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REPORT

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Contemporary
Historical
Evaluation of
Combat
Operations
REPORT

**NIGHT
INTERDICTION
IN SOUTHEAST ASIA**

9 SEP 66

HQ PACAF

**Directorate, Tactical Evaluation
CHECO Division**

Prepared by: Captain Melvin F. Porter

S.E. Asia Team

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FOR THE COMMANDER IN CHIEF

Edward C. Burtenshaw
EDWARD C. BURTENSHAW, Colonel, USAF
Chief, Project CHECO Division
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NIGHT INTERDICTION IN SOUTHEAST ASIA

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FOREWORD

The following report has been prepared to illustrate the growth of the USAF night interdiction program in Southeast Asia from its inception in January 1965 through June 1966. The initial problems, the rules and restraints, the tactics and techniques that have evolved, and the increase in effectiveness and weight of effort are discussed. Through the gradual easing of restraints, the perfection of techniques and the introduction of new and improved weapon systems, the impact of the night interdiction role within the overall interdiction program for Southeast Asia is set forth.

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NIGHT INTERDICTION IN SOUTHEAST ASIA

I. BACKGROUND

In accord with the overall emphasis on interdiction in Southeast Asia, the concept of night interdiction was under serious consideration very early in 1965. The BARREL ROLL program of tactical air strikes in Laos had begun in mid-December 1964, and on 8 January 1965, the Joint Chiefs of Staff requested comments and recommendations as to the best way to expand both day and night air interdiction in Laos with minimum risk to U.S. aircraft. Although both day and night operations were discussed, it appeared that JCS desired these comments to be primarily directed at methods of improving night interdiction operations. In response to the JCS request, CINCPACAF pointed out that the armed reconnaissance program had encountered several problems that made interdiction difficult. ^{1/} He listed some of the problems as:

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

An interdiction program, to be effective, must be responsive to the tactical situation as regards routes flown, frequency and timing of missions and target selection. It must also be continuous, comprehensive, coordinated, and with the flexibility required for rapid response to Pathet Lao/Viet Minh tactics and pattern of operations.

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It was further felt that as of the beginning of 1965 this level of responsiveness had not been reached, and that the above factors should be considered in reviewing results obtained up to early January 1965.

CINCPACAF felt that night route reconnaissance missions, in conjunction with day armed recce mission, YANKEE TEAM (photographic reconnaissance in Laos), and Royal Laotian Air Force operations, were desirable to provide a balanced day/night program to maintain constant pressure on enemy LOC's. Accomplishment of armed recce, in his view, could be made by relatively long endurance aircraft which could carry their own flare capability. Provisions in the program should include the use of cargo flare aircraft and shorter endurance aircraft to either accompany the flare aircraft, or to be on call as the tactical situation dictated. Further the night detection program could be improved through the use of Infra-Red, or Side Looking Aerial Radar (IR/SLAR) with cockpit readout aircraft to guide flare aircraft to suspected targets. He pointed out that both systems were available in limited degree in-country and could be employed as operational capability permitted.

He felt that the idea of using U.S. air against targets reported by roadwatch teams was worthy of trial, provided that the necessary flexibility and authority could be secured for the operational commander. However, identification would continue to present a major problem and certain administrative and operational problems remained to be solved.

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With reference to AAA positions, CINCPACAF felt that while attack on a preplanned basis might be desirable, such a target would be difficult to identify under flare illumination. Since the Pathet Lao had on occasion moved such weapons from prepared sites into forests and back again, it was believed that, from the military standpoint, the maximum return would be obtained through a program of heavy day strikes on many positions within a short time frame. This tactic hopefully would inflict severe damage before the enemy could counter through dispersal, camouflage or the introduction of more sophisticated weapons and thus raise the price of attack.

Night strike targets, in his opinion, had to be clearly identifiable, with an absolute minimum chance of mis-identification. He concurred in the use of time delay fuses, tire puncturing tetrahedrons, the MLU-10B aerial-laid land mines, and other similar type weapons. CINCPACAF felt that the U.S. had the resources and capability to conduct an effective interdiction program in Laos, but that it must be comprehensive, not piecemeal. He stated: ^{3/}

"...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."

After learning that the first night BARREL ROLL mission within Laos was scheduled for the period of 4 - 10 January, 1965, the Commander of the 13th Air Force, Major General Sam Maddux recommended that an

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immediate night armed recce training program for F-105's be set up and that flight could later be exchanged with the flight presently at Korat. In addition, he said he intended to include F-100 training (Takhli squadron) along with the current B-57 interdiction training program in order to increase F-100 pilot capabilities. ^{4/}

Second Air Division proposed to use NIGHT OWL (TAC-trained night-proficient F-100 crews) pilots from Da Nang for the USAF's first out-of-country night mission, and in this General Maddux agreed. However, he did believe that the mission timing might be premature, and suggested a long hard look at things to determine if the capability existed to produce the desired results. He felt it might be wiser to run a few night practice missions, under flares, prior to an actual mission. The 405th Tactical Fighter Wing's B-57 crews, already in night training in the Philippines, were coming along well, Maddux mentioned, but until Phase II training had been accomplished over land and with live ordnance he did feel that the first USAF night effort, when flown, should be with NIGHT OWL.

II. THE TANG VAI INCIDENT

Certain of the items mentioned by CINCPACAF, and by Generals Maddux and Moore, were highlighted before the Air Force flew its first night BARREL ROLL mission. Among these were the problem areas of night navigation and target mis-identification, which almost resulted in the cancellation of the night interdiction program before it was underway. On the night of 15 January 1965, the U.S. Navy inadvertently bombed a friendly Laotian village, Ban Tang Vai,

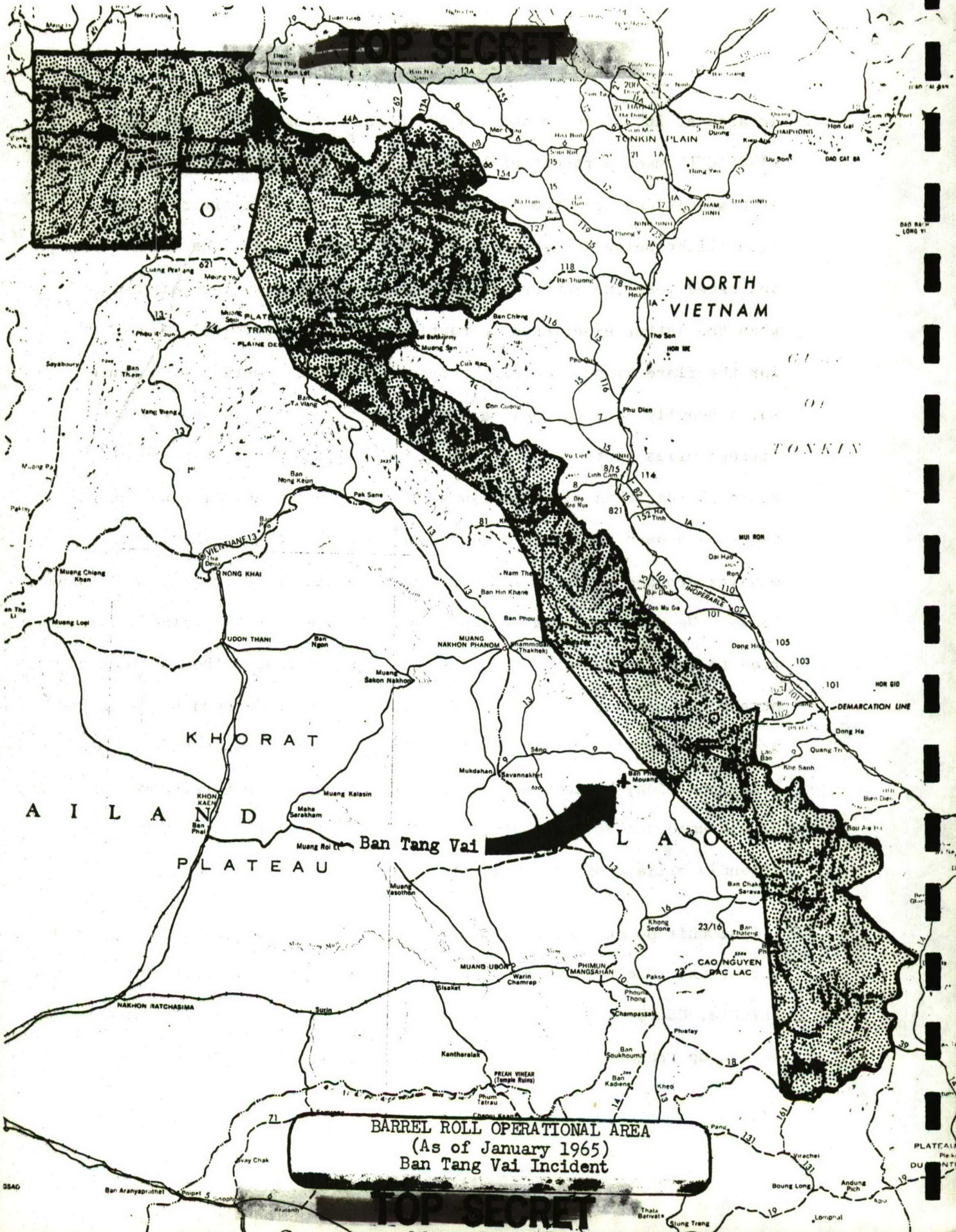
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located at 16°25' North and 105°39' East. After an investigation, CINCACFLT made a report of the bombing. ^{5/} This showed that six A-1H's (divided into two flights of three - with one aircraft of each flight being a flare ship) did bomb the village. The report indicated that the leader became separated from his flare aircraft when the latter experienced a partial radio failure. While looking for the flare plane, the flight leader then lost contact with Route 23, a heavily jungled road, and then inadvertently flew some ten to fifteen miles south. Abandoning his search, he turned back toward Route 23. At this time, he saw a fire on the ground which he thought might have been the flare aircraft which could have crashed. His wingman dropped lower to identify the fire and found it to be a burning house. He also reported seeing lights of three trucks moving on a road to the northwest of the fire. The flight leader then decided to attack and each of the two aircraft dropped two 250-pound bombs in the area. At the time of attack, the flight leader was uncertain of his exact position, believing himself to be over hostile territory. Actually, he was some twelve miles west of where he thought he was - over the friendly village of Tang Vai.

At this point, another incident added to the already mixed-up situation. The ground investigation was conducted by Captain Shinkle, USAF, from the office of AIRA, Vientiane. Captain Shinkle picked up fragments of a 750-pound bomb, a type not carried by

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BARREL ROLL OPERATIONAL AREA
 (As of January 1965)
 Ban Tang Vai Incident

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the Navy planes. The Navy pilots also reported that, just before they attacked, an unidentified high speed aircraft was sighted in the general vicinity. They had seen unidentified flares and heard English language radio transmissions concerning the flares. Further, the large fire which attracted the flight leaders attention was not the result of the Navy attacks. Since no Air Force aircraft had been fraggged into BARREL ROLL and the Laotian T-28's could not carry 750-pound bombs, the story was never fully clarified.

Four Laotian civilians were slightly wounded in the attacks and one Laotian soldier was evacuated for hospital treatment. Five houses and seven rice granaries were damaged, at an estimated damage cost of \$2000 to \$4500. CINCPACFLT said there was substantial doubt that the injuries and damage to property were the result of the Navy A-1H attacks although, admittedly, the A-1H flight leader exercised poor judgment in attacking a target when not positive of his position.

General Thao Ma, Commander of the Royal Laotian Air Force (RLAF) was infuriated. At first he thought that some of his political enemies in Laos might have duped the U.S. into bombing a friendly village to help destroy his political strength. ^{6/} All BARREL ROLL missions were immediately suspended and an American team was hurried to the village to render aid.

Ambassador Sullivan made a special trip to Savannakhet the morning of 18 January to personally discuss with General Ma the consequences

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of the Tang Vai incident. Ma accepted the personal regrets of Secretary Rusk and Admiral Moorer graciously but without enthusiasm. The general continued to harbor suspicion that Vientiane politics may have had something to do with the affair and that the U.S. might somehow have been made an unwitting dupe by elements of the Lao political scene. The Ambassador attempted to convince him to the contrary and said that the U.S. was conducting a formal investigation, the results of which would be made available to Ma.

Ma indicated that the material damage to the village was of less concern than the psychological effect. He said that the villagers first suspected "Russian" retaliation for their cooperation with FAR (Force Armee Royale) and Royal Laotian Government officials. The villagers apparently became confused when told that the incident was the result of an American error. He, therefore, welcomed the Ambassador's prompt offer of relief and assistance. Ma's reaction of suspicion was illustrative of the general aura of mistrust and wariness displayed by the military and political leaders in the Southeast Asia sphere.

As for continuation of future BARREL ROLL missions, Ma agreed that the operation could be resumed, both day and night, but insisted that - at least in the region south of Route 9 - they be confined to the area east of Muong Phine. This meant that Route 23, from that point south, would be the exclusive preserve of the RLAF. It was also established that night BARREL ROLL operations would be conducted without secondary targets and, for an extended period, any ordnance not expended on route reconnaissance

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must be jettisoned in the sea or returned to base. One of Ma's strongest provisos for resumption of BARREL ROLL operations stated that targets of opportunity by definition should be limited to vehicle and troop movements observed on or near roads. He 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.

The Ambassador to Laos had been instructed by Washington to tell the Laotians the results of the investigation at Tang Vai, but he decided it would not be prudent to release all the information in light of the discovery of the strange bomb fragments. ^{8/} In his oral reports to General Ma and to the Laotian Premier, Prince Souvanna Phouma, he limited his remarks to the Navy episode, particularly since the furor immediately attending the event subsided rapidly following his offer of American assistance. ^{9/} Souvanna Phouma displayed no undue preoccupation with the incident, although he did express gratitude for the U.S. aid to the victims. From his contact with the Prince and with General Ma, Ambassador Sullivan felt that the early resumption of BARREL ROLL was assured, albeit under revised ground roles. He was proved correct when authority for BARREL ROLL operations was renewed on 19 January 1965.

III. RULES & RESTRICTIONS

The rules of engagement in BARREL ROLL, from the military standpoint, were already inhibited by strong constraints. From the beginning of these operations, there was a requirement for a "sterile" period

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between missions. These periods were initially of three days and were intended to preclude giving any impression of a sudden escalation of air operations in Laos. The sterile period was later reduced to 48 hours. However, there remained a specified time block, usually a week, for the execution of two missions. Weather and other factors sometimes caused repeated deferral of missions and, as the end of a BARREL ROLL period approached, there was considerable uncertainty at nearly all command levels regarding the authority to execute a particular mission. ^{10/}

On 9 January 1965, a decision by the JCS was made not to set an expiration date for the execution of a specific mission, aborted because of weather or other operational reasons. At the time, it was announced that the deferred missions would constitute a "bank" of approved tasks which could be executed when feasible. ^{11/} This improved the flexibility but other rules continued to restrain the operations.

Targeting took an inordinately long time because many agencies were involved and final approval was vested within the State Department and Department of Defense. It took at least two weeks, and usually much longer, for a preplanned target or for an armed route recce section to be approved. Pilots and commanders did not have the choice of which direction they would fly a given armed recce. Flights were not allowed within two miles of the North Vietnamese Border on armed reconnaissance missions. Ordnance was the option

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of the operational commander except that napalm would not be used. To the framework of these constraints were added General Ma's latest restrictions discussed previously.

IV. TARGET ACQUISITION

The problem of target mis-identification, occurring as it did at the outset of the program has continued despite efforts to improve the situation. The Chief of Staff, USAF, sent the following message to CINCPACAF, and which was forwarded to Generals Moore ^{12/} and Maddux:

"As a result of the unfortunate results of PACFLT BARREL ROLL mission under 10 (Tang Vai incident), the air staff has reviewed the problem of night target acquisition. The problem is a formidable one, however, some suggestions which might assist Air Force units to positively identify fixed targets and recce routes in Laos are offered for your consideration: (1) The Udorn and Nakhon Phanom radars can be used to position aircraft at altitude over designated routes or targets; (2) Prestrike recce of assigned routes and targets within preceding 12 hours will assist pilots; (3) Use Laos-experienced recce pilots as pathfinders in flare and/or BDA aircraft; (4) Assign F-105's for night missions so as to use Doppler navigation system; (5) Use Da Nang, Udorn, and Korat TACAN to fix positions. Undoubtedly, you have also studied the problem of night target acquisition."

The problem also existed with regard to secondary targets for night strikes. General Ma had stipulated "no secondary targets" following Tang Vai. PACAF had requested comments from Generals Maddux and Moore in order to provide response to JCS regarding such targets for night operations in Laos; JCS definitely wanted secondary targets for several reasons. ^{13/}

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They pointed out that these 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 to the crowded Southeast Asia air bases with unexpended ordnance aboard presented unjustifiable hazards. Jettison of ordnance at sea would endanger friendly craft unless great surveillance control was established; would be wasteful and would impose undue operational uncertainties. Assignment of secondary targets would also minimize the counter-productive aspects of missions flown with no targets attacked, the futility of which would be clearly evident to the enemy.

PACAF stressed the need to provide targets which would permit ease of recognition, a relationship to surrounding recognizable terrain features and separation from friendly areas.

Thirteenth Air Force brought out the possibility of using SHORAN to pinpoint secondary targets. ^{14/} Admitting that the night acquisition of these targets was difficult and touchy at best, 13th Air Force noted that, though Doppler, TACAN and GCI were excellent aids, once the aircraft was beyond effective radio and radar coverage, the TACAN and GCI were lost. The B-57 had the SHORAN capability, 13th said, and could provide an excellent means of pinpointing secondaries in the event recce proved unrewarding. Although there were no SHORAN transmitters in Southeast Asia, 13th believed some deactivated units were positioned in Japan. The bid was made for a coordinated attack utilizing the B-57-SHORAN to pinpoint the target, a C-130 to drop the flares, and fighter aircraft making the strike.

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In a memo from Lt Colonel Coombs, Chief of Reconnaissance for 2AD, to Colonel Harold Price, 2AD Director of Operations, the above rationale was questioned. ^{15/} Colonel Coombs admitted the accuracy of the SHORAN system when the beacon sites were correctly surveyed and the target sites were correctly plotted, but doubted that the latter was the case in Southeast Asia. In any event, this question amounted to, "Why have the B-57 pinpoint the target for another aircraft?" The C-130 would have to fly in formation with the B-57 and drop on his signal. Using the B-57 for the whole job, was his point; locate the target, drop the flares, and hit the target by itself, instead of involving the other types of aircraft.

V. NIGHT INTERDICTION & RECONNAISSANCE

PACAF had shown considerable interest in the RB-57's PATRICIA LYNN aircraft (Infra-Red reconnaissance) and suggested it be tested on the first night BARREL ROLL effort. It was felt that if infra-red could resolve moving targets, there would be measurable gains through the element of surprise. ^{16/} General Moore, however, had the authority for final decision as to which aircraft would make the strikes, and his choice lay in the F-100, with qualified NIGHT OWL pilots. ^{17/} He was convinced that the RB-57 equipment did not presently have the capability to identify vehicles.

Other factors listed as pertinent to his selection of the F-100 were: ^{18/}

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- a. (F-100) unit only contingency force trained for night delivery and crews exceptionally well qualified.
- b. Crews have flown over Laos and are familiar with terrain. A-1E aircrews totally unfamiliar with terrain and have flown night strikes in the flat delta areas only.
- c. Selected crews represent years of tactical experience in night delivery.
- d. Although F-105 better airframe, crews have no experience in night delivery.
- e. B-57 crews still in training. At this time do not consider them capable.
- f. Consider this an excellent opportunity to prove USAF jet aircraft can meet mission requirements, day and night.

The first USAF night strike effort in Laos was to be BARREL ROLL 7 scheduled for 4 - 10 January, 1965, Aircraft, although actually launched on 9 January for the mission, found the target area weathered-in so returned to base. The mission was rescheduled and flown on 22 January with a C-130 flaeship, Blind Bat One, and with F-100's - call signs Manor 11 through 14 - as strike aircraft. The OPREP 4 (mission 19/ summary) reported:

"...The rendezvous with flaeship was made as planned at 1425Z (2225H). Prior to recce start point considerable activity and ground lights noted in the eastern edge of the PDJ (Plaine des Jarres). Positive sightings of vehicular traffic were observed west and southwest of Nong Het between estimated coordinates UG 1453 and UG 2862. Recce was started at Nong Het 1435Z and continued to a point east of Ban Ken with no sightings except for occasional campfires. East of Ban Ken Bridge lights were sighted by Blind Bat 1. Flares were dropped

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and a section of Route 7 lighted. Manor 11 and 12 each made passes under the flares and no vehicular traffic or activity was noted. The only lights found were in a small village on the south side of road. Estimated location was UG 6865. Malfunction of the UHF receiver of Blind Bat 1 made join-up difficult and restricted operations throughout the remainder of the flight. At UG 7767 a 6-8 tenths undercast started and continued through to Nong Het. Flares were dropped using radar positioning in the Nong Het area but positive ground position was not determined due to ground cover. Small sections of ground visible through breaks in the clouds indicate approximate flaredrop point at UG 9675. Manor 11-14 withdrew with minimum fuel at 1532Z (2332H). Refueling was accomplished and all aircraft recovered at Da Nang. Although no targets were found, it is felt that this mission proved night armed reconnaissance with flares to be both feasible and workable."

Although this first night operation by the USAF outside South Vietnam was not the dramatic success that had been hoped, it did show that the basic tools for a night interdiction effort did exist, as PACAF outlined in a later message to CSAF. 20/

"...The PACAF operational concept for night non-nuclear interdiction involves strikes by fighters and B-57's delivering munitions on targets illuminated by flares. At the present time, target illumination is provided by C-130 type aircraft dropping flares or by tactical fighters/bombers utilizing a self-contained flare capability (LAU-10/SUU-25 or internal, in B-57's). In addition, the C-130 aircraft acts as pathfinder, and airborne FAC as necessary. This concept permits employment of various planning aspects and provides a greater degree of operational flexibility to the commander concerned. Target acquisition will be accomplished visually, by artificial light, or by predetermined radar identification features. With the exception of higher than normal recovery altitudes or ordnance delivery "run-ins" and a reduction in the number of passes available, the techniques to be used for night ordnance deliveries under flares vary little from those used during the day. The

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methods or modes to be utilized in delivering ordnance under flares that appear most feasible are low-level bombing, low-angle bombing, rocketry and strafing. It is believed that initial accuracies will not equal those attained under daylight conditions; however, as experience is gained, night accuracies may equal daylight accuracies."

Although they are often equated, accuracy is not necessarily synonymous with success. In this case, the artificial constraints made accuracy an absolute necessity and a successful night interdiction program hard to achieve. An example of a directive which imposed unnecessary restrictions on the tactical commander was brought up by 2AD. ^{21/} BARREL ROLL 15 was a night armed route recce mission that had been directed to fly its route from west to east in order to avoid overflying North Vietnam. The weather conditions, when the mission was actually flown, favored initiation of the mission at the east end, where the weather was clear, proceeding westward where weather over the last third of the route was broken. These broken clouds made the exact point on the road at which to begin the recce difficult to locate. In 2AD's view, such factors as weather, AAA defense and fuel are variables which prohibit prescribing tactics to be used several days ahead. Tactics are best determined, 2AD said, by a study of many factors including latest intelligence, the latest weather, and the views of the pilots who are familiar with the target or the road, as the case may be. Second Air Division made the point that, if fear of DRV border violation was a matter of concern in this particular case, the possibility of such would be less by navigating to the point (the two mile limit) at medium to high altitude

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with radar assistance than by proceeding toward the border at six and eight thousand feet without radar. MACV concurred that such constraints unnecessarily restricted the tactical commander's ability to accomplish his mission, and emphasized necessity for tactical flexibility. MACV recommended that, in the future, all such restraints be closely monitored to ensure that the tactical commander is afforded maximum flexibility.

CINCPACAF passed this to JCS along with his own plea for greater flexibility in the field and, in response, (beginning 9 February) the phrase, "direction of flight on armed recce at your discretion" began to appear in the BARREL ROLL planning messages. ^{22/}

Being more or less in its infancy, night air interdiction naturally lent itself to difference of opinion as to which tactics and what aircraft should be used. The Navy appeared to be satisfied with its A-1H's, using organic flare carrying capability. The Commander of 2AD, Major General Joseph H. Moore believed that the C-123's, already proved in-country and flown by night-experienced flare crews, were fine for that role. CINCPACAF and 13th AF leaned strongly toward the C-130 as a flare aircraft. CINCPACAF indicated he wanted C-130's to conduct training, on an opportune basis in South Vietnam, to develop crew proficiency in flare-drops. ^{23/} He pointed out the probability of increasing the night armed recce mission in Laos, with concomitant expansion of flare delivery. Because of the C-130's better navigational equipment, range, loiter time, and speed, he felt it offered significant operational advantages over the C-123.

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Fifth Air Force, concerned over the C-130's in that environment, voiced a strong request to CINCPACAF to consider use of ECM support during the night operations. ^{24/} 5AF pointed out the vulnerability of wet-wing cargo aircraft to directed anti-aircraft fire, especially at the altitudes from which they would be dropping flares in Laos. Admitting that Elint had no confirmed sightings of gunlaying radars in Laos, the extreme mobility of the "Fire Can" radar (which had been reported in Laos, but not confirmed), coupled with the existing concentrations of AAA there, generated a fair probability of encountering accurate night fire. Fifth Air Force thought it worthwhile to mention that QRC-160-1 ECM pods were in their inventory and that the RF-101 carrying these pods would comprise an excellent ECM package capable of severely degrading "Fire Can" radars within a 50 nautical mile radius.

The concept of night armed road reconnaissance using the C-130 aircraft as a flareship pointed up a requirement for radar photo strip coverage of pertinent areas. The 315th Air Division, "owners" of the C-130's involved, brought out that the problem of target acquisition becomes great when roads are darktop, winding and narrow and the night may be moonless. ^{25/} The idea of identifying and striking moving vehicles after spotting lights on the road was questioned since it was believed that vehicles would simply travel with lights blacked out. A new tactic which provided for lighting up portions of a road, for the purpose of seeking out convoys/vehicles on a "catch as catch can" basis, was suggested by the 315th Air Division. If the suggestion were adopted

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(random drops on known LOC's), then the next problem would be that of locating the road in order to provide effective illumination. The 315th felt that radar photo strips of the objective areas would greatly enhance navigational capability and, in turn, would result in a more effective strike mission. The concept was that initial flaredrops could be made by radar positioning, in proximity to the road, with subsequent refinement based on the results of the initial drop. ^{26/}

This was one of many suggestions designed to contribute to the sophistication and effectiveness of night efforts (such as the PATRICIA LYNN program and the QRC-160-1 pods), but both real sophistication and true effectiveness were long in coming. This is not to say that there were not effective missions. One typically effective night armed reconnaissance mission took place on 23 February 1965. This was BARREL ROLL ^{27/} 24 and was reported in a supplemental OP-4 Wrap Up Report:

"On 23 Feb 65 a flight of six F-100's (two airborne spares) launched (the acft were from the 613th TFS at Da Nang, RVN) at 1125Z to fly night armed recce against Route Seven, Laos. Mission number was BR 6824 - call sign Tiger 11 through Tiger 16. Tiger 11-14 refueled with Bear 1 and 2 as scheduled. Flight departed refueling area and joined up with Panther 51 and Blind Bat 1 at rndz point. Blind Bat 1 then departed on course for the road recce. At UG 4374 the first flares were dropped and 4 or 5 vehicles were sighted on the road. Tiger 11 and 12 made the first passes and CBU was dropped where the vehicles were sighted. Two or three fires were started, but no more vehicles were sighted. Flight proceeded on down course to UG 5868 where Blind Bat 1 dropped more flares. In this area 10 to 12 vehicles were sighted on the road and Tiger 11 and 12 expended all their CBU in the area. At this point Tiger 13 and 14 took the lead and made one pass each on this target. In this area flak was encountered. The bursts were going off 12-13 thousand

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feet in a straight line, one to two seconds apart. Automatic weapons fire was also encountered but not effective. At UG 7667 flares were dropped at 1246Z and Tiger 13 and 14 made one pass each. Several fires were started. At UG 9365 Tiger 13 and 14 expended the rest of their ordnance and the recce was terminated at this point. Flight departed the area at 1310Z and landed at 1421Z. The weather in the whole target area was clear, with visibility 4 to 5 miles in haze except for the last five miles which had broken clouds in the hills."

Any lack of effectiveness in the program did not appear to lie intrinsically in the mission pilots' capabilities, but more within the framework of the program. It was applied piecemeal and hamstrung by the many political considerations, which were necessary at that time. But the difficulties in putting together a cohesive interdiction program, night or day, are apparent in the following BARREL ROLL OPS 28/ Order:

Operations Order for BR

SITUATION: PACOM forces will conduct designated U.S. Armed Reconnaissance and Interdiction air strikes against infiltration routes and facilities in Laos north of Nape Pass.

MISSION: Conduct air operations along selected routes and/or against prebriefed targets in northern Laos in accordance with guidance contained this operation order for purpose of disrupting PL/VM logistics flow.

EXECUTION: COMUSMACV and CINCPACFLT will conduct missions as assigned by CINCPAC utilizing numbers of aircraft as appropriate for each mission. Type aircraft will be at option of operational commander and armed with optimum unclassified ordnance for target to be attacked, excluding repeat excluding napalm. Support aircraft authorized as appropriate weather and flare aircraft will operate so as to minimize risk from ground fire. BDA recce may be escorted

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and retaliatory fire by escorts is authorized. BDA recce missions may be conducted as required until successful BDA photography is obtained. Prestrike recce by YT authorized if required. Direction of flight on armed recce route is at discretion of operational commander. Targets for armed recce will be PL/VM targets of opportunity which are defined as military vehicular and troop movements and active AA guns (manned or unmanned) spotted on or near roads designated for armed recce mission being flown. Campfires and civilian habitations will not be attacked. Fixed installations will be struck only in connection with attacks on clearly identified military convoys and military personnel; or when prebriefed as primary or secondary interdiction target. Under no circumstances is ordnance to be expended in Sam Neua Town, Khang Kay, or Xieng Khouang even in response to HOSTILE FIRE. Individual mission aircraft will avoid areas (known) of heavy AA concentration and will not approach NVN border closer than two miles, unless directed differently in execute instructions. CINCPAC mission assignment message will designate effective date for execution of approved missions. Once approved there is no cut off date upon which any given mission becomes invalid for execution. Approved missions may be executed in whatever sequence prescribed by COMUSMACV in coordination with CINCPACFLT. Unless otherwise authorized only one armed recce type BR mission may be conducted during any one calendar day. Barrel Roll missions to create choke points or to periodically reseed choke points are not included in this category and may be flown without restriction as to time between these and other approved BR missions, except that each choke point in BR geographical area will not be reseeded more often than every fourth day.

Add to this state of restraint, the oddities - Thai-based aircraft could overfly Laos to strike in North Vietnam (after 7 February 65) but were not authorized to strike in Laos, and still have never been authorized to strike in South Vietnam. Navy aircraft, on the other hand, were authorized to strike in Laos, but could not fly over North Vietnam to get there. Most of these things were political considerations brought

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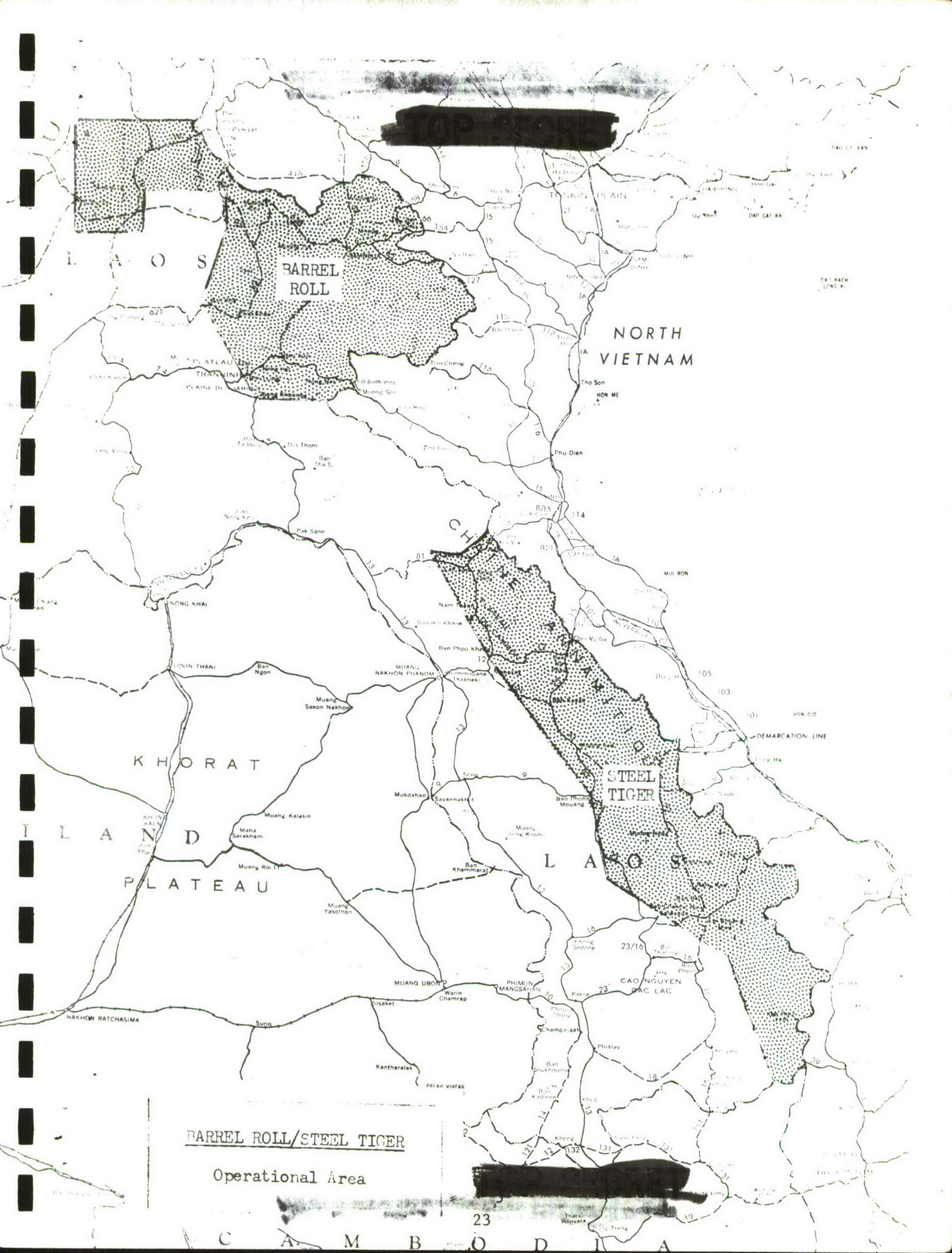
about by the often tenuous working relationships with the heads of state of South Vietnam, Laos, and Thailand, and the necessity to "go along with, or get out" when it came to supporting their positions. As a political dictate this was understandable; as a military stricture, it was extremely confining.

It was patently impossible to carry on an effective night interdiction program using one mission every two days to interdict an area roughly the combined size of New York and Pennsylvania, (Laos: 91,500 sq. mi. - New York/Pennsylvania: 94,909 sq. mi.), heavily jungled and interlaced with foot paths.

VI. BARREL ROLL/STEEL TIGER

With agonizing slowness the situation eased. The U. S. Ambassador to Thailand received and forwarded permission for U.S. Thai-based aircraft to be used on BR Four Delta on 7 April 1965 and soon thereafter Thai-based aircraft were performing strikes as a matter of course. ^{29/} Another move which tended to brighten the picture was the separation of BARREL ROLL into two programs on 3 April 1965. ^{30/} As of that date, the JCS directed that air operations in Laos against routes and targets in the Laotian Panhandle, associated with infiltration into SVN, would be considered a separate program identified as STEEL TIGER. This was primarily in the area south of Ban Nape Pass and included the "Ho Chi Minh Trail." The northern section would remain BARREL ROLL and here the interdiction and other operations would be mainly in support of FAR/Neutralist forces of Royal Laotian Government. This had the effect

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NORTH VIETNAM

BARREL ROLL

STEEL TIGER

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BARREL ROLL/STEEL TIGER

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of increasing the number of missions, both day and night.

The 8th Tactical Fighter Wing deployed its first squadron of 18 F-4C's of the 45th Tac Fighter Squadron into Ubon, Thailand on 7 April 1965. This Wing became the workhorse unit for night operations in Laos and North Vietnam in the succeeding months. The sister squadron to the 45th TFS was to bed down at Ubon by 25 June.

Even with this increase in available strike resources, the night interdiction effort was creating no great dent in the infiltration activities. Slowly the amount of sorties was climbing, but as of 5 April a total of only 16 night armed recce missions had been flown outside South Vietnam. Of these, but six had acquired and attacked targets. Significantly, however, there were 26 day armed reconnaissance missions and none had achieved any sightings of moving target destruction. Two points appeared to be clear; the enemy was hiding out during the daylight hours, and there was significant promise in the night effort if it could be expanded into a realistic program. Such a program began to emerge with the gradual lifting of the mandatory "sterile" period between strikes, the use of Thai-based aircraft, numbers of strike aircraft per mission determined by the operational commander, and the use of napalm when approved by the American Embassy at Vietiane. STEEL TIGER's entrance into the picture brought with it the promise of permission to cover major routes with a nightly mission and the ability to strike validated secondary targets, if the armed route recce was unsuccessful.

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Through 22 July 1965 thirty-one percent of the BARREL ROLL/STEEL TIGER missions had been flown at night, yet 64 percent of significant sightings had been made at night, which would make the night effort roughly twice as productive with half the effort. A welcome adjunct to night operations was the relative safety against enemy defenses - 11 USAF aircraft had been hit and four lost in day armed reconnaissance; no aircraft were hit or lost in the night armed recce. Nonetheless, the total effort and the percentage of night effort remained low through most of 1965. For example, from 6 August through 2 September there were no USAF night strikes in Laos or in the ROLLING THUNDER program in North Vietnam. The percentage of night effort, instead of going up, actually dropped. However, basic operations orders for ROLLING THUNDER for May and June 1965 both stipulated that armed reconnaissance would be conducted day and night, with emphasis on the latter. ^{31/} Of 669 strike sorties flown in Laos between 1-14 October 1965, only 18 were night sorties. In ROLLING THUNDER, USAF flew five missions, all with the B-57/C-130 teams. Through the last two weeks of October the USAF was still allocating only 3 or 4 percent of its sorties to night operations in ROLLING THUNDER but, during the first two weeks of November, this figure rose to 14 percent. The B-57/C-130 NIGHT WIND operations had largely supported ROLLING THUNDER operations, until 17 October, when an SA-2 alert forced a cancellation. After that period the C-130's and B-57's largely confined their operations to Laos, while the NIGHT OWL F-4C's (with the lead aircraft carrying MK-24 flares in SUU-25 flare dispensers) took over operations in North Vietnam. The increase in night operations

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coincided with this switch in aircraft/area responsibility. In the last week of September 1965 and first week of October 1965, six NIGHT OWL sorties were scheduled for every other night (RT 33, 34, and 35).^{32/} In RT 36 this was raised to eight sorties, and in RT 37, 38, and 39 it was paced at a steady rate of 20 sorties scheduled for every night. In the BR/SL areas the USAF flew 46 B-57 and 12 C-130 NIGHT WIND sorties.

It was in November and December 1965 that night interdiction received its biggest shift, both in direction and weight of effort. It had managed, in its first ten months, to progress from slightly over one night mission (four strike sorties, one support sortie) per week in the BARREL ROLL area, to a fragged 140 sorties per week over North Vietnam and an average of 60 sorties a week in the combined BARREL ROLL/STEEL TIGER areas. This was a sizeable gain but, even when added to the day effort, it was not appreciably hindering infiltration of either supplies or personnel from North Vietnam to South Vietnam along the overland routes.

Although the RB-66's initiated operations on 8 May 1965 and introduced Elint/ECM to the theater, the level of electronic sophistication was not high. The "wait" restriction between missions should have been evident to the enemy. As a result of such stereotyped tactics, he conceivably knew when it was safe to move and when it was not and varied his movements accordingly. The flares themselves, while necessary in most instances, had their own element of counterproductivity. The ignition of the first flare on a target, visible for many miles, would cause all traffic along a major LOC to pull over under the jungle canopy, turn out the lights and simply

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wait. The strike aircraft had but limited loiter capability before bingo fuel was reached. A truck driver had only to sit through a leisurely cigarette or two before he knew he was safe for another few nights. It was estimated that 300 tons of supplies and 4500 Communist soldiers per month were coming into South Vietnam through the LOC's in Laos. It was apparent to military planners in South Vietnam (both United States and Vietnamese) that something had to be done to accelerate the interdiction program. One of the major stumbling blocks to effective counteraction was General Ma's reluctance to accept the high rate of enemy movement reported by U.S. sources, along with his insistence in reserving most of southern Laos for RLAF operations. After observing the lights of enemy vehicular traffic during a night flight, however, General Ma began to alter his views. ^{33/}

To facilitate obtaining authority to resume full scale STEEL TIGER operations, CINCPAC concurred in providing General Ma information regarding anticipated activities in southern Laos. ^{34/} About the middle of November, Ma agreed to the resumption and expansion of USAF air operations in that area. ^{35/}

COMUSMACV accordingly published new operating rules for BR/SL. The most significant policy change was the establishment of armed reconnaissance sectors adjacent to RVN in which strikes could be conducted; with minimum restriction, along any motorable trail or road. ^{36/} He also directed a "think" group to come up with a plan specifically to increase surveillance and promote the actual attack against enemy

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troops and supplies along the Laotian border, contiguous to South Vietnam from the DMZ south to Cambodia. ^{37/} In addition, General Westmoreland directed that 2AD schedule up to 100 strike sorties per day into southern Laos and asked the Navy to add another 66, if ^{38/} necessary.

VII. TIGER HOUND

Thus the TIGER HOUND concept was formulated and, for the first time, an integrated program for interdiction was set up. This was briefed to Secretary of Defense McNamara, in Saigon on 28 November, and received his full support.

The night portion of TIGER HOUND envisioned AC-47's as strike and flare aircraft and, also, as Forward Air Controllers when night and weather precluded operations by O-1 aircraft. The TIGER HOUND task force would have 13 Mohawks (OV-1A's and B's), used to discover targets during darkness with IR and SLAR and, having cockpit readout, could generate fast response to significant findings. General Westmoreland had asked for B-52 strikes in Laos; these would be used at night for several reasons. Among them, it was hoped that Arc Light strikes would escape official detection in order that Prince Souvanna Phouma could maintain a facade of "neutrality" within his own tri-partite ^{39/} government. Also, with these strikes being directed against LOC hubs for the most part, it was felt that the greatest effect would be achieved at night during the hours of peak activity.

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With a valid concept of operation and with a weight of effort finally behind it, it was to take only application and experience to make it pay off. This was a few months in coming. Colonel John F. Groom, Commander of TIGER HOUND Task Force, said: ^{40/}

"...we admitted that this program at night was more a harassment type thing, rather than trying to find good targets and hit them. Simultaneously, over the well-travelled routes such as Route 9, from Tchepone down south along Route 92, we put in a great deal of night reconnaissance, and the RF-101's going over the area, and the RF-4C, dropping flares at random over seven mile stretches, did pick up actual trucks in the area. This convinced all of us that we had to improve our night effort. So the thing we did was get C-130 aircraft, equipped with flares, on the routes during the nighttime. We would have done this earlier but we were severely limited on flares at this time, and the in-country war came first. But around February, we did receive additional flares, and we started flying the C-130 at six o'clock, until six o'clock.

Recognizing that the photo ships were going over at random and getting trucks, we in a way followed the same tactics. We would have the F-4C's, for example with CBU's, make straight and level runs along roads that we knew were open and were being travelled. And we would drop flares, and have them drop in the area, and we got many many secondary explosions. And the following day, there was evidence that we had gotten quite a few trucks this way.

We still weren't satisfied with this kind of a program. We refined it further by adding the Mohawk - OV-1B aircraft - which is a SLAR equipped aircraft. It has the immediate readout for capability for moving targets. So at the present time, we have a team, consisting of the C-130 with flares, the OV-1B with a moving target capability, and strike aircraft operating as a package. The SLAR aircraft will move up and down the roads and if he gets a moving target indication, he will mark the target with a flare. In turn, the C-130 will pick up this particular coordinate, light up the area and call in the strike aircraft to hit the targets. We try to keep almost a 24 hour pressure - surveillance and attack - on the area, Route 9, 92, Tchepone down south."

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The increase in night strike emphasis was justified. From 6 December 1965, when TIGER HOUND started, until 31 December 1965, there were only 51 night strikes compared to 333 day strikes by USAF fighters, or approximately six and a half to one, day to night. In April 1966, the figures were 858 night to 2514 day, a ratio of nearly 41/ three to one, and climbing.

Coincident with the night strike buildup was the night photo recce effort. Through the first ten days of February 1966, fifty night photo missions were scheduled along Route 9 in TIGER HOUND, 21 against Mu Gia Pass, 37 against Nape Pass and 15 against Barthelemy Pass. RB-66's and RF-4C's were tasked with detecting night infiltrations over these passes and along the most likely routes and river crossings. The first series of sorties proved that vehicles were, indeed, moving in quantity. 42/ These night photo aircraft, dropping flash cartridges, took pictures with excellent clarity. (See photo, page 32)

The strikes which followed provided even more drama, since the February results in the TIGER HOUND area exceeded all results previously logged in the program. There were 125 trucks destroyed, another 58 damaged, and 135 secondary explosions. A third of these figures were attributed to night strikes. March results nearly doubled those of February. Here again, the night effort, to a large extent, made it possible. In one instance, an O-1 Forward Air Controller located a camouflaged truck about 40 miles south of Tchepone on Highway 92, late in the afternoon. 43/ He called in strikes which succeeded in blowing

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TRUCKS W/PROB FIELD PIECES

TRUCK

NIGHT PHOTO - TRUCK CONVOY

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the camouflage off several more. With more trucks uncovered, the strikes went on into and through the night, under a C-130 flareship, until a total of 215 sorties had been called in. When it was all over, 47 trucks had been destroyed and 28 damaged; secondary explosions were counted until the tally reached 70 and counting became academic. ^{44/}

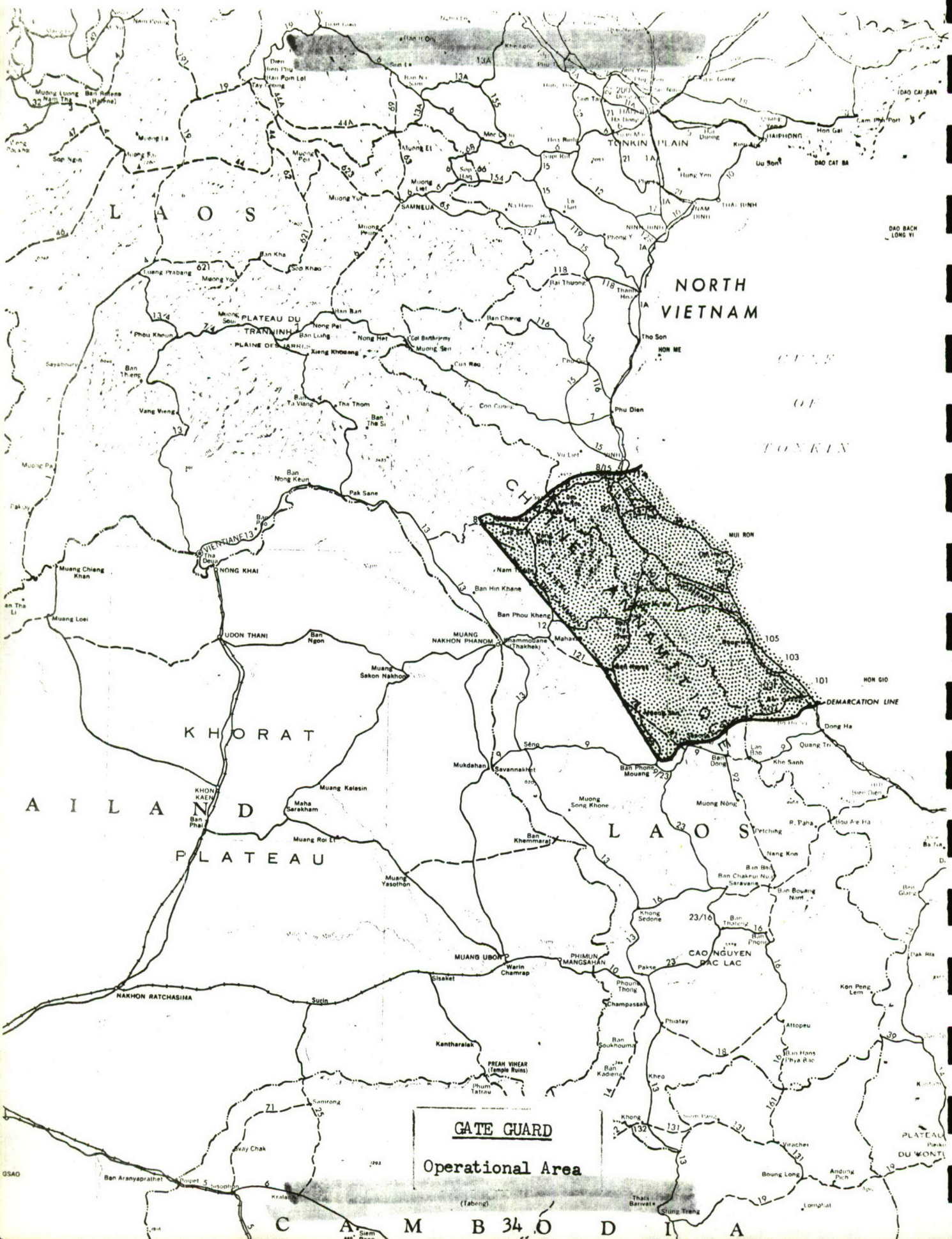
"...On the first three night strikes, 70 secondary explosions were counted. From there on in, after each strike, a chain of secondary explosions appeared every six seconds. After two hours of bombing, a portion of the area, 50-75 yards in diameter, was like a volcano. Every 6-20 seconds it would erupt with another explosion."

These successes continued to mount through April, which set another all time high (325/205 trucks dest/damaged; 442 secondary explosions) with the night portion receiving its share of the credit. In essence, the program of day/night 24 hour interdiction was so successful that it ran itself out of targets. The decline of truckkills in May foreshadowed the near-absence of truck sightings in June, when the rainy season began.

The concept showed such excellent results that in April and early May the same tactics, with a few notable additions and improvements, were applied in STEEL TIGER North and in Armed Recce Route Package I.

VIII. GATE GUARD

There was a recognized need for more emphasis within North Vietnam of the interdiction program and an operation called GATE GUARD was implemented. More than 1000 trucks were counted during an April



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GATE GUARD
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survey in RP I and, since TIGER HOUND had nearly sterilized the southern portion of the Laotian Panhandle, it was decided to shift the effort further north. GATE GUARD started in early May in STEEL TIGER North, then concentrated its weight on RP I when the monsoon turned. ^{45/} Like TIGER HOUND, it employed C-130 ABCCC's with flare capability and diversion authority, along with a continuing input of strike aircraft, ECM by RB-66's and gun-laying radar suppression by IRON HAND F-100F's and, later, F-105F aircraft. For night target acquisition, IR/SLAR was used along the coast, with photo-flash recce flown by RF-101's. The object was to interdict selected points along the LOC's during the day then seek out and destroy the fleeting targets at night. 3 April?

The enemy was determined to keep some semblance of a supply line in operation and went to great lengths to accomplish this. Examples were the removal of steel planking from an airfield runway to shore up interdicted roads, and the sighting (twice) of trucks pulling single railroad cars on undamaged sections of the railroad. ^{46/} To counter this, in July 60 strike sorties per night were scheduled into RP-1, 20 into each of three primary road segments (Rtes 137/1/1A, Rtes 15/15-Bypass and North 101, and Rtes 1A plus South 101). This allowed each section to be covered for 20 minutes of each hour and left flexibility in the event weather denied access to another area - the strikes could simply be diverted into an open sector without saturating the airspace. Six to eight photo sorties were scheduled over selected choke points

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each night. The films underwent immediate readout upon landing and, if traffic was noted, word was passed through the TACS (Tactical Air Control System) to the flareships. The flare aircraft proceeded to and illuminated the area, calling in strikes if vehicles were seen. The C-130 flareships would not normally be considered high survivability aircraft for this AAA environment, but RB-66's, as ECM pickets, and Shrike-armed IRON HAND flights negated the effectiveness of the 37/57 mm AAA and restricted ground fire to optically-sighted automatic weapons. Since the C-130's flew, blacked-out, at 6000 feet or above, they were outside automatic weapons range in addition to being very low-visibility targets. If the ECM aircraft were not on station, the C-130's retired to the south and a more permissive environment. Normally, two flare aircraft took position in GATE GUARD, one orbiting a primary choke point midway up the package and the other working random patterns over the other LOC's. The concentration on the night effort showed a marked difference in the number of sorties programmed for the hours of darkness. Roughly one out of 25 or 30 of the sorties for ROLLING THUNDER operations were scheduled for nighttime in October of 1965. In June of 1966 the ratio had risen to one in every two and a half and, in the first few weeks of July, was running in the neighborhood of one night for every two day sorties. In GATE GUARD, the truck kill for night operations surpassed even that for day strikes, which backed up the theme "Interdict in the daytime; exploit at night." In 65 days of operations, between [?] 3 April and 7 July, night strikes had accounted for 164 trucks destroyed and 265 damaged in RP I, while the day effort had gotten 154

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destroyed, 126 damaged.

IX. TALLY HO

The successes in TIGER HOUND had forced the North Vietnamese to recognize this area as unrewarding with regard to their infiltration LOC's. In their frustration, the North Vietnamese began to funnel more troops and supplies directly down through the DMZ, in abrogation of the 1954 accords. To counter this, the assets of TIGER HOUND were given the added responsibility of a new program, Operation TALLY HO. TALLY HO was initiated on 17 July 1966 and the first air strikes were flown on 20 July. The operation area included the southern portion of Rte Package I in North Vietnam from the Dai Giang River, below Dong Hoi, down through the DMZ to its southern boundary. With this new operational area, the last of the overland infiltration LOC's from the north came into the integrated interdiction concept. TALLY HO paralleled TIGER HOUND in concept; in fact, the ABCCC and FAC's from the TIGER HOUND program were used in TALLY HO, along with the Army OV-1B's for night IR/SLAR recce. The ABCCC's did not orbit directly over the DMZ because the area was not permissive. ECM support was generally north of the TALLY HO area. Although area jamming could be provided over the DMZ, whenever higher priority required direct specific jamming, the TIGER HOUND area was without effective ECM. A limiting factor in TALLY HO was the radio/radar limitation caused by mountainous terrain. Adequate radar coverage was limited to 5000 feet and above, if the radar was to track or vector aircraft.

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Routes supporting infiltration through the DMZ were 1A, 101, 102, and 103. Route 1A is the principle route to Dong Hoi and, with 102, provided the main route through the DMZ into South Vietnam. Early in the program the Army Mohawks noted moderate traffic moving in small convoys along Rtes 1A, 100, and 101. While it is too early, at this writing, to make a valid comparison between night and day effort in this area, past experience would tend to rate its importance along with that of TIGER HOUND, STEEL TIGER North and GATE GUARD.

X. OPERATIONAL PROBLEMS

Many problems were encountered and solved during the history of night air interdiction in Southeast Asia. Many were matters of political or self-imposed constraints which were, by-and-large, weeded out and removed in time. Some were inherent to night flying. The possibility of spatial disorientation (vertigo) of the pilots is an ever-present danger. An F-4C was lost in the STEEL TIGER area on 3 April 1966 when the crew was forced to eject after experiencing uncontrollable flight conditions. The aircraft commander was recovering from a steep-angle dive bomb pass, under flare illumination. He became disoriented during his pullout when the flare burned out and, subsequently, lost control of the aircraft in a stall or spin condition. Because of darkness, mountainous terrain and low operating altitude, the crew ejected immediately. ^{48/} Darkness, under conditions of poor visibility, is considered an instrument environment at any time. Tactical fighter operations further degrade this basic safety concept by introducing extreme flight attitudes. The use of flares for target

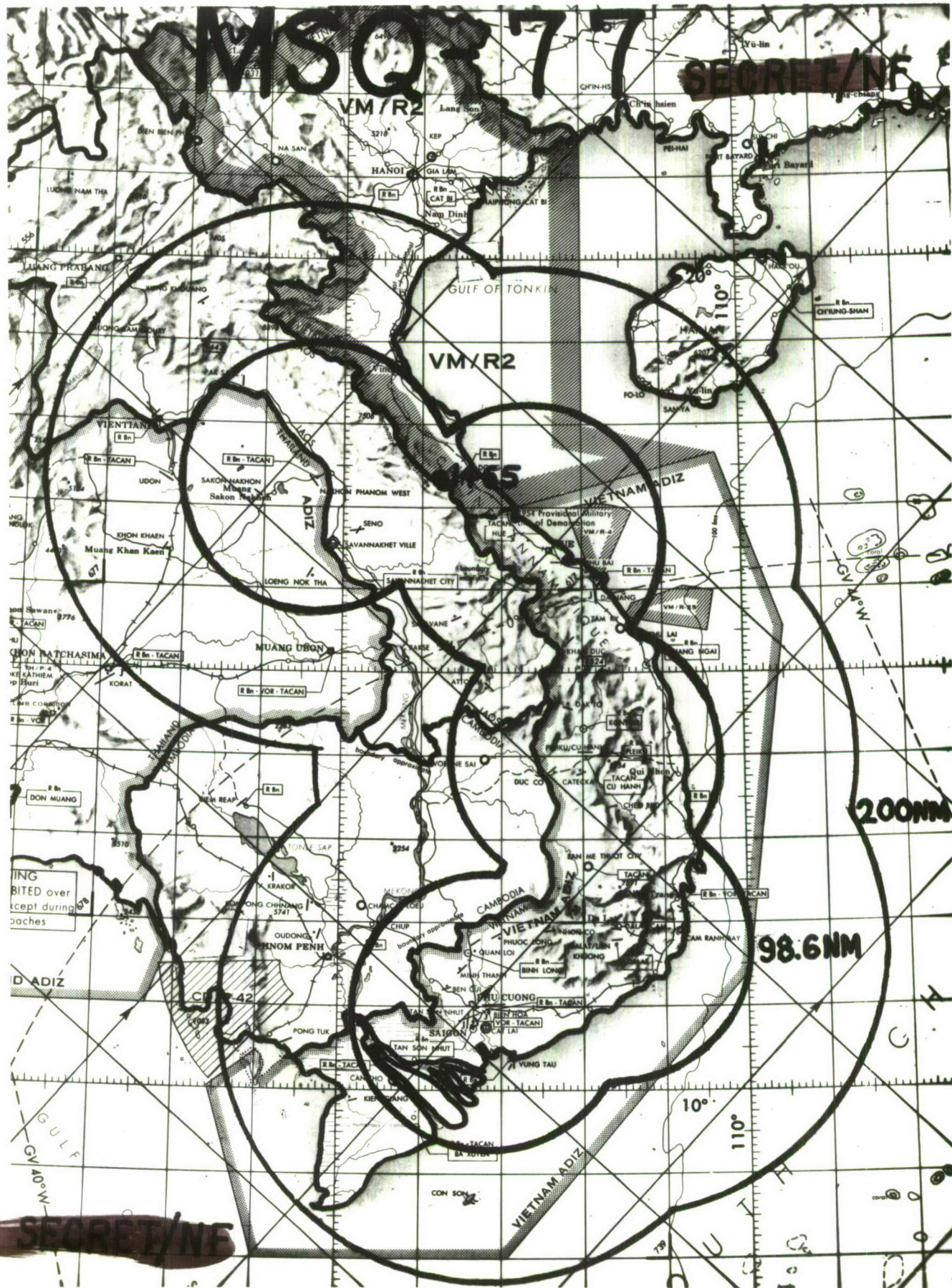
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illumination imposes additional hazards to those expected of night ordnance delivery; the pinpoint bright light and halo make visual range and dive angle computation difficult and uncertain. This has caused steeper than desired dive angles, with greater extremes in recovery and maneuvering attitudes. The smoke of the flares often stratifies and hangs in the target area, creating odd shadow patterns, both in the sky and on the ground, while materially reducing visibility. Flare ignition and burnout create alternating extremes of visibility which affect transition from visual to instrument flying. Night vision adaptation is destroyed at the first flare and is not regained while in the target area.

These conditions are inherent to night combat activities and are accepted as an occupational hazard by the night strike pilot. However, the commanders of the units involved in night operations continued to stress proper division of attention to the attack phase by visual means, and the recovery phase by instrument references. Over-emphasis on either phase would result in lowered ability to destroy targets on one hand, or excessive aircraft risk on the other. ^{49/} Among other elements tending to reduce flight safety during night operations are muzzle flashes of firing guns or rockets, bomb blasts creating a vast amount of light in one second with complete blackness the next, and nearby thunderstorm lighting flashes creating a "photoflash" effect on the eyes. All these are capable of producing spatial disorientation.

XI. NIGHT WEATHER PROBLEMS (Skyspot)

Night weather, and the attendant problems of navigation and target acquisition, plagued planners from the outset. For example, during ROLLING THUNDER 37 (last week of October 1965) all NIGHT OWL sorties, except for one night's operations, were scrubbed because of poor weather. In ROLLING THUNDER 38 and 39, of 240 sorties scheduled, only 98 were completed, weather being the primary factor, with no aircraft flying on half the nights during the period. ^{50/} Many attempts were made to alleviate this situation. The use of the Udorn, Korat, Da Nang, and Pleiku TACAN's was ruled out early because of unacceptable CEA's. "Buddy Bombing", a tactic of flying a formation of bomb-carrying fighters with an RB-66 pathfinder and dropping on his lead, was first tried in January 1966. Mu Gia and Nape Passes were bombed several times with this technique. It was well-suited for such bombing where circular error was not critical, but could not successfully be used where an errant bomb might strike friendly forces. MSQ-77, "Skyspot" filled many of the needs for a night/weather bombing system. Skyspot is a ground-based radar and, although originally developed to score simulated bomb runs over SAC Bomb Plots, its accuracy in vectoring aircraft to a pre-determined release point is such that CEA's on the order of 330 feet are the rule. ^{51/} Any point within range of the MSQ-77 (187 nm if aircraft is beacon-equipped) can be pre-plotted by survey, map measurement or by visually placing an aircraft over that point and plotting its position. The first MSQ-77 was installed 1 April 1966, with four others rushed into completion as soon as possible. The five locations were



WISQ 77
 VM/R2

SERPENT

VM/R2

25

200NM

98.6NM

NOT BITED over except during dashes

Bien Hoa, Pleiku, Dalat, and Dong Ha in South Vietnam, and Nakhon Phanom in Thailand. (See Map, Page 41) In final stages of development was a modification to increase the Skyspot range to 200 nautical miles. The advantages of the MSQ-77 system were immediately apparent. Tactical aircraft, not equipped for precision radar bombing, could be used around-the-clock and for all-weather bombing. ^{52/}

This system, valuable as it was in navigation and in terms of bomb release accuracy, could not solve the target acquisition problem for night armed reconnaissance. Weekly, SEAOR (Southeast Asia Operational Requirement) requests were sent back to AFSC in hopes of beating this continuing problem. The RB-57, RF-4C, and OV-1B aircraft, with their IR/SLAR capabilities, had limitations both in resolution and in heat-selectivity. The equipment in the RB-57 was incapable of resolving a truck-sized vehicle, for instance. The Mohawk, with somewhat better resolution and with cockpit readout capability, had advantages but was forced to operate at altitudes of 1500 feet or below, which placed it within automatic weapons range. Five were lost during the TIGER HOUND program to small arms and AW, two on one day. ^{53/}

The Starlight Scope, a light-intensifying telescope, was used with outstanding success in locating enemy personnel on the ground at Attopeu, Laos on 4 March 1966, but these were in short supply. ^{54/} An SEAOR was submitted for this equipment, both individual and crew-served, for use in the AC-47 and the O-1 aircraft. The AFSC Best Preliminary Estimate (BPE) was sent to USAF, but no schedule could be given. Obtaining

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quantities of Starlight Scopes would probably require DOD approval since all production was currently slated for immediate delivery to Army combat units in South Vietnam. ^{55/} Because flares normally alert the enemy to the possibility of an imminent airstrike, several SEAOR's were submitted and projects began to come up with an aircraft/sensor combination which could achieve the element of surprise. The Starlight Scope was only one, others were: Project Lonesome Tiger (the installation of Forward Looking IR (FLIR) in B-26K's for use in night armed recce), Project 1533 (Four A-1E's carrying Dalmo-Victor Low Light-Level TV pods for night armed recce) and Project Black Spot (C-123 aircraft with weapons and night sensor equipment, FLIR, LLLTV, and/or radar, as night armed recce test beds). ^{56/} Flight tests were scheduled to begin for Project Lonesome Tiger in October; Project 1533 was to start testing in July of 1966 and deploy to SEA in October. It was planned to test the Black Spot C-123's in December, with deployment to SEA set for ^{57/} January 1967.

Among other systems or combinations which were asked for were Foliage Penetration Radar, Laser Photo Reconnaissance equipment, and Data Link or cockpit readout of higher resolution/sensitivity IR/SLAR. ^{58/} The last was considered highly important. An SEAOR was submitted to procure a system which would permit night reconnaissance infra-red sensor image data to be imaged in near real time (hopefully, one minute) at a remote air or ground readout facility. Image interpreters at the facility would quickly interpret the IR image and immediately transmit derived

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targeting information to a strike capability before the target appreciably changed, moved or dispersed. The time delay currently experienced with USAF aircraft, which had to return to base, download and have the data processed before interpreters could derive targeting or other intelligence from it, unquestionably allowed many lucrative targets to escape. Such information is normally highly perishable. If tactical aircraft could be modified to provide such real time imagery, the time elements of the acquisition/target/strike cycle would be reduced to those required for human analysis and direction.^{59/}

XII. AC-47's

Along with the "very new" in night operations came the "very old." The AC-47 "Puff" aircraft had been tested and adopted in South Vietnam in December 1964 and January 1965. On 10 January 1966, the USAIRA at Vientiane asked 2AD to establish a requirement for six to eight AC-47's at Nakhon Phanom, for use in Laos.^{60/} Second Air Division did so on 5 February. On 17 February, urgent phone calls from Deputy Commander 2AD/13AF Thai requested AC-47's immediately for the defense of Lima Site 36, an Air America strip in northern Laos. Two aircraft were immediately sent to Udorn for use in that engagement. Although Lima Site 36 was lost, the AC's made such a good showing that the Ambassador to Laos and the AIRA requested they be left at Udorn permanently. On 19 February, CINCPAC directed that an acceptable number of AC-47's be sent to Nakhon Phanom in the immediate future. PACAF, in turn, directed 2AD to have MACV allow the deployment of four AC-47's

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to NKP for use in CRICKET (STEEL TIGER North). ^{61/} These four, with five crews, were scheduled to Udorn for 179 days TDY. Thai country-clearance was obtained on 25 February and, on 26 February, the four AC's deployed.

The venerable Gooney would not appear to show a high survivability factor in the SEA environment and six AC-47's were lost during the first eight months of operations. However, most losses, if not all, were incurred in an out-of-design role. Blacked-out at night, flying above AW range, its chances for survival should be excellent; flying low, or in an AAA envelope, they would be slim. Most of the losses appeared to be directly attributable to AW or AAA.

The four aircraft sent to Udorn remained there until A-1E's ("Sandy" low-rescap aircraft) arrived and created over-crowded ramp conditions. The AC's then moved down to Ubon, Thailand. With the arrival of eight A-26A's at Nakhon Phanom on 18 June, the AC-47's moved back to South Vietnam, having fulfilled their mission in Thailand and Laos.

XIII. EPILOGUE

Southeast Asia night operations, in the interdiction role, have progressed tremendously in the year and a half since their beginnings. From a toddling start, in January 1965, when four airplanes wandered about looking for a place to unload ordnance, through June of 1966, when 1903 night armed recce sorties helped seal off the overland

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infiltration routes into South Vietnam, the program has made great strides. In weight of effort it has grown massive; in tactics, it has achieved a real measure of efficiency; in total effectiveness, it has proved a necessary adjunct to an integrated interdiction program.

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Footnotes

(References as noted provided in one copy to AFCHO and in DOPEC file copy.)

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- 2/ Ibid.
- 3/ Ibid.
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- 5/ (TS) CINCPACFLT to CINCPAC, 272223Z Jan 65.
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- 9/ (TS) CINCPACAF to Generals' Maddux and Moore, Cite Nr. 65142, 230228Z Jan 65.
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