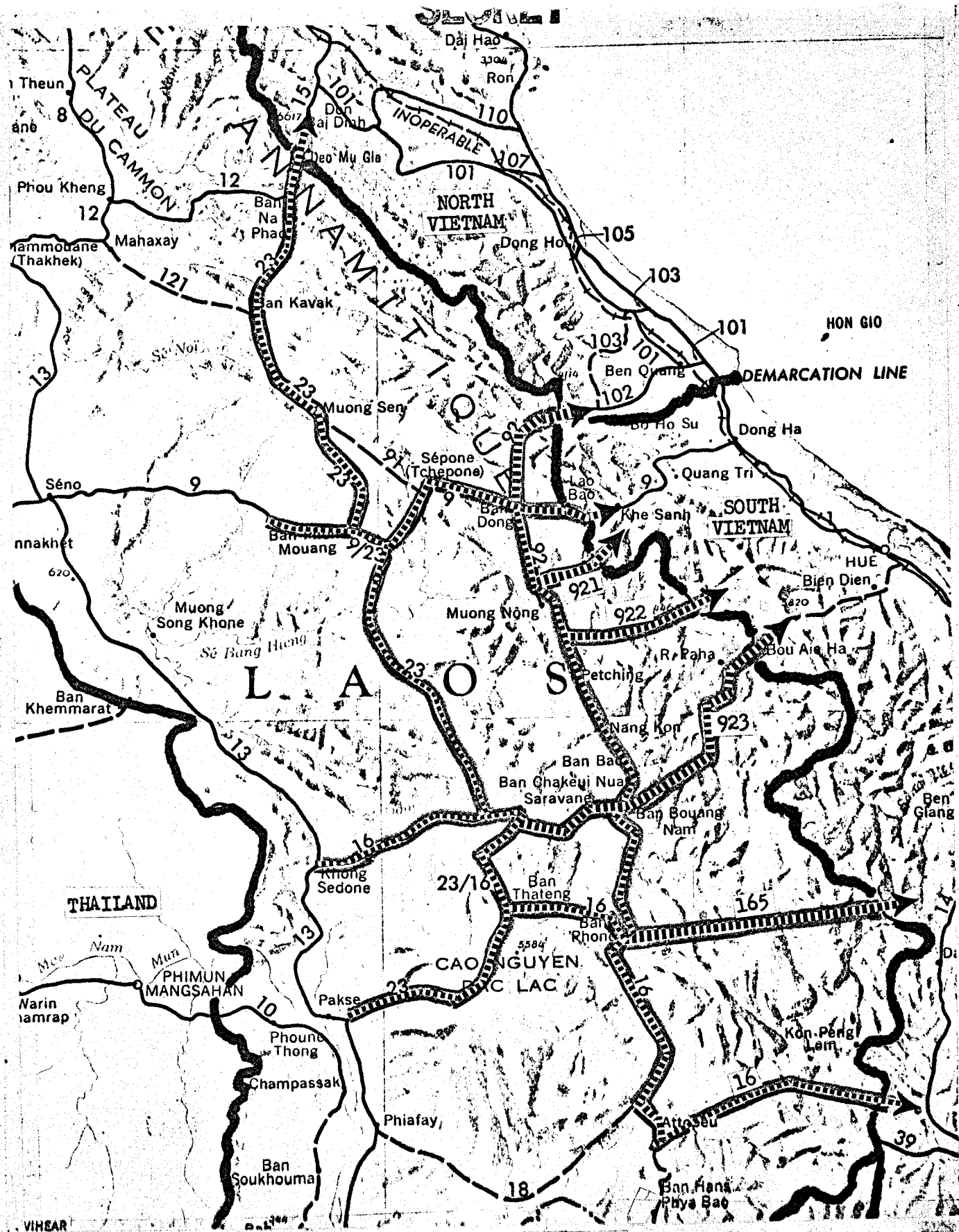
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carrying basic and light supplies for their own sustenance, simply skirted the DMZ for the most part, walking from way-station to way-station each day. The bulk of supplies, however, appeared to have been transported over the road system further inland, much of it motorable. The primary north-south roads were Routes 23, 92, and 16. East-west routes were 9, 921, 922, 923, and 165. Of the routes paralleling the Annamite Chain (of mountains) in a generally north-south direction, Route 23 was probably the primary logistics route connecting North Vietnam with southern Laos. Route 23 was a dry-weather road, approximately eight to fifteen feet wide, capable of supporting truck traffic. Movement along the route was most likely accomplished by means of shuttle runs between storage points. Truck parks and storage points at the junction of Routes 23 and 91 provided a collection area for movement of supplies south to Moung Phine and northeast to Tchepone. This was, at that time, the only motorable link with Route 9. ^{51/}

Route 9 provided an all-weather link from Route 23 laterally to Route 92 at Ban Dong, and supported most of the logistics movement into I Corps of South Vietnam. The route was capable of sustained heavy truck movement and was important enough to the Pathet Lao and North Vietnamese that they studded it with 37- and 57-millimeter antiaircraft guns. Military installations located along Route 9 provided housing and storage areas for the PL/^{52/}NVA units assigned with the security of the routes in the area.

Route 92 was an alternate, and far shorter, route from North Vietnam to areas flanking South Vietnam. From the NVN border to its intersection with Route 9, the road could support light vehicles during the dry season.

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COMMUNIST SUPPLY ROUTES

Fig. 3

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From Route 9 to its junction with Route 922, the route was a limited all-weather road, then to 12 feet wide, and from 922 south it was a fair weather road about ten feet wide. ^{53/}

Routes 92 and 964 provided alternates to Route 92 and the Se Kong (river). Much construction activity was noted in the area, including the use of heavy equipment and stockpiling of material. These roads also ran north and south, to further widen the network. ^{54/}

Routes 922, 165 and 966 were fair-weather lateral routes leading toward the South Vietnamese border, each approximately eight to 12 feet wide, earth surfaced, and motorable only in the dry season. Like most of these routes, the roads often disappeared beneath the jungle canopy for miles at a stretch.

The Se Kong made up for inadequacies in overland transportation southward from Ban Bac to Routes 964 and 165 by providing a waterway link that allowed supplies to be moved utilizing sampans and pirogues. These small boats were seen in groups of up to 50 vessels. Rapids and rock outcroppings were by-passed by portaging, then transferring the cargo to other boats that operated in the next clear stretch of river. ^{55/}

From Mu Gia Pass, construction had been started on Routes 911 and 912, parallel with and east of Route 23, through dense jungle. ^{56/} Other, as yet un-numbered, "jeepable" trails were being improved to support heavier and continuous traffic. Improvements were soon to be noted on the "Sihanouk Trail," Route 110, winding up from Cambodia, south of Attapeu, to the South

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Vietnamese border. Finally, hundreds of footpaths formed an untraceable web of connectors to the main routes, along "human ant" personnel movement by foot, ox cart and bicycle transportage of supplies.

It was against this network of roads, rivers, trails and paths that Steel Tiger operations were directed. The total capacity of the system was later estimated to be 300 tons of supplies per day infiltrated into South Vietnam, along with thousands of troops per month. Absolute stoppage of this supply and personnel movement through the network was conceded to be virtually impossible, but it was hoped that the cost of supporting this logistics pipeline could be made prohibitive to the enemy and, hopefully, that supply infiltration could be reduced to the point where it impeded the effectiveness of his combat units. 58/

IX. Restrictions to Operations

As noted earlier, political considerations imposed severe constraints on both Barrel Roll and Steel Tiger operations and substantially reduced the military effectiveness of the interdiction programs in Laos. These early missions were limited to few aircraft and flown only every few days. The *change made in Dec 1965* initial 72-hour sterile period was later reduced to 48 hours, but still induced a stereotyped form of operation, easily analyzed and countered by the enemy. Among the welter of other restrictions were: 59/

1. Overflight of North Vietnam prohibited.
2. Two-mile buffer zone in Laos along the NVN border.
3. No napalm strikes authorized, regardless of target.
4. Armed recce strikes only within 200 yards of motorable road.
5. No secondary targets for night operations.
6. No Thai-based aircraft.

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7. Direction of armed recce stipulated by frag order.
8. Choke point reseeding no sooner than fourth day.

These were direct constraints. Others, more indirect, nonetheless had a suppressive effect on the success of the programs. Among them: ^{60/}

1. All BR early missions had to be approved by JCS.
2. Two week wait for preplanned target approval.
3. Three day wait for reflight in BR, even for BDA.

The anomalies were readily apparent. In February, for instance, after strikes were begun in North Vietnam and were continuing in Laos, the two-mile buffer zone was still honored. This, in effect, gave the communists a two-mile wide "safe" strip along what was one of the most critical points of the LOCs - the NVN-Laos border. The direction of flight on an armed recce mission unduly tied the hands of the operational commander and the mission pilots. Barrel Roll 15 was a night armed reconnaissance mission that had been fragged to fly its route from west to east in order to avoid overflying North Vietnam. The weather conditions, when the mission was flown, favored initiation of the recce at the east end where the weather was clear, rather than the west portion where broken clouds made the road difficult to locate. Second Air Division, in a plea for more tactical flexibility, cited the above example and made the point that, if fear of border violation was a matter of concern in this particular case, the possibility of it would be less if the pilots were free to navigate to the two-mile limit at altitude. With medium to high altitude radar coverage, navigation would be far more accurate than at six to eight thousand feet without radar. ^{61/} Other oddities were brought about by these constraints: After 7 February 1965,

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Thai-based aircraft could overfly Laos to strike in North Vietnam, but could not perform strikes in Laos itself; Navy aircraft could strike in Laos, but could not overfly North Vietnam to do so. ^{62/} Slowness of targeting, in this area where targets, even "fixed" ones, appeared rapidly and were just as rapidly removed, dispersed or changed (e.g., revetted, protected by AAA, etc.) in such a way that the struck target was vastly different from that which had been laboriously approved. In regard to those more mobile targets, MACV felt that the three-day wait between strike and BDA reflight gave the enemy ample time to remove any evidence and relocate. He wanted the original operations order to provide for reflights to obtain BDA without obtaining further approval. ^{63/}

The situation eased slowly and by mid-1965 many of the restrictions and restraints had been removed or modified to allow for a more effective operation. By April, daily missions, day and night, were allowed and larger numbers of aircraft were assigned to individual targets. The operational commander could select his ordnance according to the needs of the target and available stocks, with the exception of napalm, and even that could be used with the approval of the Ambassador in Vientiane. ^{64/} In answer to Major General Moore's request for greater operational flexibility (Barrel Roll 15), JCS allowed the phrase "direction of flight on armed recce at your discretion" to appear in the Barrel Roll planning messages. ^{65/} The U.S. Ambassador in Thailand forwarded permission for Thai-based aircraft to be used on Barrel Roll 4-D on 7 April, and soon thereafter Thai-based aircraft were being used for strikes in Laos as a matter of course. ^{66/} (By year's

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end, the bulk of strikes in Laos were being accomplished by Thai-based planes.) The removal of these restraints gave the interdiction programs in Laos far greater latitude, scope and flexibility but, as many old restrictions were removed, they were replaced with new ones. Political restraints simply appeared to be "part of the picture" on the Laotian interdiction scene.

X. Ineffectiveness of the Early Effort

By very few criteria could early interdiction efforts be called successful, and armed reconnaissance was particularly disappointing to many officials. The harassing tactics of the day and night armed recce certainly caused some damage and a consequent slowdown in logistics flow, but North Vietnam continued to infiltrate men and supplies into and through Laos and into South Vietnam.

According to Op-4 reports (initial report of the completed mission), the first 53 Barrel Roll missions over a four month period showed approximately 27 buildings destroyed and another 50 damaged in various degrees. Twenty-six trucks were called destroyed and one more severely damaged. The reports mentioned only five secondary explosions and, while they contained extensive mention of successful road cratering, choke point seeding and landslides across roads, the enemy appeared quite successful in by-passing these road cuts or finding alternate routes. Communist infiltration showed a slight decline in March, but was then followed by a steady increase over the next three months when it registered the highest levels yet observed. ^{67/}

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While much of this lack of success could be attributed to the constraints, it was probable that the primary reason was that there was no solid weight of effort applied in a cohesive program of night and day interdiction. With the beginning of Steel Tiger, interdiction missions were flown on a daily basis, but individual missions showed little more in the way of tangible results than earlier strikes. A roadwatch truck count (kept on Route 23 for the first half of 1965) showed a daily average of 17 trucks (average two tons per truck = approximately 35 ton/day) getting through on this route alone. ^{68/} Intelligence reports, at the end of September, showed that enemy personnel were infiltrating into Laos relatively unopposed. The report showed that Mu Gia Pass watchers had counted approximately 2,500 communist troops coming through the pass in the preceding three months, in company and battalion sized units. Similar groups, numbering at least 3,800 troops, were spotted on Route 23. These troop concentrations at the north end of the trail showed that an effective by-pass to the Mu Gia choke point had been established; those at the south end, and the increased traffic on Route 23, indicated the enemy's importance placed on southern Laos in connection with infiltration efforts into the central highlands of South Vietnam. ^{69/} What was not known at the time was that the total effort of the communists was far greater than hitherto suspected; that the capacity of enemy LOCs had been expanded to a vastly larger extent than had been believed; and that our own weight of effort - as large as it appeared to some - was but a fraction of that needed to cope with the infiltration.

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Three criteria could be used to evaluate the success of an interdiction

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program. They would be: ^{70/}

1. The supply capability of the enemy relative to his requirements.
2. The costs to the enemy of achieving his supply capability.
3. The costs of our interdiction efforts to us.

Based on these criterion, our interdiction efforts up to the autumn of 1965 had not been "successful." In regard to the first criteria, the interdiction of the Laos LOCs had not reduced communist supply capability below their requirements; in fact, all signs indicated that the enemy capability exceeded his requirements to the point where he was stockpiling future supplies in South Vietnam. ^{71/} As to the second criteria, undoubtedly the interdiction programs had increased the costs to the enemy. However, in view of increasing rates of infiltration and the extensive input of supplies into the LOCs, Hanoi was able to bear these costs, at least those imposed at the time. The third criteria, in essence, depends upon the first two. Theoretically, the cost of mounting the interdiction program would be "acceptable" to the U.S. if it reduced the flow below the requirement, or if it exacted a cost unacceptable to the enemy. ^{72/} Since neither of these criterion were met, then in theory, the cost of the programs would be unacceptable to us. However, other factors had to be taken into consideration. The percentage of interdiction costs, in relation to the total cost of prosecuting the war, was not great. The environment was relatively permissive; certainly so in comparison to flights over North Vietnam, so aircraft and crew loss was low. There was a demonstrated erosive effect on Pathet Lao's morale, as evinced by interrogation reports of prisoners. This showed that they suffered shortages of food and supplies and that increasing numbers were

defecting. Another major consideration was that the Pathet Lao had not been able to sustain a single major attack in Laos since the Barrel Roll program was instituted. ^{73/}

Perhaps most significant, however, was the fact that the interdiction programs had turned the war in Laos into a night war. The overwhelming majority of vehicular traffic moved at night; most PL/NVA attacks occurred during darkness. ^{74/} If the communists were not being stopped, at least they were being disrupted and forced to rely on unwelcome tactics. This showed the kernel of worth in the interdiction program; if the key could be found to turn these small gains into hard, tangible results, interdiction would more than justify its existence.

XI. Rolling Thunder Interdiction

An overview of strikes against North Vietnam (the Rolling Thunder program) showed yet a different picture. Steel Tiger was first and foremost an interdiction program, with support for friendly troops an important but secondary aim, and attacks against hard military targets a rare bonus. Barrel Roll concentrated on support of FAR and Meo forces, using interdiction as a major adjunct to that goal. Rolling Thunder, on the other hand, began by placing interdiction in a secondary category to the primary intent of destroying hard military targets such as barracks, ammunition depots, naval bases and storage complexes. Armed recce of roads was "something to do on the way home." The JCS-recommended program for the first eight weeks of Rolling Thunder contained 32 JCS numbered targets, of which only five were

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interdictive, i.e., - bridges and ferries. ^{75/} This appeared to be justified.

Interdiction conducted in the far heavier ground fire base of North Vietnam stood to be a costlier process than in the more permissive air over Laos, and with no more guarantee of success. The JCS, however, was interested in the interdiction of the Hanoi-Vinh railway, highway bridges, roads and ferries, along with hitting the other targets. ^{76/} The first eight weeks of

strikes targeted the Cau Tung, Thanh Yen and Dong Hoi highway bridges, the Tam Dam railroad and highway bridge, and the Hau Hung highway ferry, all major interdiction points along the north-south railway and road network in the southern part of North Vietnam. ^{77/} The strikes were to begin 20 February, but were postponed several times because of weather and political reasons, ^{78/} and eventually scheduled for 2 March.

The Rolling Thunder program began with the same tight, top-level control that characterized the beginning of Yankee Team and Barrel Roll, and for the same reason--to maintain the sensitive political balance. Concurrent with the March-April relaxation of constraints in the Barrel Roll-Steel Tiger programs, Rolling Thunder also achieved more operational flexibility. The JCS authorized the use of Thai-based aircraft and gave more latitude in the force ^{79/} make-up of strikes in order that desired damage levels could be achieved. Random armed recce missions, employing four to eight aircraft plus suitable CAP and flak support, were authorized. Armed recce of highways and railways to hit rolling stock and military traffic was permitted after strike; in addition, the flak suppression and CAP aircraft could expend on these mobile targets if the environment was permissive. Low level and medium altitude

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BDA was also authorized. ^{80/}

Commenting on these easings of restrictions, CINCPAC noted that it was essential to view the western Pacific with a perspective and a constant awareness that the total communist threat extended from Manchuria to Burma. Many of the decisions, and certainly the overall strategic analysis, would still have to come from Washington. However, from the tactical standpoint, any restrictions which might hamper smooth, safe, and effective control of combat operations should be eased. ^{81/} CINCPAC's intention was to delegate authority as close to the operating level as possible, whenever feasible. In his view, effective plans and control procedures were operating for Barrel Roll, Yankee Team and Rolling Thunder - while each operation had its separate procedures and constraints, execution authority was to be delegated to the lowest practicable level. ^{82/}

XII. The Thanh Hoa Bridge

On 3 April, 1965, the first of many strikes was launched against what came to be known as "the toughest interdiction target of them all," the Thanh Hoa Bridge. This 56-foot wide, 540-foot long structure was a combination railway-highway bridge spanning the Song Ma River, three miles north of Thanh Hoa city, which if dropped, would sever a vital link in the North Vietnamese LOCs. The bridge, French-built during their occupation, was a two-span bridge of steel through-truss construction with a reinforced concrete center pier and heavy concrete abutments. The attempts to get it on 3 April foreshadowed the difficulties involved in striking this and other

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such targets. The USAF employed 31 F-105s carrying 254 750-pound bombs and 266 2.75 rockets in the first effort to destroy the bridge. Another 15 F-105s and 19 F-100s flew as flak suppression and MIGCAP aircraft. The ordnance load carried by the strike planes was considered sufficient to drop one span of the bridge. It remained standing, but an F-100 and a RF-101 BDA aircraft were shot down by heavy ground fire during the strike. 83/

Stung by the loss of the aircraft and the failure to destroy the bridge, the Air Force sent 48 F-105s back at 1100 hours the same day for a restrike. This time the F-105 strike force, supported by 16 F-100s on RESCAP/MIGCAP, dropped 384 750-pound bombs and fired 32 AGM-12B Bullpup missiles in an all-out attempt to put the bridge down. They damaged a large section of it; however, three F-105s were lost on the mission, one to ground fire and two shot down by MIG-17s - the first aircraft lost to communist jets in the 84/ war.

Numerous hits were scored by the AGM-12B (250 pound warhead) but these did little damage. Several 750-pound bombs also hit the bridge but failed to drop it. 85/ The massive abutments appeared invulnerable to the bombs. During the day, 638 750-pound bombs had been expended on the bridge, along with the missiles and rockets, without collapsing it. Five USAF planes were lost in the attempts. Clearly, this was an indication, not only of the difficulties that would be encountered in hitting such targets, but also of mounting an interdiction effort against well-defended North Vietnamese lines of communications.

For the next few weeks message traffic between the JCS, CINCPAC,

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CINCPACAF, 13th Air Force and 2nd Air Division concerned possible tactics and ordnance improvements which might tumble the stubborn span.^{86/} Semi-armor piercing 1,000-pound bombs with delayed fuzing were suggested, as was the AGM-12C with the 1,000 pound warhead. Everything from skip-bombing^{87/} to size of strike force to exactly where to place what bombs was discussed. Three years later the bridge still stood.

All such bridge-busting attacks were not so unsuccessful. On 9 April, the Tam Da railroad bridge was struck by 35 Navy aircraft on an initial strike, and then 48 more on a restrike. Although the Navy lost an F4B on the first strike and an A4C on the second, the restrike was successful in dropping the north and center spans. Forty-eight USAF F-105s came up to strike the Qui Vinh Bridge the same day, collapsing one span, then went on to their secondary target, the Khe Kiem Bridge. This they completely destroyed, and having ordnance left, proceeded to drop a span on the Phuong Can highway bridge, another secondary target. Three bridges were attacked,^{87/} three were destroyed, with no losses of USAF aircraft.

XIII. Expanding the Program

Despite the destruction of these southern NVN bridges, there was believed to be no great reduction in the North Vietnamese ability to keep their LOCs open, or in their capability of moving men and material along them. Alternate routes, by-passes, and the ability to use porters and animals for small-increment movement apparently compensated for the loss of through-road and rail traffic. The availability of fords and ferries,

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most of them near destroyed bridges, allowed the movement of supplies with time and effort the primary cost to the enemy. ^{89/}

At the Secretary of Defense conference in April at Honolulu, the Secretary commented that the Rolling Thunder bridge destroying operations were good, but that the armed reconnaissance portion of the interdiction effort was not producing results worth the resources. ^{90/} Mr. McNamara voiced doubts about the program in North Vietnam. When Admiral Sharp commented on Barrel Roll and Steel Tiger results, the Secretary seemed to favor armed recce in Laos over similar programs in North Vietnam. ^{91/}

The largest interdictory effort in Rolling Thunder to date was launched on 23 April, when some 285 tons of bombs were expended on seven bridges, all of which were dropped. ^{92/} The bridge-busting operations continued into May and, although supplies continued to be moved, apparently the squeeze was beginning to be felt. A dramatic drop-off in vehicle sightings after 184 special recce missions in a three day period, indicated a switch by the enemy to night movement, a pattern previously observed in Laos. ^{93/} As was also experienced in Laos, the enemy went to considerable efforts to maintain traffic movement on vital LOCs. If key bridges could not be repaired, or could not be kept in repair because of strikes, the alternates of fords, ferries and barges were pressed into use. Increased emphasis was noted on portages, coolie traffic and small vessel water transport, both along the inland waterways and on the coast. ^{94/}

PACAF, profiting from experience already gathered in Laos, suggested that interdiction operations be concentrated on armed reconnaissance day

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and night over those main lines of communications leading to Barthelemy, Nape and Mu Gia Passes - Routes 7, 8 and 12, respectively, along with Routes 1 and 15 in North Vietnam. PACAF also suggested that good choke points be selected and a concentrated series of road interdiction strikes launched against them. ^{95/} Follow-up strikes would naturally be the consequence. A flexible attack program was requested, to be directed at new truck parks, transshipment points, ferries, barges and river traffic ^{96/} which would be developed after successful bridge destruction.

After evaluating the results of the first three and a half months of Rolling Thunder operations, CINCPAC told the JCS that the air attacks had disrupted rail and road movements in North Vietnam, and had completely changed the pattern of logistic support in Laos. ^{97/} He indicated that there was an untold amount of work to be done south of the 20th parallel, however. The shipping and port facilities had hardly been touched and, despite the success of the bridge strikes, the major portion of the bridge and ferry system was still intact. ^{98/} It was CINCPAC's firm view that interdiction, even when maximum feasible damage was exacted against the LOCs, could not be expected to stop completely the logistics flow to the Viet Cong through ^{99/} routes in North Vietnam and Laos.

This ultimately realistic viewpoint could be answered in two ways, "Then why try?" or, "Let's try harder." CINCPAC chose the latter, proposing a more rounded concept than was presently being followed, and one which called for a round-the-clock program of immobilization, attrition and harassment by U.S. airpower. Included in this program would be night

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blockade tactics; continued route interdiction south of 20 degrees, extensive day armed reconnaissance against these land and water routes; destruction of dispersed supplies equipment and military personnel; and including stepped-up interdiction of supplies by sea through attacks on port facilities and identified North Vietnamese shipping. The air operations, CINCPAC added, should contain a mixed bag of tricks, to include flareship operations at night, increased harassment of repair activities through more frequent use of time delay bombs, and the establishment of road-watch points immediately inside the NVN/Laos border. 100/

Admiral Sharp's proposed step-up in the interdiction campaign was well-taken and perhaps overdue. The increased weight of effort was needed to counter the established - and improving - NVN tactics of using alternate routes, by-passes, dispersal of men and equipment, and expert camouflage. The weight of effort had been raised dramatically in comparison with early missions. The initial out-country program, Barrel Roll, had managed but 53 missions between mid-December 1964 and the first of April. The Air Force and Navy, splitting the Rolling Thunder effort, were each allocated 600 101/ sorties for each RT period (two weeks) for armed reconnaissance alone.

By the end of August, 21 of the 22 JCS bridges south of 20 degrees had at least one span dropped. The one remaining was JCS 14 - the Thanh Hoa Bridge. This structure still stood although it had been reportedly severely damaged by attacks following each of seven RT cycles. It was struck with M118 3,000 pound demolition bombs during Rolling Thunder 24, 25 and 28,

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after which photo recce showed it was "considered 95% destroyed and un-
serviceable except for pedestrian traffic." ^{102/} This condition, if true,
was merely temporary. Nonetheless, even with these key bridges down, the
logistics flow increased. The movement continued despite a July-August
total of 131 vehicles destroyed and 292 damaged, 60 bridges collapsed and
174 damaged, and various degrees of damage inflicted in 127 instances to
roads, rail-lines and ferry slips. ^{103/} Hanoi had pressed into service
thousands of road repair laborers and construction people and had stock
piled road repair aggregates and equipment. When a road-cut was made, the
workers would swarm over it, often repairing it within a few hours, and
traffic would be flowing again during the night.

It was variously estimated that 70 to 90 percent of the supply move-
ment was taking place at night /an analysis of truck sightings had been
made in the BR/SL areas which showed that 64% of significant sightings were
made at night, although only 31% of missions were flown at night - this
despite poor target-acquisition conditions ^{104/}. However, although CINCPAC
had made a point of stepped-up night operations, and Rolling Thunder opera-
tions orders for May and June stipulated that armed recce would be conducted
day and night, with emphasis on the latter, the night effort actually dropped
instead of going up. ^{105/} For instance, between 6 August and 2 September,
there were no USAF night strikes either in Laos or over North Vietnam. ^{106/}
This picked up in September but, through the last week of October, the Air
Force was still allocating only three to four percent of strike sorties
to night operation in Rolling Thunder. This figure rose further, to 14
percent through the first two weeks of November and, by December, 140 night

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strike sorties were scheduled each week in the RT area, along with another 107/
60 in the combined BR/SL programs.

This was another step in the development of a coherent interdiction program, but was by itself insufficient to bring out full effectiveness of the campaign. For a point of reference, from its inception 2 March 1965 until 10 December 1965, Rolling Thunder registered the following achievements 108/
in interdiction:

	<u>Destroyed</u>	<u>Damaged</u>
Transportation (incl. vehicles, RR rolling stock, ferries, river craft and aircraft)	1,258	2,012
Bridges (incl. restrikes after repair) ..	448	1,257

(Note: Numerous road and rail cuts and ferry slips destroyed/damaged. Figures not available.)

In the accomplishment of these results, the USAF flew 10,280 strike sorties over the north, dropping nearly 20,000 tons (19,872.7) of ordnance. The USN flew 11,100 strike sorties and expended over 10,500 tons (10,624.4). /This is not to imply that all sortie/tonnage figures were in support of the interdictive effort. Figures are for overall strikes./

For interdiction results in Laos, from the beginning of Barrel Roll 109/
until 10 December 1965, statistics summaries showed:

	<u>Destroyed</u>	<u>Damaged</u>
Transportation	95	100
Bridges	110	222

(Note: Numerous road cuts, landslides, fords, etc. damaged/destroyed.)

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During the period 4,773 USAF strike sorties in Laos expended 9,691.6 ^{110/} tons of ordnance, while 3,157 Navy strike sorties expended 2,947.5 tons. The above figures do not take into consideration CAP sorties, flak suppression, and other support sorties. Nor can they accurately reflect what portion of the strike sorties expended in the interdiction role - the percentage fluctuated widely because of weather diversions from one type of target to another, aircraft returning to base expending remaining ordnance on targets of opportunity, aircraft being diverted from one role to another because of higher priority, e.g., armed recce to RESCAP, etc.

In all, a total of 69,650 USAF/USN sorties were flown on out-country tasks up to 24 December 1965 when the bombing "pause" began. Of these, the Air Force flew 35,191. Over 86,274,000 pounds of bombs, rockets, missiles and ammunition were expended. ^{111/} During this period of time, the enemy had managed to increase his logistics flow into South Vietnam from an estimated figure of "...certainly less than 27 tons per day" ^{112/} (largest of several estimates) to something nearer to 300 tons per day, along with ^{113/} personnel infiltration of over 4,500 men per month. It was the impact of the latter figures upon planners that led to the formulation of the truly integrated interdiction programs that followed.

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CHAPTER II

THE INTEGRATED INTERDICTION CONCEPT - 1966

I. The Enemy Buildup

Concurrent with U.S. commitment of large numbers of troops into the Vietnam ground war in 1965, Hanoi was faced with the military certainty that their own logistic needs would soar. The communist timetable for the take-over of South Vietnam had already progressed into Phase II, and they felt prepared to institute action in Phase III - large military standing battles to crush the South Vietnamese armed forces, followed by complete subjugation of the country. American troop intervention meant sustained forces contact and this, in turn, could mean rapid burn-out of available communist supplies. ("Light combat level" logistics requirements rise over non-engaged by a factor of roughly 10 to 1.) ^{1/} The communists met the problem in typical Hanoi fashion, "pick it up and carry it south."

In May 1965, an estimate of the VC/NVA order of battle (OB) showed 71,300 VC troops and 5,200 NVA troops with a total requirement of 15 tons per day. Putting these soldiers into battle one day out of three raised the requirement to 168 tons per day. ^{2/} With U.S. troops stepping up the tempo of engagement, Hanoi countered by stepping up its infiltration of personnel and supplies, especially down through the Laotian LOCs and into South Vietnam through the western borders of I and II Corps. They also began to work feverishly on construction and improvement of roads to support the increased logistics flow. ^{3/} A PACAF Intelligence Summary noted on 7 October 1965, that:

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"...Hi alt photos on 2 Oct reveal new unnumbered road under construction in Laotian Panhandle, southward from Route 923. This marks furthest observed southern penetration of continuous vehicular road system connecting with DRV (North Vietnam) to date. If extended southward, road may bypass suspect waterborne infiltration on Se Kong River."

On 26 October, another summary amplified upon the construction activity and gave more concrete evidence of the increase in infiltration: ^{4/}

"...Communists again sending trucks into Laos via Mu Gia Pass, and will probably resume southbound truck movements in panhandle soon. Roads built or improved throughout rainy season and traffic from DRV to SVN Kontum Province will soon be possible along Routes 23, 92 and 165, and two alternate routes now under construction. 10 Oct photographs reveal vehicle tracks across Mu Gia Pass choke point. Roadwatchers reported 17 westbound trucks beyond choke point on same day. Last year, few trucks per day were reported on Route 12 until mid-Dec, southbound trucks Route 23 not reported until 20th. Extent this year's road construction suggests increase in truck traffic at earlier date than last year. A trail route (Route 911) improved east of Route 23 provides alternate link to Route 9 in Tchepone area. Route 23 from Mu Gia Pass to Route 911 appears serviceable and well used. Several new bridges on Route 92 near DMZ provide link with Routes 102 and 103 in North Vietnam. Route 92 being extended south to connect Route 165. Latter road extends east through Chavane and across SVN border. Construction includes improvements to Routes 922 and 923 and connecting link from 923 south to Chavane area. Current construction making ox cart and "jeepable" trails available to traffic, will permit through-trucking from DRV to SVN and provide alternate routes. High priority assigned to work indicates Hanoi determined continue supporting Viet Cong. More substantial traffic panhandle can be expected any time."

These and other messages confirmed the buildup in LOC capacity, the increased logistics flow, and the presence of many additional VC/NVA troops infiltrating into South Vietnam. Part of this presence was felt during the siege of the Special Forces camp at Plei Me and the battle for the Ia Drang

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Valley, in the central highlands, in October and November of 1965. Prisoners taken during and after these battles admitted being members of NVN infiltration groups. ^{5/} The Chu Phong mountain region, south of the Ia Drang, was suspected of harboring sizable supply caches and the VC/PAVN forces fought bitterly during Operation SILVER BAYONET to defend it. Ia Drang, Chu Phong and Plei Me were all just inside the SVN border, in Pleiku Province, at the very foot of the Ho Chi Minh trail. It was during these months that the by now oft-quoted figures, later expanded, "300 tons per day and 4,500 men per month" came out of intelligence compilations and promoted the question, "Why has interdiction failed, and what can we do to make it work?"

To say that it has "failed", categorically, would be placing too much blame, perhaps, on interdiction per se. The terrain, the weather, the jungle, primitive LOCs, the type of war itself, all mitigated against a clear-cut demonstration of "successful" interdiction. Artificially imposed constraints against closing off the sources, being unable to bomb or mine Haiphong harbor, for instance, kept the logistics system "open ended" - a near infinite amount of goods could be poured into it at the top to ensure whatever was necessary at the bottom. Other restrictions, as to what could be hit where and when, and with what ordnance, all lowered effectiveness.

CINCPAC admitted that, unless the restrictions against striking at the sources were lifted, especially in the Hanoi-Haiphong area, and at Port Wallut and Hong Gai, then foreign shipping would continue to resupply the

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system and the U.S. air effort could harass but not effectively deter infiltration.^{6/}

Harassment of the LOCs had certainly been accomplished, as shown by the 1965 wrap-ups, and the cost to the enemy of supporting the war in the south had been raised considerably. Time in the pipeline had unquestionably been lengthened by the air effort. Thousands of support personnel, in the form of road repair crews, guides, defense weapons manning, porters, and air defense alert personnel, had to be committed by Hanoi merely to keep the system viable. But the communists had kept the system viable, even in the face of the increased interdiction effort in the fall of 1965.

General Westmoreland, COMUSMACV, was faced with ample evidence at Plei Me, Ia Drang and Chu Phong that a sizable enemy force in-country was being re-manned and resupplied from out-country. All factors pointed to the Ho Chi Minh Trail in southeastern Laos and northeastern Cambodia as the terminal point supplying the majority of these enemy assets. General Westmoreland directed, on 15 November 1965, that a "Think Group" be formed to foster ideas and come up with recommendations for using airpower more effectively in sealing off this border infiltration.^{7/} In support of this intent, COMUSMACV directed that 2nd Air Division schedule up to 100 strike sorties per day into the Steel Tiger area.^{8/} In rapid succession, COMUSMACV requested increased USN participation in the Steel Tiger and Barrel Roll program from the previously agreed upon 32 sorties, to a total of 96 sorties per day,^{9/} and asked the Ambassador at Vientiane for defoliation of key LOCs and for B-52 participation.^{10/}

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General Westmoreland also wanted the 2AD ABCCC (C-130 Airborne Command and Control Center) in the area to direct sorties in support of the operations, and to request diversion of in-country assets in the event lucrative targets were uncovered in Steel Tiger adjacent to the border. ^{11/} COMUSMACV indicated he wanted a task force composed of Air Force, Army and Marine personnel, and that he was ready to use all assets available in South Vietnam to accomplish the job of interdiction in this critical area. In essence, this would make it an extension of the in-country war, rather than what had been thought of as an out-country effort.

Second Air Division added the proposal that this interdiction program be handled under the existing 2AD TACS (Tactical Air Control System) rather than set up a new, special operation. ^{12/} TACS already had the expertise, communications and other assets to handle the program within the present organizational setup. Under the 2AD proposal, the campaign would have ten USAF and ten Army O-1 aircraft, manned by 30 USAF crews, to accomplish VR (Visual Reconnaissance) in the area. It would also have 13 Army Mohawks - with Infra Red (IR) and Side Looking Aerial Radar (SLAR) - for night reconnaissance, and to perform VR in the more remote areas. ^{13/} COMUSMACV accepted the 2AD suggestions, and presented the plan to the Secretary of Defense at a MACV briefing in Saigon on 28 November. Mr. McNamara's response to the plans indicated full support for the requirements generated by them. ^{14/} The "Tiger Hound" task force started operation one week later.

II. Tiger Hound

Tiger Hound came into existence 5 December 1965, and started operations

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NO
SIR!
COMUSMACV
did NOT
ACCEPT
2AD
CONCEPTS

SEE WESTMORELAND'S
HISTORICAL BRIEFING

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one day later. ^{5/} It brought with it all that had previously been used in interdiction but, in addition, it brought concepts, tactics and equipment that had been used in the in-country war and found successful. By applying these in the interdiction role, Tiger Hound solved many of the problems that had so far negated interdiction effectiveness. Among the problems:

1. Overhanging jungle covered roads and trails, making them invisible to overflying armed recce flights.
2. Fast flying jets could not acquire targets because of high speed, altitude and short loiter time over the target area.
3. Lack of near real time intelligence data. Photo planes had to return to base, download, have film processed and interpreted. Mobile target intelligence decay was quite rapid.
4. No positive strike and traffic control. Previously, especially at night, uncontrolled aircraft needed large spatial separation. Often fleeting targets acquired by one flight were lost prior to the arrival of the night flight because of time delay and no positive control..
5. Lack of target validation. Under the constrained rules of engagement, many potentially lucrative targets were lost due to lengthy and convoluted procedures in getting target validated in Laos.
6. Lack of intimate knowledge of the area. A jet pilot might see one given area but five or ten times during his tour. A tire track, a new clearing, a log across a stream might have vital significance but he would be unable to recognize it.
7. Continued weight of effort was unavailable. Only too often, valuable targets escaped serious damage simply because a continuing strike potential was not available.

The Tiger Hound make-up, under the immediate direction of USAF Colonel

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John F. Groom, went a long way toward solving these problems. The first day of operation, 6 December 1965, two Ranch Hand UC-123s deployed from Tan Son Nhut airport to Da Nang to begin defoliation flights in the Tiger Hound TAOR. ^{16/} Painstakingly and at tree-top altitude, the "Trail Dust" aircraft began the job of defoliating the jungle canopy that overhung the roads. When the "burn" was complete, some weeks later, hundreds of miles of hitherto invisible roads and trails showed up with gratifying clarity. By the end of the first month of operation, the UC-123s had flown 56 sorties, expended 42,375 gallons of defoliant and had sprayed approximately 565 linear kilometers (310 nm). ^{17/}

The problem of target acquisition was greatly alleviated by the use of the little O-1 FAC airplanes, nicknamed "Hound Dog" in the Tiger Hound program. Pilots in these aircraft, flying at slow speeds and low altitudes, could and did spot targets easily missed by the fast, high-flying strike pilots. In order to keep them close to their area of operation and thus provide as much time over target as possible, the O-1s were based at four forward strips only a few moments' flying distance from the Laotian border. These were Dong Ha, an Air Force base north of Da Nang, and Khe Sanh, Kham Duc and Kontum, all Special Forces strips. ^{18/}

These FACs, with the Mohawk OV-1s, also went a long way toward solving the "real time" intelligence problem. The FACs, because of their intimate knowledge of the country, could often spot something "different", then stand off and visually re-search the area, calling for immediate strikes if necessary. The tire track or a fallen tree had meaning for them that would

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have escaped a more casual observer. The Mohawk "Spuds", with their SLAR and IR capability and cockpit read-out, could detect blacked-out truck convoys (foliage permitting) at night and immediately call for airstrikes. 19/

The C-130 ABCCC, call sign "Hillsboro", was made an airborne extension of the TACC (Tactical Air Control Center) with authority to divert strikes into the Tiger Hound area one after another, if necessary. It also functioned as a traffic controller, providing separation and timing for inbound strike aircraft, and as a coordinator between fighter and FACs for ground teams. In addition, the ABCCC aircraft alleviated much of the "validation" problem. Two Royal Laotian Air Force officers were assigned to fly on the Hillsboro flights. These officers had permission to validate targets instantly in Tiger Hound. If in doubt, they could call Vientiane or Savannakhet 20/ on single-side-band radio to get the validation, often within minutes.

Tiger Hound was expected to absorb around 100 strike sorties a day, but General Westmoreland had already said he was ready to use all assets available in South Vietnam to do the job. 21/ With this weight of effort on call it would be inconceivable that any target might escape simply because aircraft were not available. This was borne out. On occasion Hillsboro had aircraft stacked up waiting, because response was so rapid, but at no time was there insufficient airpower to accomplish a task.

A graphic example of many of the foregoing statements occurred on 23 March 1966. Late that afternoon, a Hound Dog FAC conducting VR detected what appeared to be the camouflaged tailgate of a truck near Route 92, about

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40 miles southeast of Tchepone. When closer observation revealed others, he put a call through Hillsboro for fighters. Hillsboro immediately diverted a flight into the area and the FAC put them on target. That strike, in addition to destroying and damaging many of the trucks, blew the camouflage off several others. More fighters were called in and the cycle repeated itself; besides destroying several of the previously uncovered trucks, more had their camouflage stripped off by bomb blast and more fighters were called in. Secondary explosions created chain reactions that made individual explosions impossible to count. As darkness fell, a C-130 flareship came in, and the strikes continued through the night, through the next day, and finished off with a brief flurry of activity in the early morning hours of the 25th. By the time it was over, the strike had used 215 sorties and had destroyed 47 trucks and damaged 28. ^{22/}

In actuality, Tiger Hound got off to an inauspicious start in December, as people learned each other's roles and capabilities. Prior to its inception, COMUSMACV delegated to 2nd Air Division complete responsibility for planning, scheduling and conduct for all U.S. strike operations in Laos, including Barrel Roll, Steel Tiger and Tiger Hound. ^{23/} In a message to CINCPAC, ^{24/} COMUSMACV submitted the following comment:

"Of necessity, we are embarked on a major air campaign in Laos. We feel that such a campaign should be executed by the Commander 2AD on behalf of COMUSMACV because he has the staff, the knowledge and the where-withal. The success of this campaign will weigh heavily in the outcome of the war in Vietnam."

The first steps were tentative ones, feeling out the situation. The

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Tiger Hound TAOR (Tactical Area of Responsibility) extended roughly from a line parallel to the DMZ down to the Cambodian border (see TH depiction). Initially the special Tiger Hound zones contained 29 RLAF "Priority Alpha" targets - those targets that could be attacked without further Vientiane coordination except inclusion in the daily Op-1. More were added immediately, until by mid-January the figure had grown to 69 valid targets, of which 52 had been struck at least once. ^{25/} Commenting upon this early period, Colonel Groom said: ^{26/}

"...During this month of December and part of January, we concentrated most of our efforts on these fixed RLAF targets. Frankly, we weren't getting a lot out of them - we were getting many secondary explosions, indicating that we were getting supplies and ammo. However, we didn't see much truck traffic or evidence that the Viet Cong were using the Ho Chi Minh Trail for this purpose. However, the FACs were discovering, during the day, evidence of this traffic. That is, tire prints along the roads, dust accumulated on the trees; but we did not see any traffic at all. If you look at the statistics you'll find out that, probably in December, we saw or hit something like a dozen trucks."

January 1966 showed improvement over December's unimpressive figures as the FACs began to learn their VR (visual recce) areas. Spray operations began to show defoliation burns and the operation, generally, began to take on maturity. A total of 3476 strike sorties were flown, expending 3286 tons of ordnance, but only 15 trucks were destroyed and eight damaged. However, 41 bridges went down and another 36 were damaged. Strikes put 22 AAA/AW ^{27/} positions out of commission and triggered off 133 secondary explosions.

It was in February, however, that all the elements comprising Tiger Hound crystallized into a solid, effective interdiction program. As in

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South Vietnam, Tiger Hound was divided into VR areas, and the FACs had become far more familiar with their respective territories. Long stretches of motorable routes had become visible through the bare limbs of defoliated trees, making detection of signs of traffic far easier. Increased emphasis on night operations, use of AC-47s, target acquisition through the IR and SLAR capabilities of the OV-1s, plus roadwatch reports from CAS (Controlled American Sources) and Shining Brass (Special Forces covert operations) - all began to pay off. Between 4 - 17 February, 111 vehicles were damaged or destroyed, prompting PACAF to remark, "...by far the highest total ever reported in a single area for any operation in Southeast Asia." ^{28/} The next two week period set a new record, with 133 vehicles destroyed or damaged. ^{29/} Results, viewed as "fantastic" at first, continued to climb. Total results for February far outweighed all previous figures. Task Force statistics showed 125 trucks destroyed, 58 damaged; 35 bridges collapsed, 45 damaged; 46 landslides, and 135 secondary explosions. Thus in one month's operation - and that one of the shortest months of the year - Tiger Hound ^{30/} surpassed all of the 1965 truck kills in Laos.

March promptly surpassed February's figures, in many cases by double. With sortie rate averaging nearly 141 aircraft per day, 221 trucks were destroyed and 123 damaged. Forty-four landslides were created and 423 road segments cut, cratered or seeded. Twenty bridges were dropped and another 22 damaged. Eighty AAA/AW were put out of action, 960 enemy ^{31/} structures destroyed, and the secondary explosion count soared to 475.

As if March's statistics were not impressive enough, those of April set

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yet new records, including a two-day high figure for vehicles destroyed/damaged. On 20 April, FACs called in strikes that accounted for 40 trucks destroyed and 14 damaged. The next day more strikes were poured in at five locations, accounting for another 17 vehicles destroyed, six more damaged. It was a two-day total of 57 destroyed/20 damaged with 37 secondary explosions. ^{32/} The month's total reached the all-time high of 325 trucks destroyed and 205 damaged. Secondary explosions totaled 442. ^{33/} On April 27th, an Air Force strike registered the 1,000th truck destroyed/damaged since the inception of the Tiger Hound campaign. ^{34/}

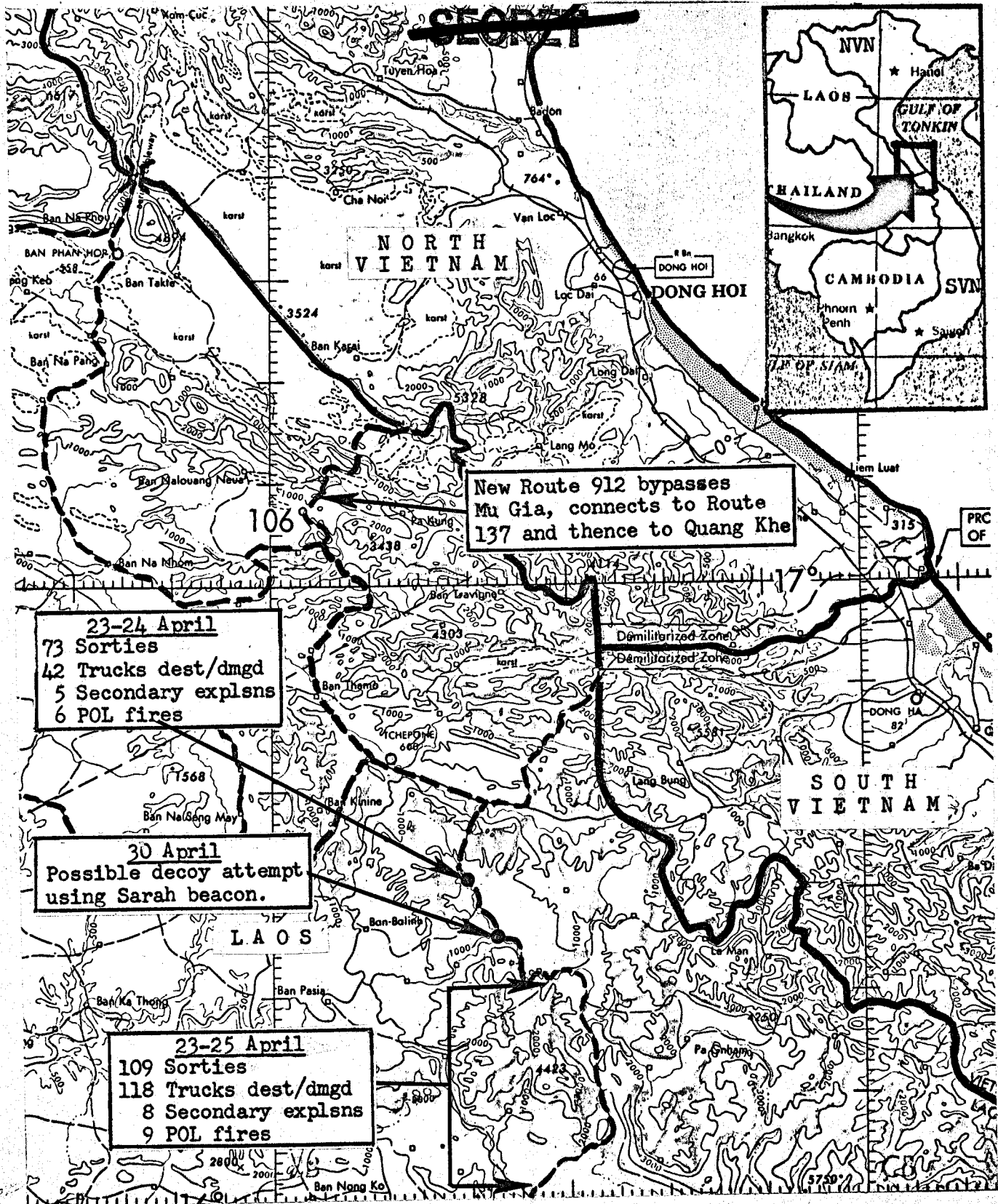
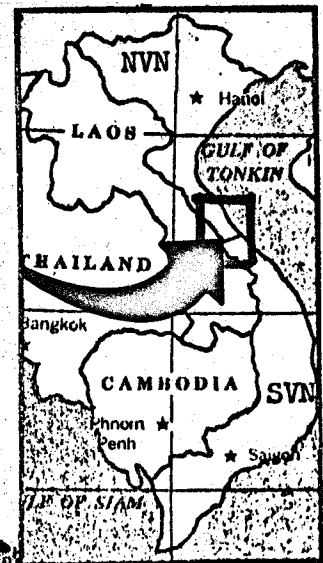
In May the figures began to decline, coincident with the onset of the monsoon season, either because of the difficulties involved in motoring supplies over the bomb-shattered roads in wet weather, or because the Tiger Hound efforts made it unprofitable. In June results dropped to a negligible level and, to all intents and purposes, the Tiger Hound program was over - at least until traffic again showed up on the roads and trails of southeastern Laos. Statistics for the first six months of Tiger Hound showed that, although the enemy may have been getting some of his logistics requirement through, he was now paying a stiff price for it: ^{35/}

Trucks destroyed/damaged	854/538
Roads cut/landslides	1430/157
Bridges destroyed/damaged	122/143
Structures destroyed/damaged	2269/830
Secondary explosions	1336

Colonel Groom gave what was possibly the greatest individual credit, for the successes scored in Tiger Hound, to the forward air controllers for their

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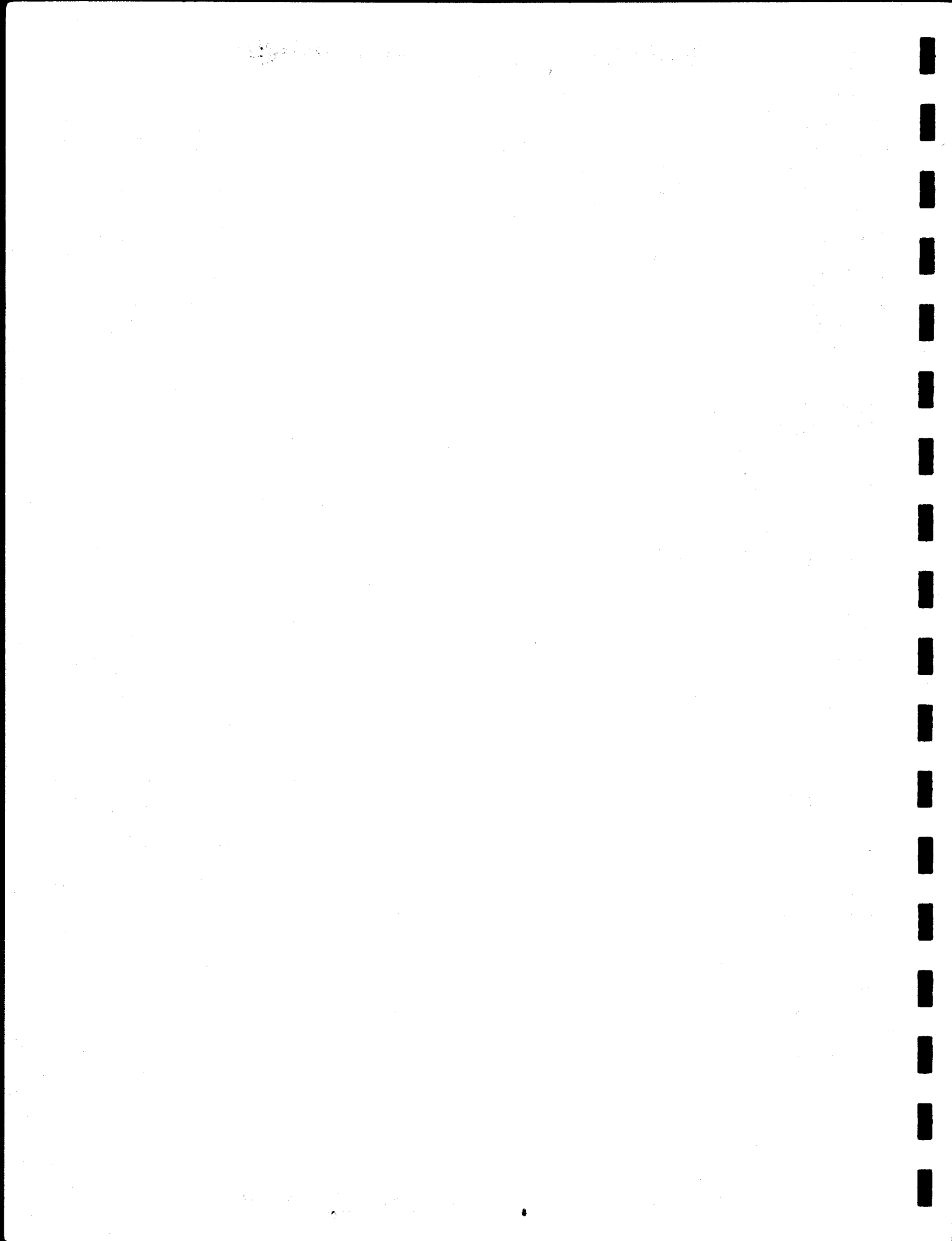
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ACTIVITY IN NORTHERN TIGER HOUND

Fig. 4

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courage and persistence in going down on the deck to seek out the truck parks and supply dumps, invariably camouflaged and hidden deeply in the thick jungle. As for the overall effectiveness, Colonel Groom felt it was the unrelenting 24-hour-a-day operation, along with the control afforded by the ABCCC and the opening up of the jungle canopy by the Ranch Hand crews that added up to the record breaking statistics. Of these results he said: ^{36/}

"...A year ago at this time the propaganda was openly published that they /VC and NVA/ were going to set up a city or a province or a government within South Vietnam, and they would probably take over IV Corps and maybe I Corps. They did try last year on numerous occasions to initiate battles and take over Special Forces camps, but this year you don't hear any of this. There is very little evidence that the Viet Cong is confident today as he was a year ago, and I think of course a lot of this can be attributed to the interdiction programs that we have throughout Southeast Asia - not only Tiger Hound, but the work that we're doing north of the DMZ, and the work that the Naval forces are doing, cutting off the approaches from the sea."

While it is unquestionably true that all the interdiction efforts were mutually self-supporting, Tiger Hound was the first to give documentable evidence that an integrated interdiction concept, using all available assets in an around-the-clock campaign, was the most effective system so far devised. It showed that a concentrated and dedicated effort, making the most of these assets, not applied piecemeal or spread thin, was capable of scoring startling results.

III. Cricket

In north Steel Tiger, the area above Tiger Hound in Laos, a program

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similar to in many respects, but not patterned after Tiger Hound was started in January, 1966. This program was called "Cricket". Cricket began out of Udorn, Thailand, 21 January 1966, as an O-1 and CAS (Controlled American Sources) oriented attack on the interdiction problem. ^{37/} The basic Cricket area of operation was that part of Steel Tiger north of Tiger Hound to approximately a line parallel with Ban Nape Pass. Without the heavy weight of effort afforded the Tiger Hound operation, Cricket made use of in-place assets - the CAS roadwatch teams ^{1/N} [infiltrated] into Laos. Operating under basically the same ground rules as Tiger Hound, Cricket was termed an immediate success. With only five O-1s at the beginning of the program, the following results were posted at the end of the first two weeks campaign: ^{38/}

CAS ²⁰⁰
or
Carson?

- 250 KBA (FAC estimate and roadwatch confirmed).
- 56 trucks destroyed.
- 19 gun emplacements destroyed.
- 2 bridges damaged.
- 13 buildings destroyed.
- 38 secondary explosions and numerous fires of POL and supplies noted in truck parks.
- 150 barrels of POL destroyed.

At first, the level of sophistication of the program was not high. Roadwatch teams could not communicate directly with the O-1s but had to radio information back to Vientiane or Udorn, from whence it was eventually passed on to the FACs. A standard, five-step procedure was followed which took ten ^{39/} to 12 hours but, nevertheless, produced results. The CAS team would radio to Udorn their sighting (route, location, speed of movement and direction) of a truck convoy. At first light a photo recce aircraft would take detailed photographs of the area where (by time reckoning) the convoy should have

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stopped for the day. Photo interpreters in the Intelligence Section of Dep. Cmdr., 2AD/13AF, Thailand, would attempt to locate either the trucks, themselves, or the most likely locations for truck parks. This information would be passed on to the Cricket FAC (call sign "Gombey"), who would visually inspect these areas. If he spotted his target, he called in the strike aircraft and functioned as a forward air controller (FAC).

As far removed from real-time targeting as this was, it was effective, primarily because of the on-the-spot validity of the original report. Among ^{40/} the highlights of the first few weeks were these:

On 23 January 1966, Roadwatch Team 20 reported a target on Route 8. 0-1 FAC confirmed target and called strikes. Pilots reported gun positions hit, two trucks destroyed and entire area repeatedly strafed.

At 0545 hours, 24 January 1966, a truck convoy moved past roadwatch team on Route 911. FAC flew over the area where truck would probably be concealed and called in strike aircraft on briefed target. Strike aircraft stated two trucks were sighted in well concealed truck park. The two sighted trucks were destroyed and in addition a secondary explosion was noted.

On the afternoon of 25 January 1966, 0-1E located truck park and 100 troops on Route 8. FAC marked the target for USN A-6 and four F-105s. Two gun positions destroyed, estimated 200 enemy troops killed by air, two large POL tanks ruptured and left burning.

On 25 January 1966, two truck parks on Route 23 were hit. Two trucks were sighted and destroyed. Seventeen trucks were sighted on Route 23, southwest of Mu Gia Pass. Seven trucks were destroyed and an additional four trucks were probably destroyed. After initial strike, ten additional trucks were sighted fleeing the area, but no strike aircraft with ordnance were available at the time.

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On 25 January 1966, a roadwatch team on Route 12 sighted a convoy. A total of 11 trucks destroyed. Part of the truck park which was covered by tree canopy was hit blind resulting in a large secondary explosion.

On 8 February 1966, four F-105s, two AlHs, an F4C and an F-8 expended against camouflaged trucks on Route 8 south of Nape Pass, destroying five and causing two secondary explosions.

One of the men credited with forging the Cricket concept and putting it into being was Colonel James P. Hagerstrom, Director of TACC at Udorn. Colonel Hagerstrom had long been concerned about the relative ineffectiveness of interdiction efforts in Southeast Asia. His primary concerns were "where the interdiction effort should be placed" and "the concentration of that effort." ^{41/} In his end of tour report, Colonel Hagerstrom stated:

"...The task of interdicting men and materiel into RVN is really a product of total Southeast Asia interdiction. If an interdiction program is limited to that part of Laos immediately contiguous to RVN the result at best would affect I Corps and part of II Corps. Proper interdiction of the LOCs as they first enter Laos would result in limiting the flow into Thailand, Southern Laos, Cambodia and in turn into all of the RVN. The optimum point to control the flow in SEA then lies somewhere near the entry of the LOCs into Laos from the DRV."

It was in this area, and at these basic arteries, that the Cricket program ^{42/} was aimed. Colonel Hagerstrom said further:

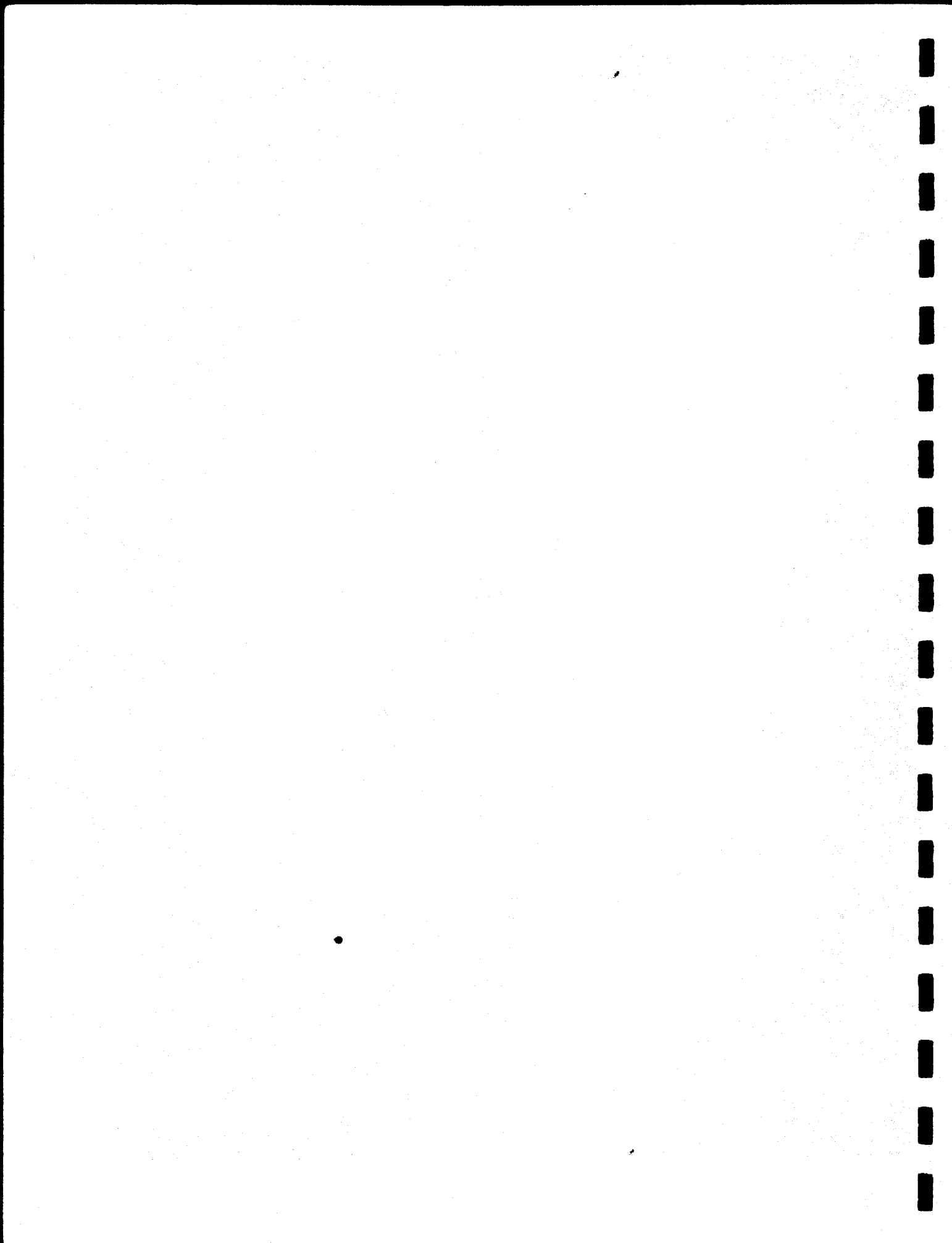
"...It follows then that sufficient concentration of forces must be put in to optimum the area. Anything less results in such a dilution as to have de minimus overall effect. The control of this effort should be placed where the best intelligence is available and in

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Fig. 5

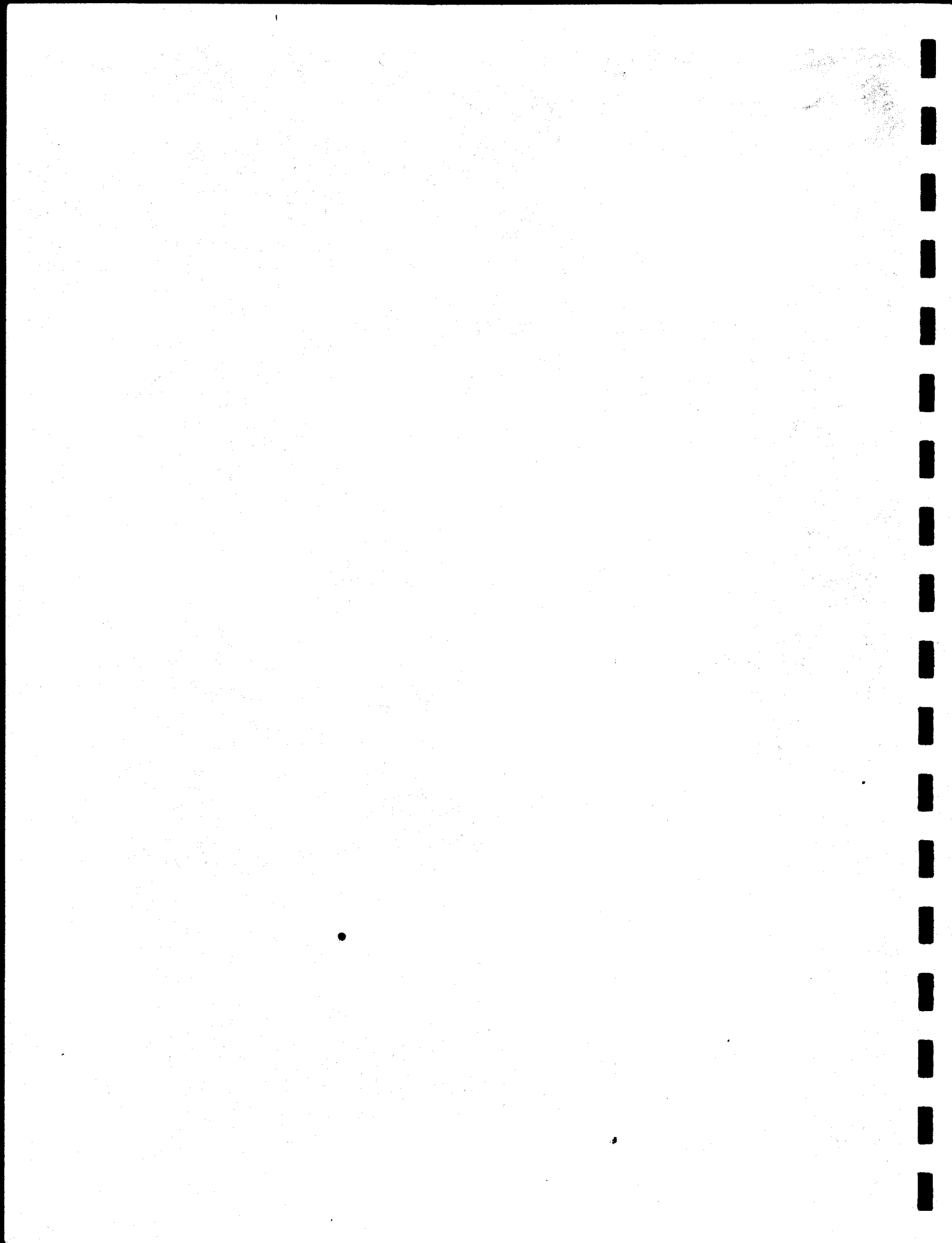
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Fig. 6

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an atmosphere where proper concentrated attention can be given it. At present such eye-to-eye intelligence is available at Udorn. In addition, the basic facilities and organization structure are also at this location. Interdiction in Southeast Asia is one problem and should be prosecuted as such."

The role of the O-1 aircraft in both Cricket and in Tiger Hound was basically the same, visual reconnaissance and forward air controlling of strikes once the target was acquired. Their basic differences related merely to facilities and equipment, i.e., roadwatch teams for Cricket and the ABCCC for Tiger Hound. Lieutenant General Moore was aware of the differences and the advantages accruing from each and cited these in a letter to General Westmoreland. ^{43/} General Moore pointed out that the Cricket FACs had the ^{10 to 12 hours?} advantage of accurate and timely intelligence information, while the Tiger Hound FACs gained from the on-station ABCCC with its ability to get immediate attacks against targets of opportunity. ^{44/} He felt that roadwatch teams should be set up for the Tiger Hound area and noted that two C-47s were being made available to Udorn for use as ABCCC in the Steel Tiger and Barrel Roll areas. He said: ^{45/}

"Meanwhile, 2nd Air Division has encouraged the Cricket FACs to request air support directly from the Tiger Hound ABCCC when strike aircraft are not available to them from Thai based resources."

To avoid any feeling that the two operations were competing with each other, General Moore stated: ^{46/}

"...I see these operations as complementing each other and believe the O-1 aircraft are equally effective in

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both systems. The ABCCC concept has proven itself to be extremely versatile and effective in the Laotian air control role. This technique could well be expanded to provide an airborne DASC (Direct Air Support Center) for the entire Steel Tiger area."

Roadwatch teams subsequently were integrated into the Tiger Hound scheme and the C-47s, as "Dogpatch", acted as ABCCCs in the northern Steel Tiger sectors and in Barrel Roll.

Along with the O-1s for daytime use, AC-47s were put into use in the FAC (and also attack) role at night. A typical Cricket DISUM (Daily Intelligence Summary) for this early period illustrates the multi-purpose role handled by the venerable "Spooky" aircraft: ^{47/}

"...On night of 27 Mar Cricket AC-47 (Spooky 41/43/42) flew armed recce in ERP-1. A. Spooky 41 was unable to establish contact with CAS roadwatch teams. 6000 rounds 7.62 were expended on RLAF Tgt Nr 109. No damage was visible. 6000 rounds was expended on a truck sighted at XD 0205 and over surrounding area. No BDA. B. Spooky 43 did not attempt CAS team contact. RLAF Tgts 109 and 548 received 7500 and 3000 rounds. No BDA. Flares were dropped over RLAF Tgt 527, truck park, but no probable tgts were sighted. C. Spooky 42 was unable to contact first two CAS teams on prearranged schedule. Acft then went to area where Spooky 41 had sighted a truck. Upon arrival a 2 mile convoy was sighted moving south on Rt 911. 6000 rounds were expended. Many trucks pulled off highway. Spooky and Blindbat (C-130 flareship) directed AF and Navy fighters onto tgts. No BDA from Spooky (who has requested API ammo be provided.) Several secondary explosions from fighter strikes."

The DISUM went on to cover the day's activities by the Gombey O-1s. The total wrap-up listed a minimum of four trucks destroyed (expected to be many more from the night strikes but BDA impossible because of darkness) and

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one damaged; four bridges dropped or approaches cratered; "several" secondary explosions; numerous road cuts and craters; stacks of crates left burning; and "coolies sighted running into undergrowth." ^{48/}

The day-night continuing effort, coupled with the intelligence input from the CAS teams, made up what was probably the most "cost-effective" interdiction apparatus of the war. It worked so well that, on the major new road and by-pass construction in the area, workers began to "trellis" the routes in an effort to keep them from prying eyes. Lattice-work of bamboo frames was suspended over the roads, apparently with the aim of training the nearby plants into inter-twining through the bamboo and covering the road; construction activity on new routes and by-passes for old ones was constantly noted by Cricket FACs. March DISUMS said: ^{49/}

TRELLISING
BEGAN
YEARS
AGO!

"(19 March) C. Gombey 21/13: 1. 4/F-105 (Tulip) responded to request for strike at XD 090903. Flight had only 20mm and expended against personnel constructing road and lattice over the road. No BDA. 2. Gombey 13 was one of original surveyors of the new route from XD 020955 to NVN border. Gombey 21 had been over area the last of Feb. Both FACs were amazed at progress on road construction, primarily south of XD 1394. Lattice work of bamboo over majority of route has been used extensively in probable hope of training foliage to cover road completely. Sighted 20 personnel running for cover vicinity XD 2001.

"(23 March) 4. Crew recommends defoliation of new road that leads northeast from Rt 911 at XD 020850 to the NVN border before lattice-trained foliage completely hides the route.

"Part 3. ...A. The effort and engineering being put into the construction of the new route from XD 0285 to the NVN border indicates renewed effort to move supplies through

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Laos. This route could well replace Mu Gia Pass as a primary entry point. It is being constructed on high ground with crushed rock fill, and avoids easily interdicted points such as rivers and karst passes. Additionally, bamboo frames are being constructed over the entire route." 50/

*General
Wholesale
decrease
to support
A-26K for
AC-47
AM F-4D
66*

The unending struggle between attempts to interdict and efforts to keep from being interdicted continued. As good a job as the AC-47 did in its night role, it was determined that it simply did not have the survivability to continue operations in the heavy AW/AAA environment of that section in Laos. Following much message traffic, ^{no} pro and con, it was decided that B-26Ks would take over the night effort over Laos and the AC-47s would return to the more permissive South Vietnam environment. Prior to the deployment of the B-26s, the Secretary of the Air Force cautioned all commands along the way not to use the term "B"-26. 51/ In deference to the Thai government's wishes not to have "B" aircraft on Thai soil ("B", standing for "bomber", would denote aircraft whose characteristics were offensive in nature - "F", "A" or "O" could be taken as defensive in character, and therefore "acceptable" in world opinion) the Secretary stipulated that all reference to the airplanes would be as the "A-26A".

The A-26s flew their first missions in the Cricket area on 21 June 1966 (in the daytime, as an area orientation function), strafing a truck shelter, under Gombey direction, and firing 7.62mm and .50 caliber machine-gune fire into suspected truck parks. 52/ The next day they were back, with rockets, .50 caliber and napalm working over gun positions suspected of shooting down a Gombey O-1 earlier in the day. 53/

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Although Tiger Hound continued to absorb 70 percent of the available sorties going into May and June 1966, Cricket made good use of what they got, including defoliation of Routes 911 and 912 mentioned previously. ^{54/} As the increased cloudiness and rainy periods (associated with the change of the monsoon) came in May, slightly over 18 percent of strike sorties in Steel Tiger/Tiger Hound were cancelled because of poor target weather. ^{55/} In June, the sortie rate declined even further, to the lowest since December 1965. ^{56/} The reasons given for the decrease were:

- Poor target weather in Laos.
- Increased effort in North Vietnam.
- Targets not available, ground alert aircraft not launched.
- Reduced supply of munitions.

The foregoing would not tell the whole story, however. Results and intelligence, both from North and South Laos, indicated that seven months of concentrated interdiction in the Tiger Hound and Cricket areas, had greatly reduced the ability of North Vietnam to perform the dual role of providing support to the Pathet Lao and to the Viet Cong. ^{57/} Further, both antiaircraft incidents and aircraft losses over Laos fell to one-half what they had been in May. Seventh Air Force attributed this to a reduced requirement, on the part of the enemy, to defend LOCs no longer usable because of interdiction and inundation. ^{58/}

7
OTHER
SOURCE
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INCREASED

IV. Gate Guard and Tally Ho

With the turn of the tropical convergence and the onset of monsoonal weather in Laos, and the attendant sealing off of the LOCs, North Vietnam

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shifted its primary infiltration effort to the Demilitarized Zone itself. Before this was fully apparent, however, the successes of Tiger Hound and Cricket prompted planners to try for a "roll-back" of the enemy supply lines in North Vietnam itself. More than 1,000 vehicles were counted in the southern portion of North Vietnam during an April survey. These constituted a valuable target base if "gates" could be thrown up to jam them into exploitable areas. This was the "Gate Guard" concept.

The idea was to set up a series of gates across easily interdicted LOCs in North Vietnam's Route Packages 1 and the Extended Route Package 1 in Laos. These gates ran basically east and west, and it was felt that, as the southernmost one was plugged up and traffic above it was exploited, the program could move to the next one north. ^{59/} The program began on 1 May 1966, with selected interdiction points (SIPs) on Routes 1A, 101, 102, and 103 in North Vietnam, and Routes 23, 911 and 912 in Laos. The intention was to interdict these

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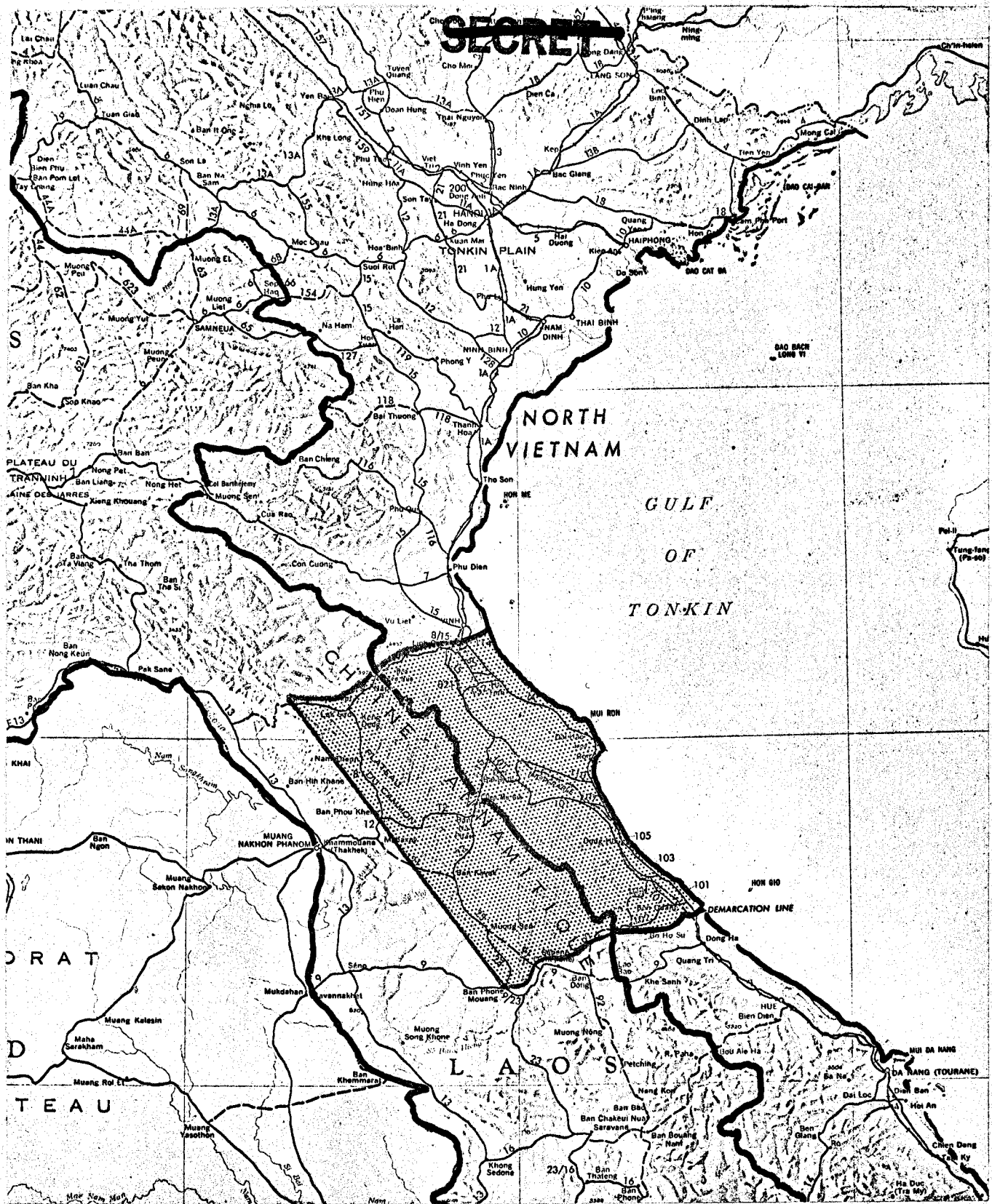
routes in the daytime, then to return at night to catch the bottlenecked traffic. ^{60/} In truth the program did acquire and destroy more mobile targets at night than in the daylight hours. The following results in Route Package 1, for the period (3 April) until 7 June 1966, illustrate this.

NOT
GATE
GUARD

	DAY		NIGHT	
	Dest	Damage	Dest	Damage
Trucks	154	126	164	285
Interdictions	685	132	148	80
AAA/AW Sites	69	43	38	31
Military Areas	28	172	14	128

Unfortunately, this interdiction effort suffered some drawbacks that were readily apparent when compared to Tiger Hound and Cricket. The

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GATE GUARD OPERATIONAL AREA

Fig. 7

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environment was entirely too hostile for O-1 aircraft, thus negating visual reconnaissance of the order it was known in the other two programs. This applies also to FAC direction of strikes. Interdiction points themselves, particularly on the most vital routes, were on flat coastal land, easy to by-pass or repair, and night strike pilots often found them by-passed early in the evenings. There were few truck parks in which to locate large numbers of vehicles, since they could be stored and serviced in the numerous small villages of North Vietnam, with the enemy secure in their knowledge that the U.S. strike forces would not attack these civilian communities. ^{62/} These and other factors mitigated against the program.

That it achieved some measure of success could be credited, in large part, to the thoroughness of the night program. The C-130 flareship, also a low survivability aircraft, was able to operate at night in Route Package 1 as long as ECM B-66Bs were on station to degrade the radar gun-laying capabilities of the Fire Can radar. As long as the B-66s could accomplish this, the C-130 could fly blacked-out, above the small arms and automatic weapons envelope in comparative safety. ^{63/}

Events, however, rapidly overtook the Gate Guard program when it was determined that the communists, in direct and flagrant violation of the 1954 Accords, had undertaken direct infiltration into and through the DMZ. ^{64/} What was considered of vital importance was that the 324B Division of the North Vietnamese Army had crossed the DMZ and was massed in I Corps. This division (8,000 to 10,000 strong) constituted a valid and immediate threat to Quang Tri and Thua Thien provinces. Its mission, apparently, was to

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deliver a sudden and overwhelming attack against these northernmost areas of South Vietnam. ^{65/}

As an immediate counter to the enemy's plan, General Westmoreland ordered a spoiling attack - Operations HASTINGS - be launched against the 324B before it could put its own plans into action. Hastings began on 7 July 1966 and, supported by continued air strikes and artillery bombardment, the U.S. Marines (along with sizable ARVN units) were on their way to battering the enemy back into the DMZ and into North Vietnam. The question ^{66/} of what to do with the infiltration routes through the DMZ remained, however. The threat, if diminished, was certainly not ended. The enemy could be counted upon to come through again, unless stopped, and his presence in the critical northern province would be a constant threat to Dong Ha, Quang Tri City and Hue itself.

Much earlier COMUSMACV had sought permission to conduct operations within the DMZ if the enemy infiltrated there, and if the need arose, but was told that such authorization was encountering high level problems in Washington. ^{67/} After considerable message traffic between Saigon, Honolulu and the Pentagon, COMUSMACV got the point across, and CINCPAC advised JCS that, "...all evidence confirms MACV reports that NVA is transiting the ^{68/} DMZ...." CINCPAC went on to say:

"...Heavy buildup in I Corps and expressed determination to continue large scale support to the VC requires NVA to seek multiple shorter routes of infiltration. This can only be through the DMZ. It appears NVN has abandoned all pretense of respect for neutrality of the DMZ and is now embarked upon additional infiltration and supply means.

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COMUSMACV is now concentrating extremely heavy air operations both day and night in Route Package I and northern I Corps. The existence of a 10 kilometer prohibited strip lying across the entire battlefield could become an increasingly costly impediment to effective operations."

With this CINCPAC support, and authorization for such a program imminent, General Westmoreland asked Lt. General William W. Momyer to develop a plan similar to Tiger Hound for the southern part of Route Package 1, and to include the eventual operations in the DMZ itself. 69/

COMUSMACV had his own concept of these operations, which would be called "Tally Ho". As he saw it, Tally Ho should include the same heavy air surveillance that characterized Tiger Hound, to "locate and destroy vehicles, supply caches and logistical areas." He made it clear, however, that Tiger Hound itself was not to be abandoned. He stated: 70/

"...the emphasis now is to develop a new operation to correspond to the pattern of enemy action in the new area of enemy buildup. The weight of our air effort must be placed where the enemy is putting the weight of his effort, and where targets are now located. The enemy's operational area has shifted; we must shift."

The General estimated that Tally Ho would probably continue into January 1967, when it was likely that the emphasis would shift back to the Tiger Hound area. 71/

The basic structure for a Tally Ho task force already existed in the task force formed in December 1965 to conduct Tiger Hound. Since Tiger Hound operations had been greatly thinned-out, following the May drop-off in targets, it was decided that the Tiger Hound staff could manage Tally Ho.

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This promised many advantages. The staff and task force were experienced, in-being, and on hand in I Corps; procedures were known and streamlined; tactics proved and effective. Further, when the LOCs in the Tiger Hound area dried up and the enemy attempted to use them again, ostensibly in January 1967, the task force would still be intact, ready to swing back to heavy operations over Laos.

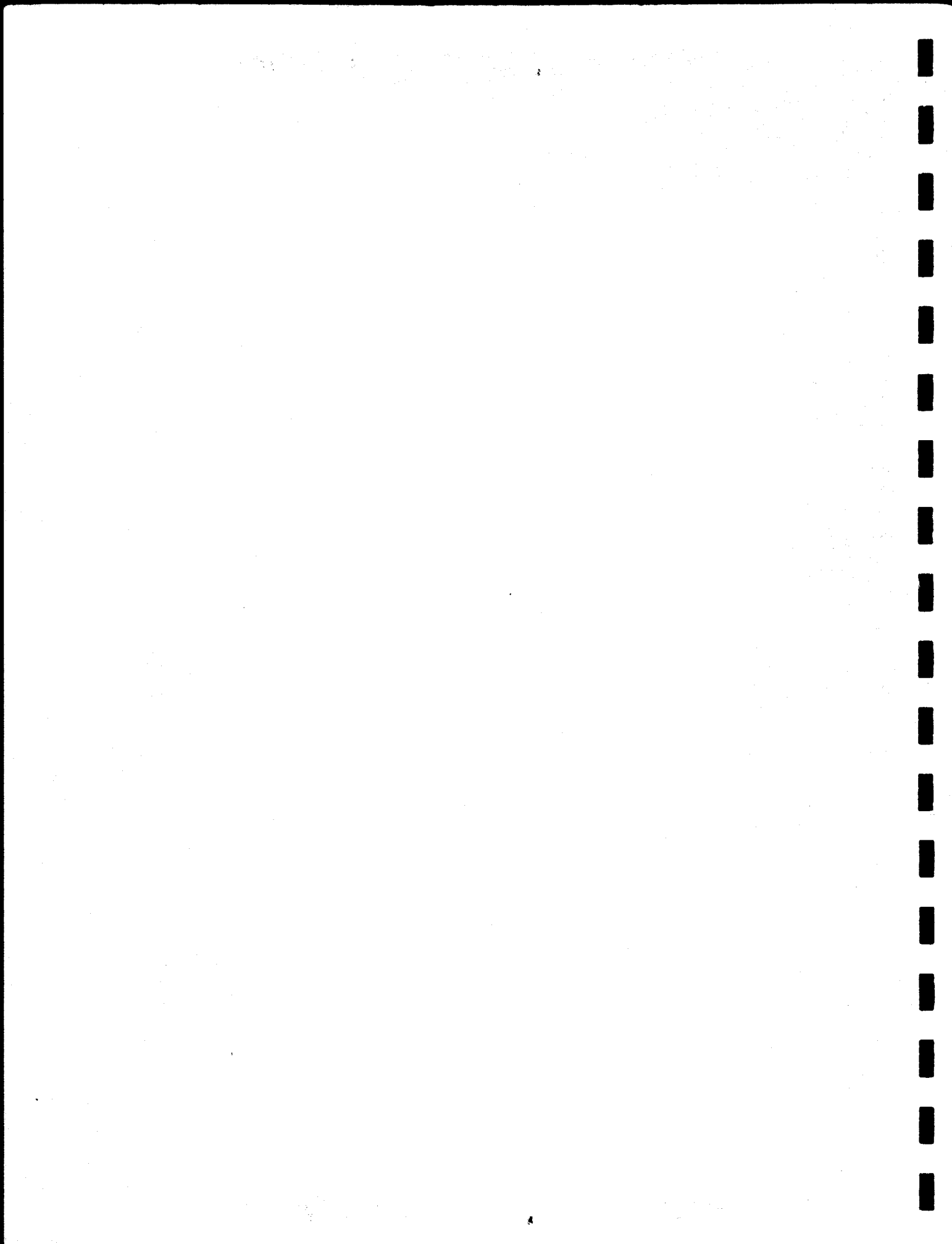
Tally Ho got into operation 20 July 1966, with an approximate planned sortie rate of 80 strike sorties per day; Tiger Hound was to be phased down ^{72/} to about 15 to 20 sorties a day. With all its planned similarities to the parent program, it was rapidly apparent that Tally Ho and Tiger Hound were not the same. The ground fire encountered was far heavier than Tiger Hound, and FACs quickly gave up their former habits of loitering at 150 feet above the tree-tops; they had to VR at 1,500 feet, for safety, which made target acquisition far more difficult. In the eastern portion of the Tally Ho area, where the motorable roads were, no altitude was permissive to the O-1s because of the concentration of 37mm and 57mm AAA, thus they were limited to that area west of a line roughly up the center of the Tally Ho TAOR. Within days, the line was moved even further west after Lt. Col. Edward Abersold, Tally Ho Advanced Commander at Da Nang, was hit by either 37/57mm and was forced to crash land. ^{73/} This restriction limited Tiger Hound FACs to the areas away from their potentially most lucrative targets, and additionally placed them over extremely thick jungle and mountainous terrain where their effectiveness was further reduced. As if this were not enough, turbulence over the mountains was described by the FACs as "...some of the worst

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[illegible]

Fig. 8

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turbulence I've experienced in the 0-1." ^{74/}

Despite the weather and the other limitations, Tally Ho forward air controllers uncovered some of the most lucrative targets of the war. On 25 July, just five days after the start of the program, and while Operation HASTINGS was still raging below them, Lt. Col. Abersold and Major Robert J. Smyth, Commander of the detachment at Dong Ha, spotted two trucks beside the road in an area suggested to them by IR returns. Lt. Col. Abersold recalled later: ^{75/}

"...I put two sticks in and got the trucks. I made a further inspection of the area...and sighted what looked to me like three trucks covered by foliage. I was sure they were trucks, but when I got the foliage blown off, it was a long line of supplies, maybe 200 feet long, ten feet high and ten feet wide. I turned it over to another FAC, and they started putting in strikes, and they started getting secondary explosions, and this went on for a day and a half. I estimate that a hundred tons of ammo went up."

A total of 50 strike sorties were pulled in to bomb the ammunition stockpile. They set off a continuing series of secondary explosions that reached a count of over 200 by the day's end. Major Smyth said: ^{76/}

"...This was by far the largest ammo dump that I have ever seen. All FACs put strikes in on this area, an extremely large one. A very lucrative target. We put air on it all day long up until 1900 or 1930 hours. We were getting large secondaries. One secondary every 15 or 20 seconds. On the next day, we went back and found another part of the dump and it was also extremely lucrative."

The following day, 30 more sorties were called in on this target and another 13 secondary explosions were observed.

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By this time, the U.S. Marines were mopping up Operation HASTINGS and the NVN 324B Division was withdrawing through the DMZ. It was more or less accepted that the huge ammunition dump destroyed by Tally Ho contained the reserve ammunition needed by the 324th to sustain the battle, and that the loss of it hastened their retreat. When Hastings was officially terminated on 3 August, at least 824 of the enemy had been killed, with a great deal of the credit going to Tally Ho. ^{77/}

Through August, Tally Ho concentrated on day strikes, under Hound Dog control, in the western section and night strikes, under Blindbat, on the roads and traffic in the eastern section. While infiltration definitely had not been stopped, it was generally agreed that the enemy had been hit hard enough to reduce his attack potential. No large number of vehicles had been found - only 32 destroyed and 20 damaged by the end of August, but this was predictable, considering that the FACs could not operate over the eastern end where the roads were. However, the worth of the program was evidenced ^{78/} by the large tally of secondary explosions, 806 in all, in just 40 days. These denied the enemy much-needed ammunition and POL and greatly lowered the communists' ability to engage in large scale battles in the northern provinces.

Throughout September and into October, it was felt, especially by Lt. General Walt, Commander of the Marines' II MAF at Da Nang, that the enemy must launch a major attack soon. The communists had a very real need for a decisive and major victory, if only for psychological reasons, and this had been denied them in all Corps areas for over a year. General Walt believed that a massive NVA offensive in I Corps was imminent, regardless of

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losses the enemy might incur. ^{79/}

However, this offensive did not occur in the first weeks of October and, on the 10th of that month, a 7th Air Force briefing to Secretary of Defense McNamara and Ambassador Lodge may have contained the explanation. Brigadier General C. M. Talbott, Deputy Director of TACC, gave the briefing, in which ^{80/} he assessed the achievements of the air interdiction program. He said:

"...Mr. Secretary, you are well aware of the compound difficulties which prevent accurate quantitative assessment of the effect of the air interdiction program upon the enemy. Notwithstanding these difficulties, however, in our judgment the air interdiction program carried on by U.S. Air Force, Marine and Naval strike aircraft and supported by a comprehensive reconnaissance effort, had produced these major results.

"In North Vietnam and Laos the enemy has been forced to divert major resources from his support of the insurgency in the south in order to repair and maintain his LOCs, move AAA pieces and provide crews with food and ammunition, handle and disperse POL stocks and still meet the bare essentials of purely civilian transport requirements.

"If half of the trucks destroyed and damaged were carrying average loads of two tons, then over 3,000 tons of enemy supplies have been destroyed and over 2,400 tons damaged by strikes against trucks alone. Nearly 5,000 secondary explosions touched off and the total of more than 7,000 structures destroyed and damaged surely reflect a substantial reduction in the amount of enemy supplies reaching South Vietnam.

"Taking into account these indications of damage to enemy supplies, both stored and enroute, and noting the restrictive effects which our air presence has upon enemy capability to move his supplies over primary LOCs, may place the lack of initiative of enemy forces in South Vietnam in the more understandable perspective. Constant pressure by friendly forces in SVN may well be forcing the enemy to expend supplies at a

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rate which his inadequate supply system cannot replace. Without a great increase in the quantities of supplies received from sea and through Cambodia, it may be that the enemy has reached the limit of his supply capability.

"These conclusions are supported by reports of the conditions of VC/NVA troops in South Vietnam and the enemy's decision to move his primary infiltration avenue to the DMZ, which is closer to his defendable LOCs. Overall, NVA troops are underfed and overworked, harassed by friendly ground thrusts, artillery, and tactical air strikes; their ranks are decimated by casualties and disease; and they are isolated from the populace they were told would welcome them with open arms.

"There is no doubt that air interdiction operations have made - at least insofar as enemy personnel and supply losses in South Vietnam are concerned - a major contribution to the continued success of the military phase of this conflict."

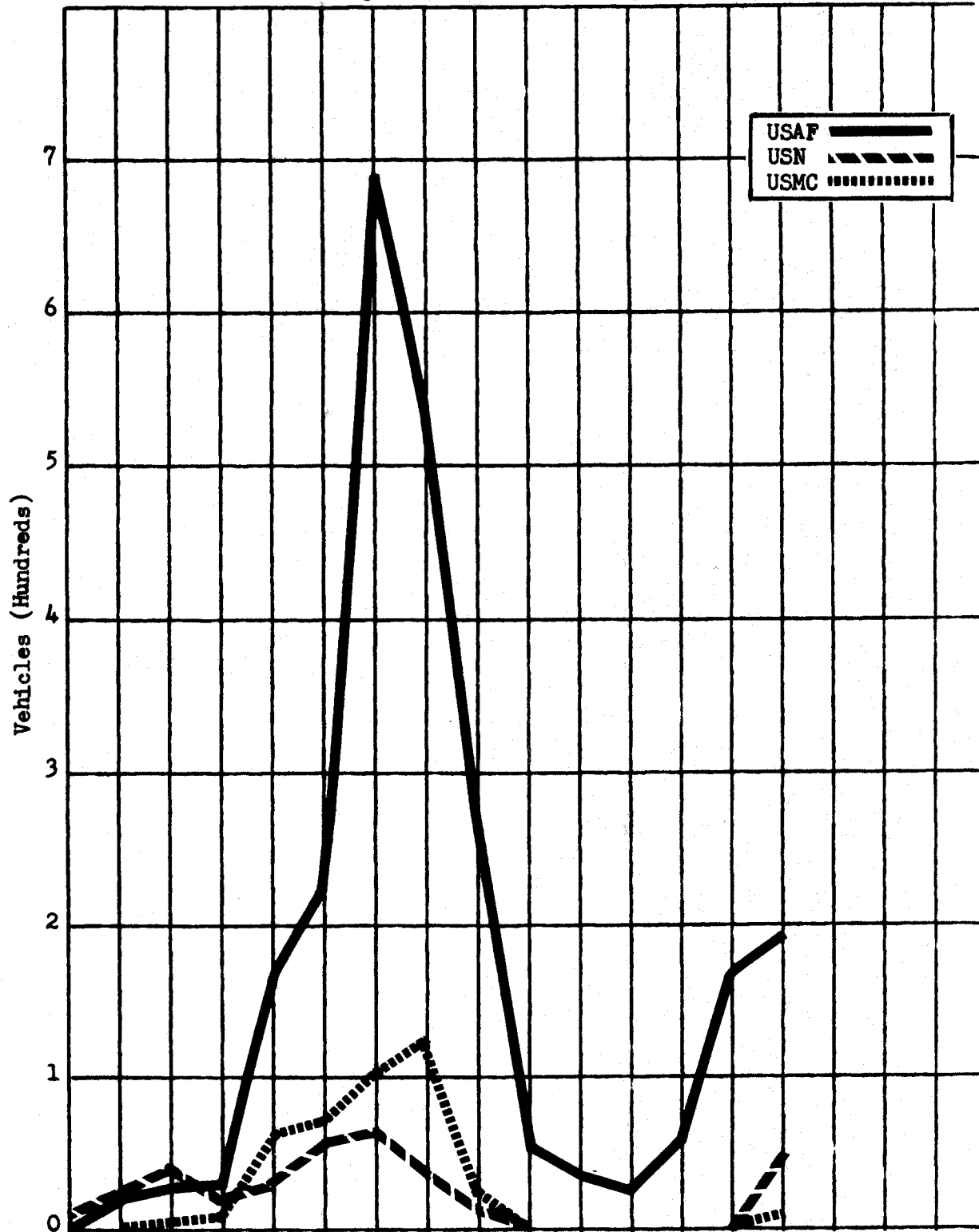
The northeastern monsoon, in October, turned the upper half of the Tally Ho area into "one big mud-puddle" and greatly reduced the sortie rate into the area. Even with the lowered number of strikes, the communists failed to launch their major offensive, and it was felt the 324B Division was still rebuilding to its pre-Operation HASTINGS strength.

The anticipated offensive still had not occurred by the end of November, ^{81/} by which time Tally Ho had achieved the following results:

Trucks destroyed/damaged	72/61
Roads cut, cratered/seeded	339
Landslides	6
Structures destroyed/damaged	1208/624
Enemy KBA (confirmed)	135
Watercraft destroyed/damaged	85/132
AAA/AW positions destroyed/damaged	92/22
Secondary explosions	1414

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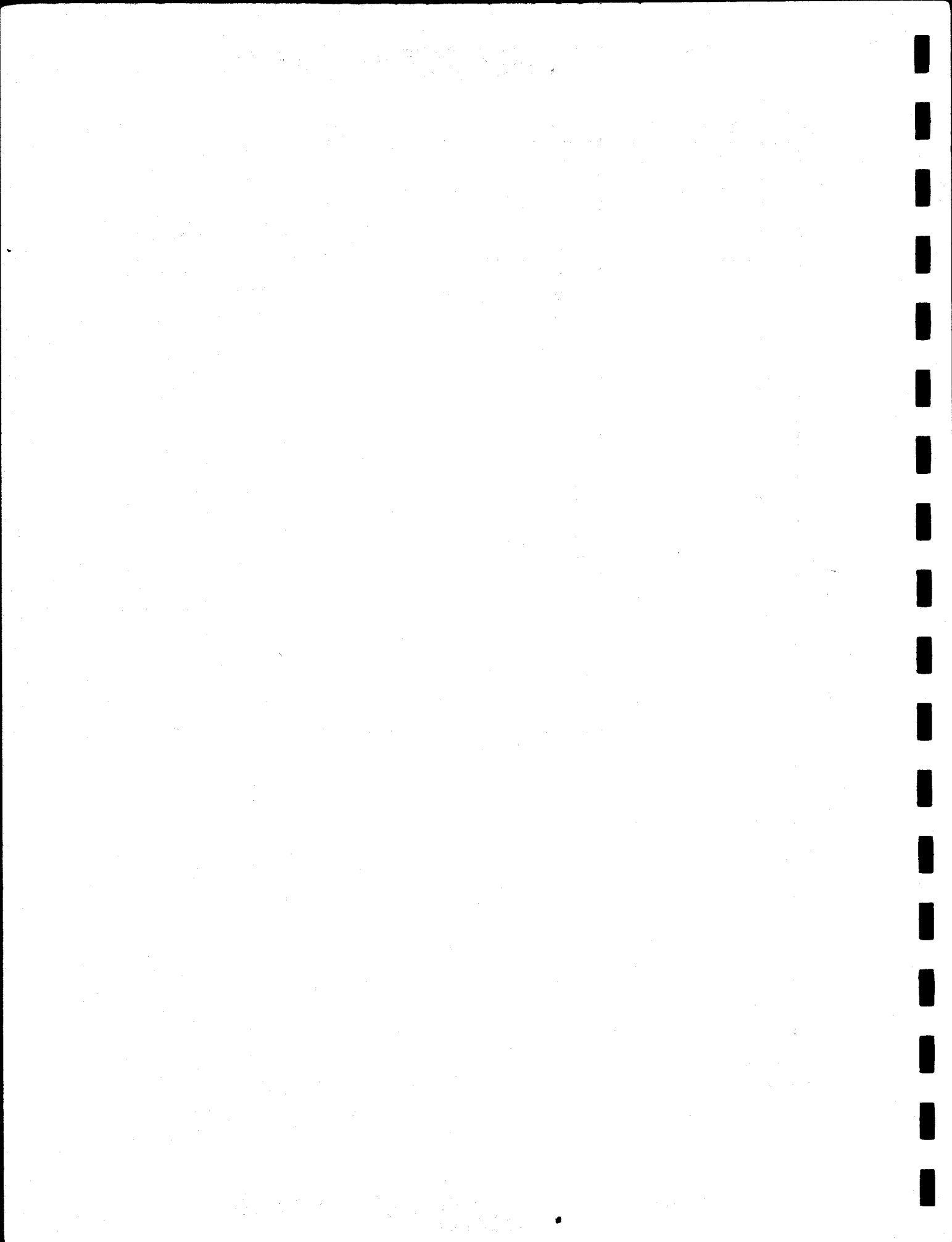
1965 1966 1967
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr



MONTHLY TOTAL OF ROAD VEHICLES DESTROYED/DAMAGED IN LAOS

Fig. 9

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As drying roads and clearing skies presaged an enemy return to the LOCs in Laos during December and in January 1967, the interdiction forces prepared to shift the major weight of effort back to the Tiger Hound and Cricket areas of the panhandle.

V. Summary

From the first few ill-prepared and uncoordinated interdiction efforts in December of 1964, the overall interdiction campaign had grown to massive proportions by early 1967. Integrated, sophisticated and unquestionably a factor in the conduct of the war. However, the prime question, "Did interdiction succeed?" remained quantitatively unanswered. A wealth of NOTE evidence - prisoner reports, photographs, statistical data - indicated its undeniable impact at specific times and places. Yet, by spring of 1967, the enemy order of battle had grown from the estimated (Nov 1965) 83 Viet Cong and 27 NVA battalions to 190 VC battalions and 95 battalions of North Vietnamese (1 Apr 67). ^{83/} These were combat units that were receiving the bulk of their weapons and ammunition, medicine and other supplies directly or indirectly from North Vietnam. Uncounted sorties, from Als to B-52s, unloaded hundreds of thousands of pounds of bombs in Mu Gia Pass alone, yet week after week the roadwatch teams reported "road open and motorable." Every bridge worthy of the name in the southern portion of North Vietnam (with one notable exception - Thanh Hoa) had been dropped at least once, yet the LOCs remained viable. By the criteria of "reduce the enemy's logistics flow below the level needed to sustain him in battle," the interdiction programs were not "successful."

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It would be less than truthful, however, to rely upon such a statement as a flat indictment of interdiction's worth. The statistics added up in Tiger Hound, Tally Ho and Cricket were not empty ones; the thousands of enemy trucks destroyed and damaged cost money and had to be replaced; each bridge down cost effort and time; each of the thousands of secondary explosions represented POL or ammunition that could have been - would have been - used against friendly forces in battle; all items of measurable value to a sorely-pressed enemy. Admittedly, with the open-end logistics system allowed North Vietnam through self-imposed constraints, no interdiction program could cut off the flow completely, but a well-planned and executed one could raise the cost to the enemy, disrupt his time-table and thwart his plans. Many thought the integrated interdiction programs of 1966 had done just this. In a briefing to the Secretary of Defense at Honolulu, 84/ Major General Grover Brown said:

"...Hard information useful in making an estimate of effects upon enemy intentions and capabilities is difficult to come by. ... Nevertheless there is a good evidence with which we are all familiar, demonstrating beyond doubt that enemy support to SVN has been accomplished with great difficulty and at high costs, with a key and painful burden falling upon the people. There is ample evidence for us to conclude that the enemy was hurrying to the year of decision in 1966. We do not know how many men and how much material he intended to move south in 1966 but judgment tells us that it was substantially more than he has done. We are fairly sure that he had strategic and tactical plans for operations which would have required larger numbers of forces and more supplies than he was able to introduce, principally in the highland area.

"POWs speak of up to three months in movement from training areas to South Vietnam. The many vehicles

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that were destroyed tell us that a great quantity of supplies destined for SVN never arrived. The NVA threat now posed in and north of the DMZ would be much greater if those units and their support system were not under constant attack. Many troops from the north are given inadequate training under difficult conditions. They move southward at an ever slowing pace. These troops, with up to 60 percent of their number sick, killed, wounded or deserted have arrived in South Vietnam with low morale and combat effectiveness.

"We believe that as of this date the air campaign against NVN has had an appreciable impact upon the capability of North Vietnam to support the insurgency in the south."

Several sophisticated devices were pioneered in 1966 as aids to the air effort in interdiction - the Starlight scope and seismic sensor devices to warn of passing traffic on roads being among them. The year 1967 promised increased gains in sophistication, greater use of area denial munitions, and an increased weight of effort including massive B-52 raids over suitable area targets, in the aim of interdicting the North Vietnamese logistics flow to South Vietnam.

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