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PREFACE

Commando Hunt V, the third large MACV air interdiction campaign against North Vietnamese dry-season efforts to resupply their forces in South Vietnam, Cambodia, and Laos through the southern Laos pan-handle, began on 10 October 1970 and continued through 30 April 1971. It was an integral part of a United States air effort in Southeast Asia that also included support to Royal Lao forces throughout Laos, US and Vietnamese forces in South Vietnam, Cambodian and Vietnamese forces in Cambodia, and the Vietnamese ground-interdiction force in southern Laos. This report documents these diverse air operations with emphasis on the interdiction campaign.

The loss of their Cambodian logistics channel at the end of the previous dry season had multiplied the importance to the North Vietnamese of the southern Laos resupply drive. The continuing withdrawal of US combat power from Southeast Asia had increased the importance to the Free World Forces of countering it. To do so during Commando Hunt V required concentration against the enemy logistics system of US air resources which had decreased since the previous dry season.

The report describes how this application of air resources was accomplished while needs for air support elsewhere in Southeast Asia continued to be met. US Air Force tactical and strategic units in Vietnam and Thailand and US Navy and Marine air elements at sea and in Vietnam played important roles, as did the Vietnamese and Lao Air Forces. The report tells how the North Vietnamese used the various elements of their logistics system—the trucks, the roads, the storage areas and the defenses. And it tells how force was applied against these elements to achieve the results that made Commando Hunt V a success.

L. D. CLAY, Maj. General, USAF
Commander
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CHAPTER I
INTRODUCTION

Interdiction of the overland flow of supplies from North Vietnam to Viet Cong and North Vietnamese forces in South Vietnam and Cambodia was a primary mission for American airpower in Southeast Asia. Before the cessation of bombing of North Vietnam on 1 November 1968, the primary target for air interdiction was the supply system in North Vietnam. With the bombing halt, the emphasis shifted to the logistics channel the North Vietnamese maintained in southern Laos. These interdiction campaigns in southern Laos, the Steel Tiger area of operations, bore the name Commando Hunt with numerical designations that changed with the semiannual monsoonal shift. Commando Hunt V was the third northeast-monsoon, or dry-season, campaign and covered the period 10 October 1970 through 30 April 1971.

COMMANDO HUNTS I AND III

The first Commando Hunt, November 1968 through April 1969, saw the development of techniques to employ available airpower in around-the-clock interdiction of the total North Vietnamese logistics system in southern Laos. Refinements to force-control and targeting procedures evolved from a dynamic interaction between interdiction measures and logistics and defense actions. Improvement of equipment and tactics received equal attention and prompted the development of systems that reached maturity in Commando Hunt V.

In Commando Hunt I, the resupply activity of the North Vietnamese Army (NVA) ran at a high level from January through April of 1969. Against it US forces expended an average of 399 fighter-attack and two gunship sorties plus 22 B-52 sorties per day. These sorties destroyed or damaged 6000 trucks and produced 50,293 fires and secondary explosions. As a result, the NVA was able to transport through Laos to South Vietnam only about 8537 tons of the 45,119 tons of supplies estimated to have been brought into Laos from North Vietnam, a throughput-to-input ratio of approximately one to five.

The next dry-season interdiction campaign, Commando Hunt III, covered the period November 1969 through April 1970. The North Vietnamese started their resupply effort earlier than in the previous year. Road work and materiel shipments began before the end of the wet season and intensified after the rains slackened. Truck activity reached new heights in January and February of 1970 as did the efficacy of the truck-killing force. Fighter-attack aircraft flew an average of 288 strike sorties per day and gunships an average of 8 per day. Twenty-three B-52 sorties struck per day. Damaged or destroyed trucks numbered 10,032; fires and secondary explosions, 49,277. The estimated throughput-to-input ratio was about one to three: 18,979 tons into...
the Republic of Vietnam for 34,227 tons into Laos. A reduced air
effort and an increased NVA logistics effort had resulted in a larger
supply flow through Laos during Commando Hunt III than during Commando
Hunt I.

This throughput did not meet the needs of the North Vietnamese,
however, for they continued their resupply effort, albeit reduced,
well into the wet season. The cumulative effects of rain and bombing
brought this effort to a virtual halt in August.

The North Vietnamese resupply operation received a major setback
as Commando Hunt III was ending when the Cambodians refused them fur­
ther use of the port of Kompong Som. The successful Allied cross­
border operations into Cambodia during May and June 1970 compounded
their difficulties: they lost some 8679 tons of food and ammunition
that had been available to support forces in the southern part of the
RVN, and their sanctuaries in Cambodia were no longer secure. In addi­
tion, they became engaged in active operations against Cambodian forces
which increased their needs for supplies from North Vietnam (NVN).

WET SEASON ACTIVITY - 1970

During the 1970 wet season the North Vietnamese departed from
past practice in Steel Tiger and did not return their construction
battalions to North Vietnam. They continued to build and improve the
roads. West of Ban Bak there was construction on a new road that
would bypass a system of interdiction points that had received many
air strikes during Commando Hunt III. Improvement of the Bang Hiang
River channel for free-floating supplies into Laos continued the devel­
opment of the road-waterway-pipeline complex west of the Demilitarized
Zone that stood at the head of the shortest, least-exposed supply route
through Laos from North Vietnam to South Vietnam. Many NVA antiair­
craft positions remained active in Laos to protect the route structure
and the truck movement that took place. NVA wet-season activity pre­
saged an intensive resupply effort in the dry season.

Within North Vietnam also, preparations for the dry-season resup­
ply effort went forward. There was continual improvement of roads,
transshipment points, and bridges to speed truck movements to Laos.
Replacement trucks were evident. For example, one truck park near
Haiphong held over 1200 vehicles, while eight others in the Hanoi–
Haiphong area contained 5000 more. The North Vietnamese also expanded
POL storage capacity in their southern panhandle.

In contrast, the 1970 NVA and Viet Cong (VC) activity within RVN
was lower than in previous years. The enemy's active-lull-active pat­
tern of combat continued on a reduced scale, but there was a shift from
battalion-sized attacks to smaller unit actions. Also, the rate of
attacks by fire had decreased from 175 per month in the period June
through August of 1969 to 150 per month a year later. This reduction
was accompanied by a more dramatic drop in attack intensity, from 62
to 41 rounds per incident. The supply shortages resulting from the Commando Hunt campaigns and the capture and destruction of stores in Cambodia and RVN appeared to have sapped the capability of the NVA and VC to mount large offensive actions within the Republic.

US tactical air activity throughout Southeast Asia during the southwest-monsoon period declined to an average of 417 sorties per day for the third quarter of 1970. The corresponding figure for the previous wet season had been 780 sorties per day. Poor weather was a contributing factor, and 7AF implemented a program to reduce sortie usage and conserve resources while good targets were scarce. In addition, the Joint Chiefs of Staff prescribed a lowered sortie level authorization for FY 1971: 14,000 US fighter-attack sorties per month for Southeast Asia, including 10,000 Air Force, 2700 Navy, 1300 Marine.

STRATEGIC ASSESSMENT FOR COMMANDO HUNT V

Seventh Air Force's assessment of the strategic situation to be faced during the 1970-71 northeast-monsoon season concluded that the North Vietnamese would mount an early major logistics effort to resupply their forces in RVN and Cambodia.

Across-the-beach resupply would not be able to meet their needs in either the Republic or Cambodia in the face of Allied naval patrols and the success of pacification. The Cambodian seaport was no longer available to them, nor were they expected to push significant amounts of supplies through the Demilitarized Zone (DMZ). The assessment concluded that in addition to its earlier role as the resupply route to NVA and VC forces in northern RVN, during Commando Hunt V the NVA line of communications in Steel Tiger would be the channel for resupply of NVA-VC forces in southern RVN and Cambodia as well. In a strategic sense it would be the critical point in the overall North Vietnamese campaign in Southeast Asia. Heavy preparations by the NVA in Laos and in NVN substantiated this conclusion.

The assessment noted the forecast by the American ambassador in Vientiane that a holding strategy would be pursued in northern Laos, the Barrel Roll area of operation, during the dry season. The Meo guerrillas and Royal Lao Army forces would not launch major offensive actions into or across the Plain of Jars (PDJ). Instead, they would concentrate on preventing NVA and Pathet Lao advances southwest of the PDJ and toward the capital cities of Luang Prabang and Vientiane. Air support of the Lao defenders would be necessary to preserve a viable Royal Lao government (RLG) that would continue to acquiesce to US air interdiction in southern Laos.

Whereas the North Vietnamese were projected to mount a bigger resupply drive than they had the previous year, the US air effort in Southeast Asia would be smaller than before. The authorized level of fighter-attack sorties for FY 1971, 14,000 per month, was 50 percent
below the Commando Hunt III level. Moderate increases in the capabilities of the Vietnamese and Royal Lao Air Forces would offset this reduction somewhat. In addition, improvements to and doubling of the AC-130 force were expected to enhance the truck-killing program to a marked degree. Also, the B-57G force would add to the truck-killing capability.

COMMANDO HUNT V PLAN

Based upon his assessment of the strategic situation, the Commander, Seventh Air Force, promulgated Seventh Air Force Operation Plan 715, the campaign plan for Commando Hunt V. Since the campaign was an integral part of the overall MACV effort in Southeast Asia, the plan was a corollary to plans for air operations in RVN and Cambodia. Its objectives were:

- To reduce the flow of personnel and materiel into the Republic of Vietnam and Cambodia to the lowest possible level, and
- To make the enemy pay an increasingly greater cost for his efforts to dominate Southeast Asia.

The plan concentrated available airpower against the NVA's critical point, its resupply effort through Steel Tiger. The plan allocated 9800, 70 percent, of the 14,000 fighter-attack sorties per month to Steel Tiger interdiction. To the holding action in Barrel Roll, the plan allocated 900 fighter-attack sorties per month, and to operations in RVN and Cambodia, the remaining 3300. The proven capability of Southeast Asia tactical airpower to shift forces to handle contingencies made economy of force practical in Barrel Roll, RVN, and Cambodia. The plan also allocated the majority of the eventual 660 AC-130 and AC-119K gunship sorties to Steel Tiger interdiction with provisions for coverage of routes in Cambodia and for interdiction and troop support in Barrel Roll. The plan recognized the primacy to be given to support of ground forces engaged with the enemy. The Commander, US Military Assistance Command, Vietnam (COMUSMACV), approved the plan. It was then briefed to and endorsed by the Commander in Chief, Pacific, and the Joint Chiefs of Staff.

Just prior to the campaign, an addendum to the plan set forth a program for concentrated interdiction of the entry routes from NVN to Steel Tiger to preempt an expected early North Vietnamese logistics surge. COMUSMACV approved the addendum and stated that most of the 1000 Arc Light sorties per month would be available to the entry interdiction effort. Entry interdiction was the opening move in a Commando Hunt V campaign designed to take the initiative and maintain maximum pressure on the NVA logistics network in southern Laos.

The succeeding chapters treat Commando Hunt V in terms of its
major features. First, the entry interdiction program is described and analyzed. Entry interdiction not only was the opening phase of the campaign, but also was an innovation in Steel Tiger interdiction efforts—the first sustained, concentrated saturation-bombing effort designed to delay and impede traffic flow. Chapter III describes the truck-killing program. New aircraft configurations specialized for the night-time truck-killing role had matured for full exploitation during Commando Hunt V. Their targets, management, and results are described. Chapter IV addresses the most significant difference between Commando Hunt V and its predecessors—the Lam Son 719 two-month incursion into Steel Tiger by a South Vietnamese corps. Chapter V treats the other facets of the campaign within Steel Tiger, the attacks against truck parks and storage areas, defenses, and lines of communication, and the air support furnished indigenous forces and guerrillas operating in Steel Tiger. Chapter VI presents brief resumes of the air efforts in Cambodia, RVN, and Barrel Roll to reflect the integral nature of the overall air war in Southeast Asia. Chapter VII treats the Steel Tiger air interdiction effort in total to summarize the accomplishments of the campaign.

Detailed data on allied and enemy resources and operations are left to the appendices. Appendices also treat the buildup of the gunship force, the introduction of the B-57G, weather factors during the campaign, aspects of materiel activities that underlay operational success, and data bases.
CHAPTER II
ENTRY INTERDICTION

CONCEPT

The entry interdiction program was conceived as a concentrated and persistent application of road interdiction. Its objective was to impede the movement of enemy trucks and supplies from North Vietnam into the route structure in Laos by cutting all entry paths using the least number of interdiction areas.

The input routes interdicted were those leading into Laos through the Mu Gia and Ban Karai Passes, Ban Raving, and the western edge of the DMZ. The targets in Laos were established where these roads ran through constricted areas framed by extensive karst formations or difficult terrain that would make enemy bypass construction difficult and time consuming. Each of the original target boxes was about 1 by 2 km in size.

Entry interdiction started on 10 October 1970 and marked the beginning of the Commando Hunt V campaign. It seized the initiative prior to the enemy's logistics buildup, which was to begin on 14 October according to intelligence estimates. It delayed the enemy's logistics surge and gained time for the buildup and training of the AC-130 and B-57G truck-killing force.

RESOURCES

The strike forces employed were Arc Light B-52s and tactical air. COMUSMACV allocated 27 Arc Light sorties per day to entry interdiction. Arc Light was to be complemented by an average of 125 tactical air sorties per day. Arc Light strikes were to destroy the roads and tactical air was to prevent repair activity and maintain a presence to deter movement through the boxes. Each B-52 delivered forty-two 750-pound M-117 bombs and twenty-four 500-pound MK-82 bombs. At first, the bombs were fuzed for a 0.10 second delay to achieve maximum cratering. Most fighter and attack aircraft delivered MK-82 bombs. Gaps in coverage of two hours or longer were to be preceded by tactical air emplacement of time-delay munitions, principally MK-82 bombs fuzed for delays of up to five hours.

In addition to the Arc Light and tactical strike aircraft, certain types of support aircraft were necessary to the operation. Each day the B-52s required five support packages, each consisting of two Iron Hand F-105s and two EB-66s. The F-105s carried either Shrike or Standard ARM radar-homing missiles to provide protective
reaction against surface-to-air missile (SAM) firings. The EB-66s provided an electronic countermeasures (ECM) capability to supplement that of the B-52s. Two F-4s provided flak suppression against 100 mm AAA. These F-4s, in addition to those flying escort missions for reconnaissance aircraft in Route Package I of North Vietnam, were directed to put their unexpended ordnance in the interdiction boxes. Their ordnance was expected to harass traffic and repair activity.

Combat air patrol (CAP) against a potential MiG threat was provided to the B-52s when necessary. The MiG CAP consisted of two F-4s and flew with Arc Light strikes in the Mu Gia area. Strikes in other areas required MiG CAP only when Intelligence estimated that there were MiGs at airfields within operating range of these areas.

PROCEDURES

Target Selection

The target boxes were designated as follows:

<table>
<thead>
<tr>
<th>Entry Corridor</th>
<th>Box</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mu Gia</td>
<td>A</td>
</tr>
<tr>
<td>Ban Karai</td>
<td>B</td>
</tr>
<tr>
<td>Ban Raving</td>
<td>C</td>
</tr>
<tr>
<td>DMZ</td>
<td>D</td>
</tr>
</tbody>
</table>

Figure II-1 shows the general location of these boxes. To vary the approach directions for bomb runs, target boxes had alternative orientations. As the campaign progressed, additional boxes were developed to cut bypasses or specific route segments outside the original boxes. When the original target areas became ineffective for reducing traffic, new areas were selected. Alphanumeric designations identified the various box configurations, e.g., A-1, B-3, C-2.

Box A

Figure II-2 depicts the original Box A. The box cut Routes 23A and 1202 where they were constrained to pass between large karst formations bordering the Ngo River. The extensive karst in the area made the construction of bypasses difficult. While this target box blocked the main routes from Mu Gia Pass to the south, it was bypassable by taking Route 12E to the west and returning to Route 23A by way of Routes 128A and 128I. However, this bypass was about 65 km longer than the direct route down 23A or 1202. Also, trucks were more vulnerable to air attack on Route 12E, which was straight, flat, and exposed. Nevertheless, the enemy used this long bypass when it became difficult to keep the roads open through Box A. Because the box was within operating range of MiGs at Phuc Yen Airfield, all Arc
Light strikes required MiG CAP support. The box was 9.5 NM from the NVN border and about 80 NM from the nearest known occupied SAM site as of 10 October.

**Box B**

Figure II-3 depicts the original Box B. The box cut Routes 912B and 9125B where they passed between two karst formations alongside the Chala River. The route structure southwest of Ban Karai Pass contained many bypasses built to counter previous interdiction campaigns. However, in October 1970 all motorable roads leading into the core route structure converged just north of the original Box B, and all southbound traffic had to cross the box on Route 912B or Route 9125B. About 4 NM south of the box the route structure fanned out into terrain which did not lend itself to road interdiction. This box was 8.5 NM from the NVN border and 105 NM from the nearest known occupied SAM site as of 10 October.

**Box C**

Box C, depicted in Figure II-4, cut Routes 92A and 1035A where
FIGURE 11-2

LOCATION OF BOX A
LOCATION OF BOX B

FIGURE II-3
LOCATION OF BOX C

FIGURE II-4
they passed between a large karst formation and the Banghiang River (Waterway 7J). The steep karst on the south side of the river formed a natural barrier to road construction. Traffic moving south from Ban Raving on Routes 1038 and 1039 was channeled through this constricted area before fanning out into the central route structure. Box C also covered Waterway 7J, which had been used earlier in the year for free-floating supplies to transshipment points north of Tchepone. Box C could be bypassed to the north and east by following Route 910 from NVN. However, a portion of this route was in trail status in October 1970, and it never received heavy use of inputting supplies into Laos.

This box was 10 NM from the NVN border and 130 NM from the nearest known occupied SAM site as of 10 October.

Box D

Figure 11-5 depicts the original Box D, which cut Route 1032B where it made a steep descent from the north, crossed Waterway 7J, and made a steep ascent to the south along the Laos-RVN border. It also cut Route 92A, an alternative route leading toward Tchepone, and it covered Waterway 7J at a launching area for free-floating supplies. Route 1032B was the only road leading south from the western edge of the DMZ to Routes 9, 925, and 926, the northernmost throughput routes to RVN. This box was on the Laos border just south of the Demarcation Line in the DMZ and 135 NM from the nearest known occupied SAM site as of 10 October.

Sortie Scheduling

Arc Light strikes for entry interdiction were scheduled to occur at random times, and the axes of approach were varied. Tactical air strikes were scheduled around Arc Light strike times. The intent was to cover target boxes during hours of darkness, in particular between 1700 and 2300 (Laos Time), when most of the truck activity took place. Arc Light strikes were made by cells of three B-52s to insure cutting the road on each strike and to provide adequate mutual ECM support over the target. Tactical air strikes were scheduled in flights of two aircraft each. A typical 24-hour schedule of strikes against Box B is shown in Table II-1.

The number of sorties scheduled against each box depended on the condition of the roads, the ease of interdictability, and the number of roads or bypasses to be cut. At first, an equal weight of effort was applied to each of the four boxes. As the situation changed and experience was gained, the weights of effort were adjusted for maximum effectiveness. In general, 27 sorties per day was the maximum Arc Light allocation. This figure varied at times, decreasing when there were higher priority requirements elsewhere and increasing to
30 or 33 when a surge was carried out against the entry interdiction boxes. The number of tactical air sorties available for entry interdiction depended on relative mission priorities and the number of aircraft carriers on station. The weekly sortie data for Arc Light and tactical air are shown in Table II-2.

ENEMY ALTERNATIVES

At the outset of entry interdiction four basic options to counter the program appeared to be open to the NVA:

1. try to stop or reduce entry interdiction by military means;
TYPICAL 24-HOUR SORTIE SCHEDULE FOR ENTRY INTERDIRECTION BOX B

<table>
<thead>
<tr>
<th>DAY STRIKES</th>
<th>TIME OVER TIME</th>
<th>AIRCRAFT</th>
<th>TARGET</th>
<th>NIGHT STRIKES</th>
<th>TIME OVER</th>
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<td>PERIOD</td>
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<td></td>
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<tr>
<td>0501-0600</td>
<td>1701-1800</td>
<td>2A-7</td>
<td>1730</td>
<td>0601-0700</td>
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<td>2F-4</td>
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<td>0335</td>
<td>0430</td>
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</table>

TABLE II-1

2. try to go through the interdiction boxes;
3. try to go around by constructing bypasses; or
4. develop new input corridors.

Within each of these basic options there were several separate suboptions that could be used one at a time or in combinations.
### ENTRY INTERDICTION SORTIES FLOWN

<table>
<thead>
<tr>
<th>PERIOD ENDING</th>
<th>BOX A ARC LIGHT</th>
<th>TAC AIR</th>
<th>BOX B ARC LIGHT</th>
<th>TAC AIR</th>
<th>BOX C ARC LIGHT</th>
<th>TAC AIR</th>
<th>BOX D ARC LIGHT</th>
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<td>8 DEC</td>
<td>50</td>
<td>284</td>
<td>92</td>
<td>344</td>
<td>39</td>
<td>280</td>
<td>15</td>
<td>87</td>
</tr>
<tr>
<td>15 DEC</td>
<td>49</td>
<td>283</td>
<td>85</td>
<td>406</td>
<td>39</td>
<td>246</td>
<td>18</td>
<td>143</td>
</tr>
<tr>
<td>22 DEC</td>
<td>52</td>
<td>158</td>
<td>82</td>
<td>319</td>
<td>38</td>
<td>198</td>
<td>24</td>
<td>144</td>
</tr>
<tr>
<td>29 DEC</td>
<td>18</td>
<td>217</td>
<td>92</td>
<td>152</td>
<td>15</td>
<td>254</td>
<td>50</td>
<td>106</td>
</tr>
<tr>
<td>5 JAN</td>
<td>62</td>
<td>221</td>
<td>18</td>
<td>158</td>
<td>47</td>
<td>222</td>
<td>28</td>
<td>104</td>
</tr>
<tr>
<td>12 JAN</td>
<td>73</td>
<td>154</td>
<td>0</td>
<td>190</td>
<td>63</td>
<td>138</td>
<td>22</td>
<td>101</td>
</tr>
<tr>
<td>19 JAN</td>
<td>71</td>
<td>160</td>
<td>63</td>
<td>223</td>
<td>39</td>
<td>160</td>
<td>30</td>
<td>142</td>
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<td>88</td>
</tr>
<tr>
<td>2 FEB</td>
<td>0</td>
<td>201</td>
<td>84</td>
<td>220</td>
<td>36</td>
<td>206</td>
<td>41</td>
<td>79</td>
</tr>
<tr>
<td>6 FEB</td>
<td>0</td>
<td>125</td>
<td>42</td>
<td>48</td>
<td>20</td>
<td>108</td>
<td>29</td>
<td>43</td>
</tr>
</tbody>
</table>

**TABLE II-2**

15
Stop or Reduce Interdiction

To stop or reduce the saturation bombing the North Vietnamese could have moved surface-to-air missiles to areas within range of the interdiction boxes. They would deploy the SAM batteries under cover of darkness or weather and move them often. Firings would be made at the B-52s. Another option was to introduce 100 mm antiaircraft artillery (AAA) either in the target area or along the approach and departure paths. Also, the enemy could have introduced AAA fire-control radar. A fourth option open to the enemy was to use fighters to force the B-52s away from the entry interdiction boxes. North Vietnamese MiGs had shown little inclination to cross the Laotian border in the past, however. Table II-3 summarized these options and shows their estimated likelihood and actual employment.

### Estimated Likelihood and Actual Employment of Enemy Options to Counter Entry Interdiction

<table>
<thead>
<tr>
<th>Option</th>
<th>Highly Probable</th>
<th>Probable</th>
<th>Possible</th>
<th>Unlikely</th>
<th>Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>USE SAMS</td>
<td>A,B,D (BOX)</td>
<td>C</td>
<td>B,C,D (BOX)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USE 100 MM AAA</td>
<td>B</td>
<td>A,D</td>
<td>C</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>USE RADAR WITH AAA</td>
<td>D</td>
<td></td>
<td>A,B,C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USE FIGHTERS</td>
<td>A,B</td>
<td>C,D</td>
<td>A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Table II-3

Push Through Interdiction Boxes

The North Vietnamese had the alternative of trying to force supplies through the boxes while either ignoring the saturation bombing or taking advantage of any reductions in its intensity.

It was considered probable that the enemy would porter supplies through or around the interdiction boxes depending upon the terrain. For portering through a box, the activity was most apt to start soon after an Arc Light attack. During the course of the entry interdiction program, portering was believed to have been employed in all
four areas. It was evident from a light level of truck activity detected north and south of a box while photography showed no signs of vehicle tracks through or around the box. At times photography showed foot trails and stacks of supplies in the areas where portering was suspected. Attacks against these areas at night often produced scattered secondary explosions and fires.

In addition to portering, it was considered possible that the enemy might use helicopters to move heavy material that porters could not handle. It was estimated that, if used, the helicopters would operate from inside North Vietnam and fly numerous shuttles at night. Use of this option was not detected during Commando Hunt V.

It was also considered probable that the enemy would use waterways to float supplies through the interdiction boxes. Waterway 7 had been used for free-floating supplies near the end of Commando Hunt III and during the wet season. The Ngo River flowing through Box A could be used in a similar way during high-water periods, but the Chala River flowing through Box B was not deep enough. The North Vietnamese did not use waterways in the entry interdiction areas. One reason may have been that the saturation bombing had destroyed the banks of the waterways to the point where free floatation was no longer possible.

Another enemy option was to construct a road through an interdiction box and run several trucks through between strikes. As the soil dried out and became pulverized from repeated bombing, it became easier to construct roads through the boxes. This option seemed to have been used often.

Build Bypasses

Although the bypass along Route 12E was 65 km longer than the route through Box A, it was used when roads through the box were interdicted. Another bypass could have been constructed from Route 12E south to Route 1281 across the karst ridge about 5 km west of Box A (Figure II-6). It was never built.

The most probable starting point for construction of a bypass around Box B appeared to be at the east end of Rat Pink Valley. The bypass would run south to Route 915 and west to Route 912A through rolling terrain and triple-canopy foliage (Figure II-7). This eastern bypass was built in early December, and designated Route 9127. In mid-November a western bypass (later designated Route 9125B) around Box B had been developed from a portering trail between points on Route 9125. It traversed rugged terrain and appeared to be seldom used after the eastern bypass was opened.

The most feasible routes for bypassing Box C ran around the
northwest end of the box and are shown in Figure II-8. The NVA used the more southern of these bypasses during Commando Hunt V.

In the DMZ area the best bypass appeared to loop around the karst hill to the southeast of Box D to join Route 1032B about 1 km farther south (Figure II-9). In January, the enemy added a western bypass that ran south from Route 92A and split into two branches to intersect Route 1032B about 1.5 km and 2 km south of the box.

Develop New Input Corridors

The use of Nape Pass as an alternate input route would have required extensive road repair and would have exposed enemy supplies,
men, and equipment to air strikes for a longer distance than existing routes. No evidence developed to suggest that Nape Pass was used during Commando Hunt V as an input corridor.

The use of Route 910 seemed probable if pressure was maintained on the interdiction boxes (Figure II-10). It had been motorable during Commando Hunt III but had reverted to trail status by October 1970. Traffic was detected on Route 910 near the end of December when the entry interdiction program had been in effect for over 75 days. However, it never developed into a major input corridor.

Monthly sensor-detected southbound truck movements on Route 910 were:

<table>
<thead>
<tr>
<th>NOV</th>
<th>DEC</th>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APR</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>40</td>
<td>28</td>
<td>32</td>
<td>9</td>
<td>7</td>
</tr>
</tbody>
</table>
FIGURE 11-8

IMPLEMENTATION

Entry interdiction began with an Arc Light strike on Box A at 0045G on 10 October. Enemy truck activity was still at a low level, 49 trucks having been detected as input to Steel Tiger during the first week of October. By 13 October forward air controllers (FACs) reported the roads closed in all boxes except B.

On 11 October a warning advisory was issued for two 100 mm antiaircraft guns just south of Box B. B-52s striking Box B reported the first 100 mm firing at 2015G on 17 October. Arc Light strikes against this box were suspended while the situation was analyzed. By midday on 18 October it was concluded that 100 mm firings were not a serious threat to the B-52s, and the strikes were resumed.
By 19 October it was apparent that Ban Karai would be the most difficult entry corridor to interdict. The terrain in Box B was flatter and wider than that in the other boxes. Ban Karai was also the most used of the four input corridors and one which the enemy seemed determined to keep open. Thus, it became necessary to allocate a greater weight of effort to Box B than to any of the other boxes.

From 25 October to 2 November, truck activity throughout Steel Tiger declined as typhoons brought heavy rains on 25 and 28 October. The estimated amounts of rainfall in the entry interdiction areas were:
Of the 49 southbound trucks estimated to have moved through the interdiction boxes from 10 October to 2 November, only 9 were detected after 25 October.

As the roads in the entry corridors dried out, enemy activity there increased. Since the roads in all four interdiction boxes...
were obliterated, Arc Light bombing patterns were sometimes lengthened to 1 by 5 km to increase the area of destruction. Early in November, fires and secondary explosions were observed at the northern ends of these long boxes, suggesting that supplies were being stacked outside the original box areas. The absence of vehicle tracks through the boxes led to the estimate that portering was taking place.

On 3 November, FACs reported apparent portering over the karst formation at the western edge of Box B and identified the portering trail as a potential bypass around the box for truck traffic. Photography of 3 November confirmed that the western bypass was being built. On 6 November, long Arc Light boxes were oriented to cover the bypass. In addition, tactical air struck two points on the new road.

After 17 days with no detected traffic through Box B, sensors counted 21 southbound trucks below the box on the night of 8 November. A FAC reported on 9 November that the western bypass around Box B showed signs of recent vehicular traffic. A new Arc Light target box was developed to improve interdiction of the bypass, and photography of 12 November showed the bypass to be cut. The photography also showed nine destroyed trucks on the bypass.

The conditions of the entry interdiction boxes at various stages of the program are shown in Figures II-11 through II-16. By mid-November it appeared that maximum destruction had been achieved in the original boxes. Photography of Boxes A and B at this time showed the beginning of road reconstruction through the dried and pulverized soil. These single-lane roads could be made motorable by a skilled bulldozer operator in a short time.

Truck activity in all input areas except the DMZ started to rise around 17 November, and on 19 November, an input surge began which lasted 10 days. The start of this surge coincided with a reduction of entry interdiction tactical air sorties in connection with protective reaction strikes into North Vietnam. The use of much of the available Iron Hand support for these NVN strikes led to the diversion of Arc Light strikes from the interdiction boxes to other areas. On 21 November, the total entry interdiction effort was 6 Arc Light and 15 tactical air sorties. After this low point, the effort increased to an average of 27 Arc Light and 146 tactical air sorties per day through mid-December.

The enemy's demonstrated capability to push roads through Boxes A, B, and C by late November showed that the boxes were losing some of their effectiveness. To rectify the situation, new interdiction boxes were developed. In the Mu Gia area Box A was moved to a point about 2 km southwest of the original box (Figure II-17). The enemy showed no signs of reconstructing Routes 23A and 2304 but concentrated...
FIGURES II-11/II-12
FIGURES 11-15/11-16

BOX D ON 8 OCTOBER

BOX D ON 13 NOVEMBER
on keeping Route 1202 open. The new box cut that route where it squeezed between a karst cliff and the Ngo River. Strikes against it began on 25 November, and by 27 November had caused large karst slides and closed Route 1202.

For Boxes B and C, the only good alternate interdiction boxes were closer to the North Vietnamese border and the SAM threat. On 30 November, the entry interdiction program experienced its first Arc Light divert due to indications of a SAM firing. An Arc Light cell enroute to strike Box C was diverted after one of the Iron Hand aircraft fired a Shrike missile at a Fan Song radar signal from southern North Vietnam. Movement of Box B was deferred pending further assessment of enemy intentions. In the meantime, a concentrated effort of 27 Arc Light sorties hit Box B on 2 December. Some
strikes against Box C were shifted about 3 km northeast to cut the
approach to the bypass on the north side of the box.

On 4 December, another enemy surge took place, with most traffic
going through or around Box B. Of the 37 southbound trucks detected
south of the boxes, 32 had gone through or around Box B. On 5
December, 44 southbound trucks were detected by sensors as having gone
through or around Box B. FAC reports and photography of 4 and 5
December indicated that no traffic had traversed the box, nor had
sensors on the western bypass shown any activations since 2 December.
All evidence suggested that traffic was using an eastern bypass around
Box B which FACs had reported under construction in late November.
The precise trace of the bypass was unknown at the time, but it was
known to begin at the east end of Rat Pink Valley, a good interdic­
tion point. Tactical air sorties hit the east end of Rat Pink Valley
on 6 December, and Arc Light strikes in the same location began on 9
December. Throughout early December, low ceilings covered the general
area extending from the original Box B to Ban Karai Pass and made it
impossible to get photographic or visual coverage of the eastern
bypass.

Good weather on 11 and 12 December allowed visual and photographic
coverage of all entry interdiction boxes. Coincident with these dates,
an upsurge of traffic was detected as having come through or around
Box D (Figure II-18), and a new target box was established on 14
December to cut it. For the following week an average of one Arc
Light strike (3 sorties) per day hit Box D, with the strikes alter­
nating between the eastern bypass and the original box. This level
of effort had little effect on input traffic. A concentrated effort
of 15 Arc Light sorties on 26 December reduced sensor-detected traffic
in this area to near zero.

On 1 January, SAMs were fired at an Arc Light cell striking Box
B. From 2 January to 16 January, Arc Light struck an interim Box B
located to the southwest beyond the SAM-threat line. It covered the
main routes leading south from Ban Karai but was in terrain which
made bypassing quite easy. Tactical air continued to strike the
original box and the east end of Rat Pink Valley. Photography of
13 January showed a new road across the southeastern corner of Box
D. A western bypass around the box was also under construction and
a new interdiction box was developed to cut it (Figure II-18). With
three potential routes through the box, it was necessary to strike
the area with three Arc Light cells daily to keep the roads closed.

The proliferation of bypasses and the declining effectiveness of
the original box areas prompted a reassessment of entry interdiction
in mid-January. In the Mu Gia area another good interdiction box
remained which would cut Routes 23A and 2302 about 12 km south of the
southern box. In both the Ban Karai and Ban Raving areas, it would
be necessary to strike two interdiction boxes located between the original boxes and the North Vietnamese border. However, there had been no SAM firings since 1 January. Arc Light strikes against the new Box A began on 16 January. On the same day, Arc Light strikes resumed on the interdiction box at the east end of Rat Fink Valley.
Strikes in the original Box B continued, but on 20 January, were shifted 5 km northward to a new interdiction box to cut Routes 9120 and 9125A (Figure II-19).

LOCATION OF NEW B BOXES

Arc Light strikes in the Mu Gia area were discontinued after 19 January to concentrate the effort on the other three entry areas. Tactical air continued to interdict near Mu Gia, cutting roads and emplacing delay munitions during the day and striking trucks at night. The reasons for selecting Mu Gia as the entry area in which to discontinue Arc Light strikes were:

1. it had better weather than the other entry areas, thus providing a better environment for tactical air operations; and

2. it was farthest from the exit areas and would require the longest exposure of traffic to air attacks.
On 26 January, Arc Light strikes ceased in the original Box C area. They resumed on 28 January about 8 km to the northeast to cut Routes 1038 and 1039B (Figure II-20).

**LOCATION OF NEW C BOXES**

**FIGURE II-20**
The entry interdiction effort was phased down in early February as strike resources were shifted to support Operation Lam Son 719. The last day on which Arc Light strikes were directed against Boxes B, C, and D was 6 February. Thereafter, the boxes were interdicted singly or in pairs on a less consistent basis. An average of 11 Arc Light sorties per day struck the Ban Karai boxes from 10 through 16 February. An average of 8 per day struck the Box D area from 10 through 16 March with excellent results in reducing input traffic. Arc Light strikes in both Box C and D areas resumed on 7 April.

**PROBLEMS**

**Weather**

One of the chief problems associated with entry interdiction operations was weather. During the northeast monsoon, spillover of clouds along the ridgeline and through the passes often produced low ceilings that extended several miles into Laos. Table II-4 shows how weather hampered visual and photographic reconnaissance. Lack of reconnaissance made it difficult to ascertain the condition of an interdiction box, adjust bombing patterns if necessary, and determine enemy reactions. Often, sensor detections provided the only feedback on effectiveness of entry interdiction in a given area.

It had been hoped at the start of entry interdiction that constant surveillance over the box areas would deter repair activity.

<table>
<thead>
<tr>
<th>BOX</th>
<th>VISUAL</th>
<th>PHOTOGRAPHIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>83%</td>
<td>62%</td>
</tr>
<tr>
<td>B</td>
<td>68</td>
<td>36</td>
</tr>
<tr>
<td>C</td>
<td>43</td>
<td>35</td>
</tr>
<tr>
<td>D</td>
<td>24</td>
<td>26</td>
</tr>
</tbody>
</table>

**TABLE II-4**
The fact that some of the interdiction boxes could not be seen from the air for days at a time made the constant surveillance concept unworkable in most cases.

**SAM Threat**

The SAM threat did not affect tactical air operations against the entry interdiction boxes, but some Arc Light diversions resulted from Fan Song radar signals and actual SAM firings. Although the ECM capability of 3 B-52s and 2 EB-66s gave high assurance that the SAM guidance signals would be jammed, the adverse consequence of losing a B-52 induced caution in their use.

**AAA Threat**

Tactical air strikes against the entry interdiction boxes were not affected to a great extent by AAA firings even though the enemy knew that attacks were being made on a regular basis against the same target. In mid-October, occasional 100 mm firings around Box B had some effect on B-52 tactics. One Arc Light strike against Box B was diverted because of the 100 mm threat, and for several weeks no strikes were scheduled around the time of sunset to avoid illuminating the high-flying aircraft as they passed over the target areas. When it became evident that the 100 mm firings represented harassment at most, Arc Light strikes were scheduled again on a normal basis.

**Sensors**

In theory, sensor strings located adjacent to an interdiction box on each route leading to and from the box would have measured all traffic through the box area. In practice, terrain and vegetation often dictated the location of sensor strings. Traffic measurement was further complicated by the existence of storage areas between sensor strings. These storage areas were often the terminals for truck shuttles, and their presence tended to disrupt the pattern of sensor-dedected truck movements.

The experience in the Mu Cia area illustrated problems in the use of sensors. Sensors were located on Route 1201 about 8 km north of Box A and in a band across Routes 2304, 23A and 236, about 5 km south of the box area (Figure II-21). Southbound trucks usually passed through the sensor string on Route 1201 and seemed to end their shuttles in cave storage areas north of the interdiction box. Shuttles southbound from the caves were not detected until they had passed through the interdiction box. This pattern of movement made it difficult to correlate traffic north and south of the box and so assess the number of movers going through or around it. The sensors south of the box were relied on for the most part to determine how much southbound traffic had come through or around the box. However,
these strings became ineffective from time to time, and sensors on Routes 2309, 23B, and 911A had to be used. The latter strings gave correlations with detections north of Box A because another large storage complex lay between them and the box.

**EFFECTIVENESS OF ENTRY INTERDICATION**

The most direct assessment of the effectiveness of entry interdiction would be to compare the number of enemy trucks detected moving south through or around the boxes with the number the enemy intended to push through. Without firm quantitative estimates of the enemy's intent it was not possible to make such an assessment. However, analysis of all events associated with entry interdiction showed that it had a definite detrimental impact on enemy activity, particularly during the early part of the campaign.

A less direct assessment compared observed patterns of enemy traffic movement. During both Commando Hunt III and Commando Hunt V sensor-detected southbound truck movements in Steel Tiger varied in
a cyclical manner that followed the phases of the moon. Periods of peak activity occurred during periods of high moon illumination. Southbound truck movements in the entry areas to the Laotian route structure from North Vietnam showed the same trend. However, truck movements southbound through or around the entry interdiction boxes followed this trend only in the absence of saturation bombing. The sustained entry interdiction effort caused movement through the interdiction areas to vary according to the weight of air effort applied and the point of application.

Figures II-22 through II-25 show trends of southbound movers through the box areas and bombs delivered against the boxes. All the graphs show that, in general, an inverse relationship existed between the number of bombs delivered and southbound movers through the boxes. For Box A and C, regression analysis showed that a decrease in movers through an interdiction box was correlated at the 98 percent confidence level with an increase in bombs delivered.

For Boxes B and D the situation was more complicated. By mid-January each had two active bypasses as well as a motorable route through the original box, making it necessary to strike more than one target to close all routes. A rise in traffic always accompanied the opening of a bypass, and this rise was independent of air activity until air strikes were directed against the new route. As a result, correlation between bombs delivered and movers through the interdiction area had to be done on a route-by-route basis. Figures II-23 and II-25 show that whenever a bypass was discovered and struck with enough ordnance, traffic through the area declined.

A major benefit of entry interdiction in Commando Hunt V was the time gained for buildup of the truck-killing force. This time was needed at the start of the campaign when the B-57Gs and AC-130 gunships were not up to full strength or effectiveness. By mid-December, when most of the truck-killing force was operational, it was estimated that cumulative input of enemy supplies was about 64 percent of what it had been at the same time in the previous year. If the enemy intended to follow the previous year's schedule, then he was about two and a half weeks behind. If he intended to start a logistics surge in mid-October, as intelligence reports indicated, then he was four and a half weeks behind.

An unanticipated benefit of entry interdiction in Boxes C and D was to render Waterway 7 unusable for the free-floating transportation of supplies. At the start of Commando Hunt V, the waterway was considered a potential input route as it had been during the wet season. However, severe cratering and erosion of its banks in Boxes C and D made it difficult for floating supplies to traverse those areas (Figure II-26).
FIGURE II-22/II-23
BOMBS DELIVERED AND SOUTHBOUND MOVERS
IN BOX C
THREE DAY AVERAGES

BOMBS DELIVERED AND SOUTHBOUND MOVERS
IN BOX D
THREE DAY AVERAGES

FIGURE 11-24/11-25
Besides assessing the measurable aspects of entry interdiction, nonquantifiable aspects must be taken into account. As noted before, the data were imperfect and incomplete. Yet when following entry interdiction on a day-to-day basis in context with all other Commando Hunt activities, it was apparent that concentrated applications of force led to decreased enemy traffic and below-threshold applications led to increased traffic. The great effort which the enemy expended to build bypasses, porter supplies, and marshal SAMs and AAA was evidence of the detrimental impact which entry interdiction had upon his logistics plan. Traffic through the box areas did not show a sustained surge until mid-December when most of the bypasses were complete, and road repair was facilitated by the dry, pulverized soil.

In summary, by upsetting the enemy’s timetable for the 1970-71 dry season, forcing him to expend considerable extra effort on bypass construction, and gaining time for buildup of the B-57G and AC-130 force, entry interdiction made a major contribution to the success of Commando Hunt V.
CHAPTER III
THE EFFORT AGAINST TRUCKS

The effort against trucks operated within the framework of two objectives: to minimize supply flow into RVN and Cambodia, and to increase enemy costs in conducting his logistics campaign. The truck effort in Commando Hunt V built upon the experiences of Commando Hunts I and III. It operated in conjunction with entry interdiction as enemy vehicular activity gained momentum and systems for killing trucks became available and matured to full effectiveness. Strikes against trucks built to a high level in mid-December and remained there through April.

RESOURCES

The specialized systems for attacking trucks at night were the AC-130 and AC-119K gunships, and B-57Gs. Because the AC-130s and AC-119Ks lacked flak-suppression capability, they required fighter escorts when operating in high-threat areas. All fighter and attack aircraft attacked trucks to varying degrees; they were the only systems used to strike during daylight.

AC-130

The AC-130 gunship force for this campaign was larger than in Commando Hunt III, and all aircraft had 40 mm guns and improved sensor systems. The Surprise Package aircraft, introduced during Commando Hunt III, flew the first AC-130 combat mission on 25 October. Five Update AC-130s flew their first missions between 2 November and 27 December. They differed from the Surprise Package in having night observation devices instead of the low-light-level television (LLLTV) and lacked its digital fire-control and inertial-navigation systems. Six new Pave Pronto aircraft that had LLLTV flew their first combat missions between 22 November and 22 January. Two other Pave Pronto aircraft, released from training roles, began combat on 25 and 26 March.

Until 15 February, the AC-130s operating in Steel Tiger were restricted from working in Visual Reconnaissance (VR) Sectors 4, 6, and 9 (Figure III-1) due to the intense AAA threat in those areas. After 15 February all but the northern half of Sector 4 and the northeastern two-thirds of Sector 6 were open to the AC-130.

AC-119K

The opening of the campaign found 16 AC-119Ks in SEA. The AC-119K mounted 20 mm guns and had a forward-looking-infrared (FLIR)
sensor and a night observation sight. In the early part of the campaign, AC-119Ks were restricted from flying in any high-threat area in Steel Tiger. From February on, the restricted areas were VR Sectors 4, 6, and 9 at anytime, and VR Sector 8 during periods of more than 50 percent moon illumination.

B-57G

The first B-57G combat mission took place on 18 October 1970. The eleven B-57Gs available for use in Steel Tiger delivered M-36El and laser-guided MK-82 bombs. They had LLLTV and FLIR.

IMPLEMENTATION

Truck Activity

Despite the fact that some 2800 trucks were estimated to be in Steel Tiger at the outset of the Commando Hunt V campaign, truck
activity did not begin to rise from wet-season levels until mid-November, reaching its first peak in mid-December (Figure III-2).

Activity then ascended in steps to a season high in mid-March during the Lam Son 719 operation. Beyond that point activity dropped off, returning to the January level by the end of the campaign. In Commando Hunt III, truck activity had started about three weeks earlier. The delayed start in Commando Hunt V was attributed to entry interdiction, aided by heavy rains in late October.

Igloo White sensor-detected truck movements, while not precise indicators of the absolute level of truck activity and hence of the number of potential targets, were the best available measure and were adequate for planning. Figure III-3 shows the change in sensor-field strength over the course of the campaign. While changes in the size of the sensor field affected average trends in sensor detections, the field strength did not change at as great a rate as did the level of sensor-detected truck movements; hence the general increase and later
The decrease in sensor-detected truck movements reflected real changes in truck activity. Also, while sensors were not monitored during the day in general, daytime monitoring in previous dry-season campaigns had indicated that truck movement was very slight in the daytime, and selective monitoring during Commando Hunt V gave the same result. In addition, visual observations in all dry-season campaigns were always much lower in the daytime than at night, despite heavy daytime presence of FACs and strike aircraft. Figure III-4 shows the Commando Hunt V experience. At night, the trend and major perturbations in sensor-detected truck movements were correlated with those of total truck observations, as Figure III-5 shows.

The enemy's logistics system in Laos was primed for high-level activity by the end of the first surge in truck activity in December. Figure III-6 shows that at about that time the percentage of sensor-detected truck movements that were southbound fell to a constant level of about 55 percent. This same steady-state level was experienced in previous dry-season campaigns.
TRUCKS OBSERVED BY HOUR OF THE DAY

(LAOS TIME)

TRUCKS OBSERVED VS SENSOR-DETECTED TRUCK MOVEMENTS

FIGURE III-4/III-5
Operational planners at 7AF viewed truck targets in a geographic and temporal context, by VR sector and hour of the night. The VR sectors delineated areas of FAC responsibility and of gunship and B-57C operations. Strike planning involved the allocation of aircraft and ordnance to VR sectors and times on station so as to maximize expected trucks destroyed or damaged. Trends and projections of sensor-detected truck movements affected this scheduling. Figure III-7 shows the variations in sensor-detected truck movements that occurred in the VR sectors over the campaign.

VR Sector 4, encompassing the Mu Gia Pass entry area, did not show high activity until late in the campaign (Figure III-7). Sector 6, which included the Ban Karai Pass, was the first to show high activity, peaking by the week of 18 through 24 November, earlier than the first system-wide peak. The activity in Sector 9, which included the Ban Raving and DMZ entry areas as well as the little-used Route 925 exit gate, followed a pattern similar to that in Sector 4. Activity in Sectors 7, 8, 10, and 11 peaked for the first time about three weeks after the first peak in Sector 6. Activity in Sectors 12, 13,
SENSOR-DETECTED TRUCK MOVEMENTS AND PERCENT SOUTHBOUND
BY VR SECTOR

MOVEMENTS
THOUSANDS
PER WEEK

% SOUTHBOUND
100

MOVEMENTS
THOUSANDS
PER WEEK

% SOUTHBOUND
100

FIGURE III-7