Evaluation of PSAC Report
Effect of Air Strikes
in North Vietnam and Laos

16 May 68 TOP SECRET Hornig to Helms letter re draft of Ad Hoc Vietnam Panel

Attachment: TOP SECRET report, The Effect of Air Strikes in North Vietnam and Laos, a Report by a Special Subpanel of PSAC, 26 Apr 68

No Date Blind Memo re Comments on The Effects of Air Strikes in North Vietnam and Laos

50X1

11 Jun 68 [redacted] to DD/OER memo re Comments on PSAC Report

Attachment: TOP SECRET Hornig to Helms letter re final version of PSAC report on The Effect of Air Strikes in North Vietnam and Laos, A report by a Special Subpanel of the President's Science Advisory Committee, 27 May 68 (report attached)

~~SECRET~~

MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : DD/OER

DATE: 11 June 1968

FROM : Chief, D/I

SUBJECT: Comments on PSAC Report

1. There are no changes in any of the conclusions of the report and no evidence on any additional work, rethinking, or modifications. The only changes made have been some minor cutting and a fair amount of reshuffling of paragraphs within various sections of the report.

2. Table II, Averages. Daily Tonnage Destroyed in North Vietnam First Quarter of 1967 and 1968, was not in the earlier draft. This was probably an oversight, however, because the numbering of tables in that report had jumped from I to III.

3. We had suggested the words "soon after the first strike against the bridge" be inserted in a sentence describing the number of bypasses around the Dourmer bridge. This suggestion was used. All the others were ignored including the one on petroleum stockpiles.

4. Finally, where in the first draft the report in several places read, "CIA estimates", it now reads "intelligence community" or "the best estimate available." However, there still are specific references to some CIA estimates, e.g., "...flow rate into Laos... has been estimated by CIA....".

5. Conclusion: the reactions of the recipients may have been considered by the committee but ours were largely ignored. However, the really strong objectives that must have come from some recipients were obviously also ignored. All in all I think it is a fair analysis which bears the strong flavor of our past efforts.

[redacted]

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GROUP 1
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TOP SECRET

DDI-1665-68

THE WHITE HOUSE

WASHINGTON
6 June 1968

Dear Dick:

Attached is a final version of the report on "The Effects of Air Strikes in North Vietnam and Laos" which you have already seen in draft. The reactions from the recipients of the Draft Report have been carefully considered during the revision.

The revised report has also been reviewed by the full committee (PSAC) which concurs in detail with its conclusions and recommendations; PSAC also concurs in general with the body of the Report.

Since this is obviously a sensitive report, I believe that its distribution should be limited and therefore request that it be given no further distribution without my specific approval.

Sincerely yours,

Don

Donald F. Hornig
Special Assistant to the President
for Science and Technology

The Honorable Richard A. Helms
Director
Central Intelligence Agency
McLean, Virginia

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I. INTRODUCTION

As part of a more extensive study that it is conducting on a number of questions relating to Vietnam, the President's Science Advisory Committee has examined the problem of the effect of air strikes in North Vietnam and Laos.

In its examination of the problem, the Committee has focused its attention on the following general questions relating to various bombing policy alternatives:

1. What have been the effects of the previous bombing campaigns of 1966 and 1967 against North Vietnam?

2. What effect will the policy announced March 31, 1968, by President Johnson have on the flow of supplies to enemy forces in South Vietnam?

3. What would be the effect of restricting the bombing of North Vietnam to Route Package 1?

4. What would be the effect of stopping all bombing of North Vietnam?

5. What would be the effects of an enlarged bombing campaign with broader targeting in North Vietnam than permitted prior to March 31, 1968?

The Committee's evaluation is based in large part on a critical review of the studies of various aspects of the bombing of North Vietnam that have already been made by IDA, CIA, RAND, OSD (Systems Analysis), and the Air Force. We also have had the benefit of many operational and intelligence briefings which brought these studies up to date and covered critical aspects of the problem in greater detail.

II. CONCLUSIONS AND RECOMMENDATIONS

The Committee has been impressed that much of the information relating to this problem is subject to large uncertainties or simply non-existent. We have attempted to identify such gaps in information

and the major uncertainties, some of which could probably be narrowed by further study. Nevertheless, we believe that existing information does permit us at this time to draw certain important general conclusions which we submit in the hope that they may be useful in connection with the current negotiations with North Vietnam. Here we give a summary of conclusions and recommendations without, however, repeating all of the qualifying remarks to be found in the body of the report.

A. Conclusions

General Effects Apart from Interdiction

1. The bombing has produced substantial disturbances in the life of the ordinary citizen, has exacted an economic cost which has been largely passed on to North Vietnam's allies, and has exacted significant manpower costs. Nonetheless, all the evidence suggests that the costs have been met and that the capability exists to meet even greater costs. We have not focused on the political or psychological aspects of the bombing of North Vietnam; however, while it has apparently improved morale in South Vietnam, we see no evidence in the material we have reviewed that our bombing has significantly weakened the will of the North Vietnamese to carry on.

Interdiction in North Vietnam

2. The bombing campaign against North Vietnam in 1967 and the first three months of 1968 not only failed to reduce appreciably the flow of combat materiel reaching South Vietnam, but also failed to prevent the enemy from increasing his level of operations. It appears that something like 18 short tons per day (STPD) of military supplies were destroyed in 1967 in North Vietnam (roughly 10 per cent of the materiel destined for Laos or South Vietnam).

Interdiction in Laos

3. The interdiction campaign in Laos does not appear to have seriously limited the flow of combat materiel to South Vietnam at the current level of operations since (1) we destroyed in Laos only something like 14 STPD, roughly 25 per cent, of the supplies on the trails in 1967, and (2) the North Vietnamese have been able to develop the

methods and to allocate sufficient resources to prevent degradation of their Laotian logistics system, although it costs them the services of 40,000 men who must themselves be supplied. Our interdiction capability is currently improving and, unless the enemy improves his air defense system or changes his supply tactics, might destroy 30 per cent or more of a substantially larger flow of supplies in transit through Laos. There appears to be ample opportunity for increasing the level of attack in Laos (during the good weather, October to May) and this could still further increase the fraction of supplies destroyed or impose an additional burden in the form of changes in his supply system.

The Total Interdiction Campaign

4. The North Vietnamese and their allies were able to prevent degradation of their logistics system in North Vietnam and Laos, and, in fact, to improve it. We believe North Vietnam has the flexibility to increase her supply rate above the present level despite our air campaign, but do not know how large an increase (nor on what time scale) she could make on a sustained basis.

5. It is our judgment that with prudent planning the enemy should have been able to schedule and move supplies to South Vietnam at a rate which would accommodate the losses inflicted by the bombing campaign in North Vietnam. We believe that factors other than our air campaign in North Vietnam will largely determine the scale of the war in South Vietnam in the future.

Limitations in Effectiveness of Past Interdiction Campaigns

6. In the past, the achievements of the United States' air interdiction campaign have been seriously restricted by the technical limitations on our capability to conduct attacks at night or in bad weather, and by our inability to deliver iron bombs with sufficient accuracy to attack effectively trucks, trains, bridges and roads.

Substantial improvements in night attack capability of low-performance aircraft (using simple night vision devices and armed with guns or CBU weapons) have been made in Laos, which is currently an area of low enough threat to permit the use of such aircraft. An increase in the number of aircraft equipped with night vision devices (especially with stabilized optics) could improve our night attack capability in Laos and South Vietnam.

In the high-threat areas in North Vietnam, where high-performance aircraft are needed for survival, no substantial improvement in operations at night or in bad weather can be expected within the next year unless new technical solutions to some of the problems can be accelerated.

Daytime attacks against point targets with suitable characteristics (e.g., high contrast) can be improved in all areas by the use of the Walleye TV-guided bombs, but the planned production rate (to be achieved by August 1968) will provide only about 20 bombs per day. Laser-guided bombs show promise for both night and day, but the date of their availability in adequate numbers is uncertain.

Alternative Campaigns

Attacks Only in Route Packages 1, 2 and 3, Laos, and South Vietnam

7. The reallocation of attack sorties programmed for the Northern Route Packages prior to March 31, 1968, to the attack of trucks in Route Packages 1, 2 and 3 ought not decrease and, with a properly designed campaign, could improve our interdiction capabilities against supplies flowing south, perhaps increasing the destruction of trucks in North Vietnam by as much as a factor of 2 or 3 over corresponding periods in 1967. Nevertheless, the resultant destruction in North Vietnam would probably not materially alter the availability of military supplies in South Vietnam.

Important new or intensified threats to our air and naval forces may arise, such as enemy introduction of new weapons in North Vietnam, the movement of aircraft, and the shifting of AAA and SAM assets south. These should be identified and monitored by adequate photo reconnaissance and SIGINT collection.

Attacks Only in Route Package 1, Laos, and South Vietnam

8. Air strikes confined to Route Package 1, Laos, and South Vietnam could at present be almost as effective as those including Route Packages 2 and 3 as well. Eventually, the enemy could increase the density of AAA in this more confined geographical area. In addition, MIGs based in Vinh (Route Package 3) might present a threat to our air operations in Laos, Route Package 1, and the DMZ. We do not know how serious these threats might be, but it seems unlikely that they would be critical.

Attacks Only in Laos and South Vietnam

9. With a well-designed campaign, supplies flowing south could be more effectively attacked in Laos than in North Vietnam, except during the summer monsoon (July, August, September). Of course, attacking supply lines in both Laos and in southern North Vietnam is more effective than in either area alone, and permits the shift of strike forces from one area to the other as the bad weather season alternates between them. However, the relatively light air defenses now in Laos permit our use of low-performance aircraft of superior effectiveness in truck interdiction. Further benefits result from the poor trafficability of the present roads during the monsoon. On balance, we believe that concentrating all our forces on a Laotian campaign would preserve the larger part of our interdiction effectiveness should diplomatic objectives require an end to strikes in Route Package 1. Attempting to close the passes into Laos, coupled with attrition of trucks on the trails, is a possible tactic which we believe warrants study in greater detail.

In time, the superior effectiveness of interdiction in Laos can be degraded if the enemy successfully introduces air defenses into Laos which force us to use less vulnerable but less effective (for interdiction) high-performance aircraft.

10. Careful consideration should be given to responses to various North Vietnamese military actions that might follow a limitation of our air strikes to Laos and South Vietnam. Examples of threats to consider are:

-- Increased tactical disadvantage to our troops near the DMZ in engaging an enemy operation from sanctuary.

-- Build-up of radar-controlled AAA or SAMs in Laos and the panhandle area of southern North Vietnam.

-- Escalation of North Vietnamese air activities close to the DMZ.

-- Build-up of materiels at the North Vietnam-Laos border waiting military or weather conditions in which they could be transshipped through Laos to South Vietnam.

--- Expansion and hardening of North Vietnamese air defenses.

-- Installation of surface-to-surface missiles for attack on our naval forces operating close to the shore of North Vietnam.

Expanded Air Campaigns in the Northern Route Packages

11. A resumption of the bombing campaign, eliminating restricted areas, could exact a small additional cost to the North Vietnamese effort through revised target emphasis and a major cost to the civilian economy through attacks on the waterways. A campaign with no restriction with respect to populated areas would permit attacks on several high-value military targets. An unrestricted campaign on the transportation system, including the mining of Haiphong, would temporarily disrupt some military supply, but would affect primarily the civilian sector; after a period of readjustment, it would probably affect the military capabilities of North Vietnam to support its operations in South Vietnam, but only marginally.

12. Insofar as interdiction is concerned, none of the studies we have seen of possible expanded campaigns makes a convincing case for a campaign of expanded scope in the northern route packages.

B. Recommendations

1. Integrated operational plans should be developed immediately for effective air interdiction for each alternative campaign.

2. A more systematic effort should be mounted to identify and procure equipment which would improve air interdiction. High priority should be given to an intensified development and production program to equip aircraft with a system of night-viewing sensors and displays and weapons of high accuracy.

a. Special attention should be focused on increasing the production rate of new weapons which are particularly effective or promising in the interdiction campaign, e.g., Walleye and laser-guided bombs.

b. There should be a crash program to improve the capability of the Mark 36 and BLU 45 bomblet land mine by providing for delayed fusing and random counting in order to

achieve and maintain interdiction of passes and choke points in the face of countermeasures and bad weather.

It is also essential to press the development of new weapons which might be available in 12 to 24 months.

3. An analysis in depth of the total enemy logistic systems should be carried out to determine their vulnerabilities and capabilities. This analysis should serve as an input for the further refinement of alternate operational plans.

4. The results to date and present plans for the Muscle Shoals (electronic barrier) program should be reviewed immediately to determine its most effective use as an integral part of future interdiction campaigns. Other applications for Vietnam, including the monitoring of agreements that might be reached, should also be investigated.

5. Aerial photographic reconnaissance of all of North Vietnam should be continued during any period of restricted bombing.

6. Electronic surveillance of all varieties should be maintained during any period of restricted bombing, with special attention to new collection activities which can be performed with resources freed by the change in bombing policy.

III. THE EFFECTS OF THE AIR WAR

This section discusses the effectiveness of the bombing in three separate categories: (1) its general effects on the North Vietnamese economy, including manpower and other resources; (2) its effect on the flow of supplies moving south within North Vietnam; and (3) its effect on supplies moving along the Ho Chi Minh trail into South Vietnam.

A. General Effects Apart from Interdiction

The physical damage to North Vietnam's industrial base as a consequence of the intensive 1967 campaign following those in 1965 and 1966 has been very great. Most of North Vietnam's modern and recently-developed industry has been effectively neutralized, and trade and transportation have been highly disrupted. The life of the average citizen has become increasingly trying. Much of the population of the major cities has been evacuated. United States forces have made a major effort to avoid attacking civilians; nonetheless, the number of civilian casualties (dead and injured) appears to have totalled about 48,000 through 1967, with an additional 28,000 military casualties in North Vietnam.*

Quite apart from casualties there have been substantial manpower costs. Approximately 93,000 full-time military personnel, about one-fifth of the total North Vietnamese force under arms, are tied down in manning the air defenses of the North. A labor force that numbers approximately 500,000 (many on a part-time basis) has been required to repair roads, bridges, and other physical damage inflicted by air attacks, to man the transportation system under air-war conditions, and to handle other aspects of the emergency created by the air attacks.

There were also substantial economic effects. It is estimated that the damage to economic and military tragets from 1965 through 1967 exceeded $400 million, with economic targets accounting for nearly 70 per cent of the damage. The foregoing are the effects of an air war in which 191,000 sorties were flown against North Vietnam in 1967. The extra cost to the United States through 1967 has been far in excess of $3 billion (which includes the loss of 1,000 high-performance airplanes) and 700 pilots lost (killed, captured or missing). The $3 billion includes the cost of POL, ordnance, and aircraft losses over and above that of normal peace-time operation, but it does not include support costs, base construction and base protection, which are substantial.

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* CIA Estimate

It is the consenses of the reports examined that most of the modern portion of North Vietnam's industrial capacity has been destroyed, but there has been adequate readjustment, as is illustrated by the dispersal of the power-generating capacity. Nonetheless, since most of the war materiel is produced by North Vietnam's allies, much of the cost of the bombing has been passed on to them. For example, annual foreign economic aid has been increased from $100 million before the bombing to about $390 million in 1967. Military aid, which was $210 million in 1965, has been increasing each year and will possibly reach $600 million in 1968. The preponderance of the aid is from the Soviet Union, but the Chinese contribution is substantial, as is aid from the Bloc countries. The current levels of aid do not impose a serious economic strain on any of these nations.

Despite the bombing, the general level of economic activity seems to have been substantially maintained, in part through imports and shifting of activities of the population, and in part because much of the population is normally engaged in agriculture at what is in effect less than full employment. There seems to be no good assessment as to whether there exist critical shortages in managerial or technical talent. However, we have seen no evidence of a critical shortage, and the North Vietnamese seem to have been able continuously to expand their capabilities and train new cadres as needed.

Conclusion

The bombing has produced substantial disturbances in the life of the ordinary citizen, has exacted an economic cost which has been largely passed on to North Vietnam's allies, and has exacted significant manpower costs. Nonetheless, all the evidence suggests that the costs have been met and that the capability exists to meet even greater costs. We have not focused on the political or psychological aspects of the bombing of North Vietnam; however, while it has apparently improved morale in South Vietnam, we see no evidence in the material we have reviewed that our bombing has significantly weakened the will of the North Vietnamese to carry on.

B. Interdiction

Interdiction may be conducted with either or both of the two objectives: (1) to destroy supplies en route, and (2) to increase the effort the enemy must commit to obtain a given flow. In weighing the effect of

interdiction, though, one must consider not only the average effects over long times but also the speed with which an enemy can respond to a heightened interdiction campaign, since, for example, it may slow the flow temporarily until the necessary extra effort can be supplied, and have important temporary effects, such as denying him supplies at a critical time.

In this section we review our success in achieving both objectives. Although there are great uncertainties in the data, general assessments can still be made with reasonable confidence.

1. Interdiction in North Vietnam

The Soviet Union, China, and the Bloc countries, the sources of the military supplies used in the south, are inaccessible to our bombing. Since North Vietnam serves as a funnel for military supplies produced by her allies and destined for North Vietnam's borders with Laos and South Vietnam, we can measure the effectiveness of this aspect of our bombing by the degree to which it has prevented materiel from reaching these borders.

Calculations of the total supplies destroyed en route in North Vietnam are based on pilot reports as to the number of trucks effectively destroyed,* plus their observations on secondary explosions and fires in depots, truck parks, etc. Such estimates are admittedly difficult to make, and even more difficult to evaluate as to precision or reliability. However, when making comparison between different places (such as Route Packages 1, 2 or 3, or Laos), as in discussing alternate campaigns, there is a good chance that systematic errors are minimized, since one is concerned with relative rather than absolute levels.

In Tables I and II, we list the average daily rates of destruction for 1967 and for the first quarters of 1967 and 1968.

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* Trucks "effectively destroyed" is a term employed by the intelligence community to take account of the possibility of salvage. It is computed by adding 3/4 of the number of trucks reported destroyed to 1/4 of the number of trucks reported damaged.

TABLE I

Approximate Average Daily Destruction (STPD) in North Vietnam for 1967

	Route Package 1	Route Packages 2 and 3
Destruction computed from trucks reported destroyed or damaged [1]	9 STPD	4 STPD
Destruction estimated from fires and secondary explosions [2]	5 STPD	0.3 STPD
	14 STPD	4 STPD

1 Estimates based on figures of 2,200 trucks effectively destroyed in Route Package 1 in 1967, and 900 in Route Packages 2 and 3, with the assumption that half the trucks effectively destroyed are carrying 3 tons -- a judgment generally accepted throughout the intelligence community.

2 We have seen no convincing analyses showing what tonnages of supplies these incidents represent; however, the 7th Air Force assumes an average of 1/4 ST per incident in North Vietnam. We use their figures, but other sources have proposed, on the basis of more fragmentary information, a figure as high as 1 ST per incident.

TABLE II

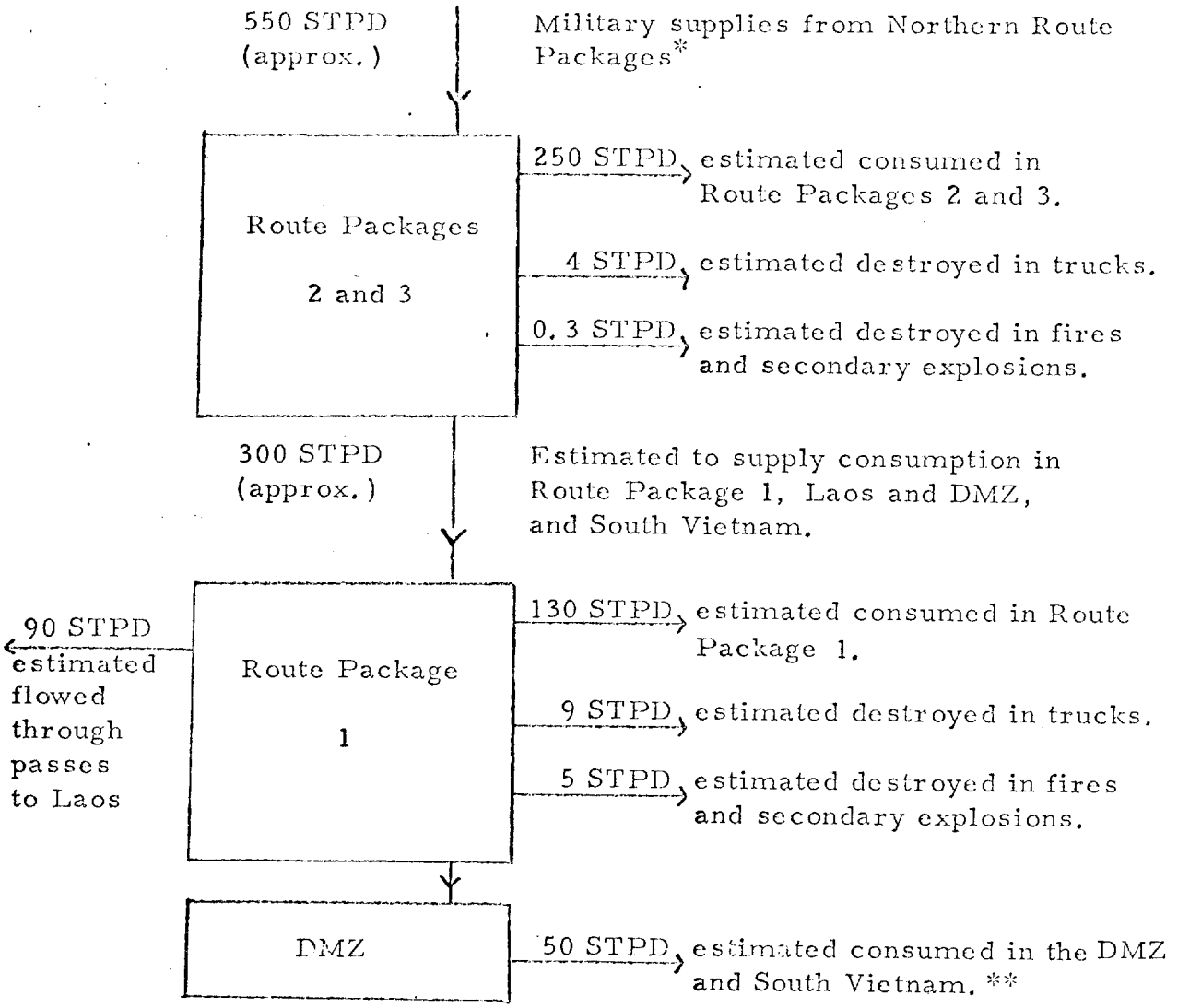
Approximate Average Daily Tonnage Destroyed in North Vietnam
First Quarter 1967 and 1968

	Route Package 1		Route Packages 2 and 3	
	1967	1968	1967	1968
Destruction computed from trucks reported destroyed or damaged [1]	2 STPD	4 STPD	1.5 STPD	6 STPD
Destruction estimated from fires and secondary explosions [2]	2 STPD	3STPD	1 STPD	1 STPD
	4 STPD	7 STPD	3 STPD	7 STPD

1 Estimates based on figures of 141 and 241 trucks effectively destroyed in Route Package 1, and 99 and 354 in Route Packages 2 and 3 for the first quarter of 1967 and the first quarter of 1968, respectively, with the assumption that half the trucks effectively destroyed are carrying 3 tons -- a judgment generally accepted throughout the intelligence community.

2 Estimates based on the 7th Air Force's assumed average of 1/4 ST per incident in North Vietnam.

Of the materiel destroyed, only a small part was actually bound for Laos or South Vietnam. Thus, the intelligence community estimates that in 1967 the average consumption of military supplies was 180 STPD in Route Package 1 (including the DMZ) (which were imported from Route Packages 2 and 3), and 250 STPD in Route Packages 2 and 3 (which were brought in from the north), that about 90 STPD went over the passes from Route Package 1 into Laos, and that about 50 STPD were consumed in and below the DMZ. Similar estimates are available for the first quarter of 1968, but not for the first quarter of 1967. These numbers are summarized in Figures 1 and 2.

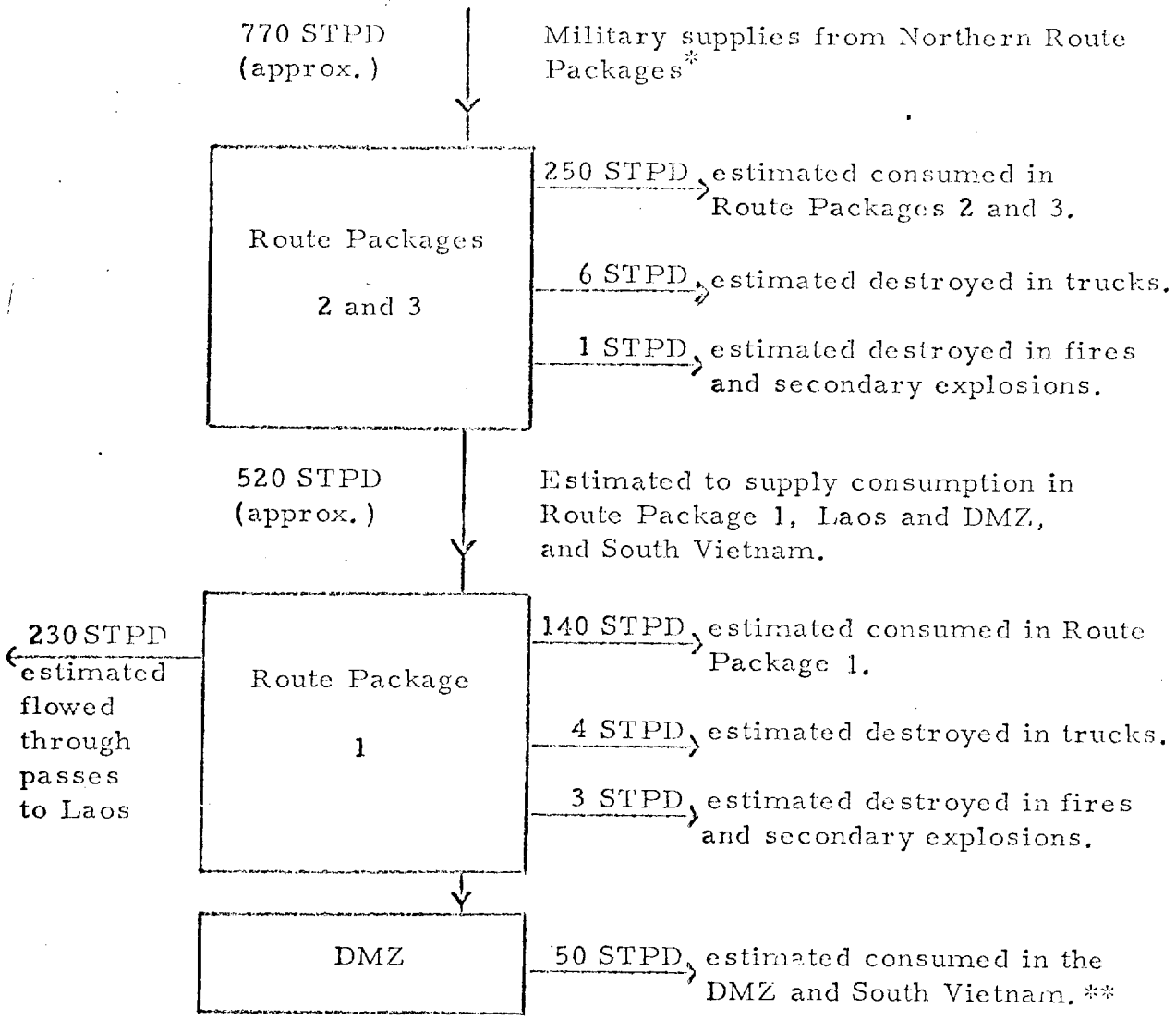


* "Military supplies" include:

i. military-related economic goods (i.e., machinery, trucks, construction equipment and materiels, and miscellaneous joint-use goods.
ii. petroleum.
iii. military food supplies.
iv. weapons, ammunition, engineer, medical, signal supplies, etc.

** These supplies are for troops operating just north of, in, and just south of the DMZ.

Figure 1. Flow Chart of Supplies in Southern North Vietnam. (Flows in STPD averaged over 1967.)



* "Military supplies" include:

i. military-related economic goods (i.e., machinery, trucks, construction equipment and materiels, and miscellaneous joint-use goods.
ii. petroleum.
iii. military food supplies.
iv. weapons, ammunition, engineer, medical, signal supplies, etc.

** These supplies are for troops operating just north of, in, and just south of the DMZ.

Figure 2. Flow Chart of Supplies in Southern North Vietnam for the First Quarter of 1968.
(Flows in average STPD.)

The 14 STPD destroyed in Route Package 1 in 1967 were therefore only a small percentage of the materiel in transit within Route Package 1, which could be variously summarized as about 5 per cent of the amount brought in, or 15 per cent of the materiel estimated sent out to Laos, or about 10 per cent of the materiel destined either for Laos or for consumption by troops near the DMZ. Similarly, the 14 STPD destroyed in Route Packages 1, 2 and 3 during the first quarter of 1968 were an even smaller fraction of the greater quantities of materiel believed to be in transit at that time. Of course, it must be recognized that operations in Route Packages 1, 2 and 3 are severely curtailed by weather during the period January-March. In 1967, for example, less than 6 per cent of the total truck kills in North Vietnam occurred in the first quarter.

We thus estimate that in past campaigns roughly 10 per cent of the materiel intended for Laos or South Vietnam was destroyed in Route Package 1. Obviously, the tonnage destroyed figures, based on the computations mentioned in the footnotes to Table I, are subject to major uncertainties. The percentages are even less reliable, since the total flow is largely based on consumption estimates. Nonetheless, there is no doubt they are small enough to permit ready accommodation by the enemy.

The bombing analyses referred to earlier agree that North Vietnam has the physical capability of transporting substantially greater amounts of military goods from the northern to the southern and western borders:

-- In the face of the bombing, truck and railroad rolling stock inventories have increased. Many trucks are stockpiled in China, 11 miles from the North Vietnamese border, and are available to replace losses. Unused railroad equipment is also available. Although more than 22,000 watercraft have been reported damaged or destroyed, there are no apparent shortages.

-- Repairs to highways, bridges and railroads are made rapidly.

-- Delays are further minimized by the redundancy which has been built into the system, as is illustrated by the bypasses around the Doumer bridge at Hanoi soon after the first strike against the bridge (a rail ferry, seven highway ferries, four highway pontoon bridges, two highway pontoon causeways within 20 km of the Doumer bridge).

-- North Vietnam has steadily improved the quality and amount of her Lines of Communications (LOCs), much of her rail

line to China has been converted to take both narrow and broad gauge trains; 1,100 miles of new highway have been constructed; and waterways have been added to provide a continuous inland route from China to southern North Vietnam.

-- The dispersal of North Vietnam's POL storage and of her power sources has rendered them largely immune to current air strikes.

Therefore, it is generally agreed that, although the bombing has caused the North Vietnamese to put great effort into operating the transportation system, it has not caused serious strain on North Vietnam's ability to support her forces in the south. Indeed, since the bombing began, she has consistently increased her forces in the south and the flow of materiel to them. Her flow rate into Laos since January 1968 has been estimated By CIA to be about 1.6 times the rate of a year ago.

Conclusion

The bombing campaign against North Vietnam in 1967 and the first three months of 1968 not only failed to reduce appreciably the flow of combat materiel reaching South Vietnam, but also failed to prevent the enemy from increasing his level of operations. It appears that something like 18 short tons per day (STPD) of military supplies were destroyed in North Vietnam (roughtly 10 per cent of the materiel destined for Laos or South Vietnam).

2. Interdiction in Laos

After traversing North Vietnam, most of the supplies destined for South Vietnam cross the Annamite Chain at Mu Gia Pass (Route 12/12) or frather south on Routes 137/912 to travel 150-a00 miles through Laos on the various brances of the Ho Chi Minh Trail and into South Vietnam. Our air attacks in Laos have included attempts to "close" the passes, attacks on suspected supply dumps, attacks on roads and choke points, and attacks on the trucks themselves. The North Vietnamese response to the attacks in Laos has been similar to their response in North Vietnam. They have built parallel bridges, fords and roads with cross trails. They have repair crews available, and they take advantage of nearby forest cover by day and move materiel by night.

As in North Vietnam, we compute the attrition of the enemy's supply from pilot reports of trucks destroyed or damaged, and of

secondary fires and explosions. To a large extent, one expects the systematic errors to be the same as those in North Vietnam, but there are three apparent reasons for the systematic errors to change. They are:

i. In Laos, many of the truck kills are made by pilots flying low-performance aircraft in a region of low AAA threat, in contrast to North Vietnam, where high-performance aircraft are needed for survival in the higher AAA threat.

ii. In Laos, corroborative data on strike results are obtained by FACs in some instances.

iii. Based on the 7th Air Force estimate, the figure of 1/8 ST per incident is used to describe the loss to fires and secondary explosions, rather than 1/4 ST per incident in North Vietnam.*

Table III lists the daily tonnage destroyed in Laos, averaged for 1967, for the first quarter of 1967, and for the first quarter of 1968.

TABLE III

Daily Tonnage Destroyed in Laos
(STPD)

	1967 (Average)	First Quarter 1967	First Quarter 1968
Destruction computed from trucks reported destroyed or damaged [1]	9	8	33
Destruction estimated from fires and secondary explosions [2]	5	2	15
	14	10	48

[1] A figure of 3 tons destroyed for one-half of the trucks effectively destroyed was used.

[2] 7th Air Force estimate of 1/8 ST per incident used.

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* The 7th Air Force Estimate.

The first point to note is that the Laotian average for total tonnage destroyed in 1967 is the same as that of Route Package 1 (Table I) (14 STPD) and only slightly less than the combined total of Route Packages 1, 2 and 3 (18 STPD). However, since much of the traffic in Route Packages 2 and 3 was concerned with supplying troops within these Route Packages, the extra 4 STPD (however imprecisely known) destroyed within them are relatively unimportant in the destruction of combat materiel intended for use in South Vietnam.

This is an example of a general observation -- that the closer one is to the border of South Vietnam, the larger the fraction of the goods transported or destroyed is intended for use in South Vietnam.

The second point to note is that the daily tonnage destroyed for the first quarter of 1968 is 4 times that of the first quarter of 1967. In Route Packages 1, 2 and 3, the number of trucks destroyed per day doubled in the same period.

What fraction of the supplies flowing in Laos are we destroying? The primary data available here are from road watch teams observing the Mu Gia Pass. Route 137 has not in general been monitored, but on the basis of the character of the road and many detailed considerations, the intelligence community has made estimates of the truck traffic on Route 137. These numbers give the estimated flow into Laos shown in Table IV.

TABLE IV

Estimated Flow into Laos
(STPD)

	1967 (Average)	First Quarter 1967	First Quarter 1968
Trucks per day entering Laos through Mu Gia Pass as estimated by road watch team	17	25	34
Intelligence estimate of trucks per day entering Laos via Route 137	13	19	43
Total trucks per day entering Laos from North Vietnam	30	44	77
Total STPD entering Laos from North Vietnam	90	132	230

That the effectiveness of our air action in Laos during the first quarter of 1968 has improved over that of 1967 is shown by the fact that, while the number of entering trucks rose by a factor of 1.6, the number of sightings in Laos rose almost seven times, from 2,600 to 18,000, and the number killed rose four times.

Since the intelligence estimates have the truck population increasing only by about 50 per cent during the year, it is clear that the increased effectiveness resulted from an improved capability in sighting trucks, itself due to better night vision equipment for the FACs, greater use of low-performance aircraft, better operational efficiency and intelligence provided by Muscle Shoals.*

The improved sighting capability has not yet been matched by improvement in attack effectiveness, in part because of a lack of sorties dedicated to this mission, and in part because we have not developed and provided in adequate numbers the effective weapons and auxiliaries which would allow the strike aricraft to do the job most effectively.

If the North Vietnamese should undertake countermeasures such as deployment of AAA and SAM that would prevent extensive use of low-performance FAC aircraft in the sighting of trucks in Laos, remote sensors of the Muscle Shoals system could become more crucial in attacks on trucks without the present extensive search tactics from the air.

At the present time, some 40 to 100 37-mm AAA guns are estimated to be in Laos, but the air defense environment is still regarded as benign. This lesser air defense threat allows much more effective truck attack than in North Vietnam and will permit further improvements in the future if the situation does not change.

From Tables III and IV, we note that for the first quarter of 1968 our destruction rate of materiel in Laos is about 20 per cent of the total estimated to be entering Laos. However, since about half the entering flow is attributed to the unmonitored Route 137, this figure is clearly not very firm.

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* Muscle Shoals is the code name for the electronic portion of integrated system developed on a crash basis during 1967 to monitor as a basis for interdiction the flow of manpower and materiel from Laos and North Vietnam to South Vietnam. Some 35 strings of sensors, covering about 250 km of the complex of roads making up the Ho Chi Minh Trail system in Laos, were operating between December 1967 and April 1968. These, rather than the antipersonnel sensors which were deployed around Khe Sanh are referred to here.

It is interesting to summarize by a flow diagram the general balance among flow in, out, consumption, destruction, and changes in storage. The numbers in Figure 2 represent the best estimates available to us. These summary charts help bring out some of the major uncertainties encountered in computing per cent attrition.

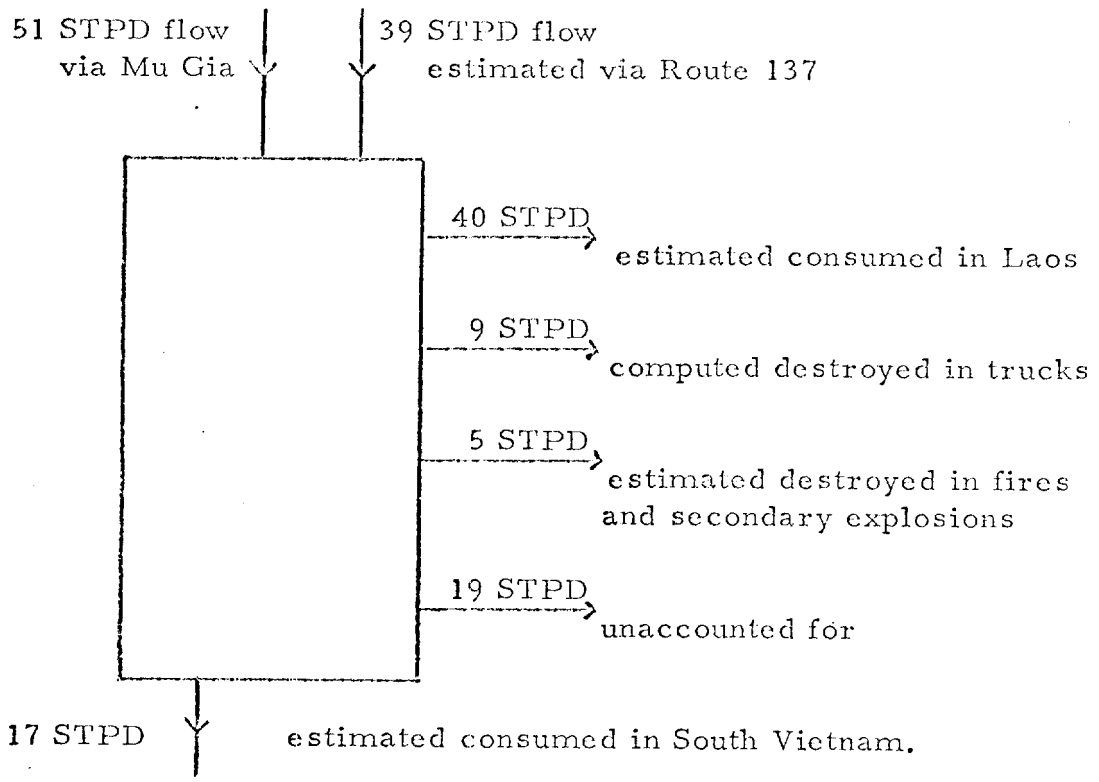

Figure 2 a Flow Chart of Military Supplies Through Southern Laos. (Averaged over 1967 and based on estimates of consumption and flow. Materiel imported from North Vietnam.)

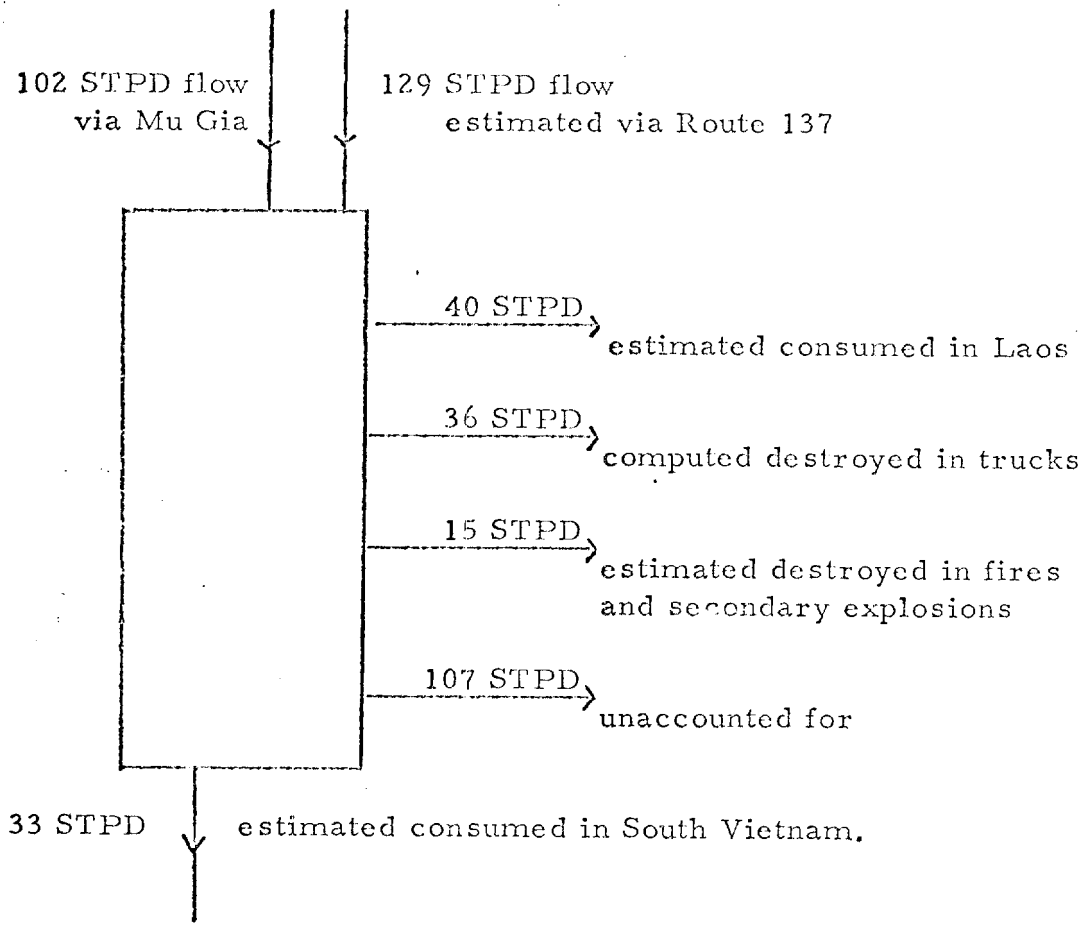

Figure 2 b Flow Chart of Military Supplies Through Southern Laos. (First Quarter 1968. Materiel imported from North Vietnam.)

The figures on consumption in Laos are based on such things as estimates of AAA ammunition expended, food for military personnel, POL for trucks, etc. The figures on consumption in South Vietnam are based on troop complement (from order of battle) and average figures for consumption of supplies per day. It is therefore not possible to say with any certainty for 1967 whether the 19 STPD which are unaccounted for are real (perhaps being stockpiled in Laos or South Vietnam) or simply a measure of the errors of calculation.

The 110 STPD unaccounted for in the first quarter of 1968 are of a different character, since they must contain supplies that will be used in Laos or South Vietnam during the coming monsoon when the transport of supplies on the Ho Chi Minh Trail will be difficult. They, too, when averaged over a longer period, may result in an uncertainty as to how much materiel moved into South Vietnam simply because our model is too gross for precision on the distribution of residuals. We therefore note that there are major uncertainties in the estimate of supply flow into South Vietnam, and thus in any attempt to relate the destruction rate to the rate of flow into South Vietnam.

However, the entire Laotian activity is really in very direct support of the LOC to South Vietnam. Thus, the division of supplies into "Laotian" and "for use in South Vietnam" is perhaps artificial anyway. For these reasons, we believe the most meaningful figures to compare between Laos and North Vietnam are the tonnage destroyed (Tables I and III) and that a rough measure of how our effectiveness is changing in Laos may be obtained from a comparison of the destruction (Table III) with the flow into Laos (Table IV).

It has been reported to us consistently that our interdiction efforts in Laos have been seriously limited by an inadequate number of FACs and by the timely availability of strike sorties. It should be noted that in the first quarter of 1967, for example, only about 20 per cent of the trucks sighted were actually killed, and only about 10 per cent for the comparable period in 1968. This reflects, of course, the ineffectiveness of some weapons (bombs) to hit point targets, but it also suggests that heavier (and in some cases repeated) attacks on the targets sighted, as well as more extensive use of guns and rockets in low-threat areas, could be profitable. Thus, there appears to be ample opportunity for profitably increasing the level of attack on trucks in Laos.

Conclusion

The interdiction campaign in Laos does not appear to have seriously limited the flow of combat materiel to South Vietnam at the current level of operations since (1) we destroyed in Laos only something like 14 STPD, roughly 25 per cent of the supplies on the trails in 1967, and (2) the North Vietnamese have been able to develop the methods and to allocate sufficient resources to prevent degradation of their Laotian logistics system, although it costs them the services of 40,000 men who must themselves be supplied. Our interdiction capability is currently improving and, unless the enemy improves his air defense system or changes his supply tactics, might destroy 30 per cent or more of a substantially larger flow of supplies in transit through Laos. There appears to be ample opportunity for increasing the level of attack in Laos (during the good weather, October to May) and this could still further increase the fraction of supplies destroyed or impose an additional burden in the form of changes in the supply system.

3. The Total Interdiction Campaign

To gain perspective the daily attrition by air in Route Package 1 and in Laos may be compared with a variety of indices such as:

1. The total of supplies imported over the northeast rail line from Russia and China, plus that imported through Haiphong, or with

2. The combat materiel estimated expended by NVN/VC forces in South Vietnam.

3. The imports by truck into Route Package 1 and into Laos from Route Package 1.

However, a look at some of the broader aspects may also be useful.

Insofar as the attrition is reasonably steady, the North Vietnamese can plan for the necessary increase in imports to supply these losses. The total destroyed materiel is only a small fraction of the imports, and hence is probably readily met by North Vietnam's suppliers at a cost of only $20-30 million per year. Steady attrition puts an additional burden on the logistics system in transporting goods which are never used. This has really been a small additional burden, not only in comparison with the total flow at any point, but in Route Package 1 even relative to the logistics burden forced on the North Vietnamese in supplying their AAA guns with ammunition, their crews with supplies, and their repair and administrative teams with support. Thus we believe that the continued and reasonably predictable destruction of goods places largely an additional planning burden on the North Vietnamese supply system, much like that imposed by the seasonal weather, but the additional import and transport required are not significant at the attrition levels which we have achieved.

The destruction of bridges and the general disruption of the road system has clearly forced the North Vietnamese to build a robust logistics system and to operate it in a way which imposes a considerable delay on the shipment even of priority goods. The same effort, in the absence of interdiction, applied to a single high-speed route would have provided a more quickly responsive (and infinitely more vulnerable) supply system to the borders of North Vietnam. The delay we have imposed does not seem to be important in a steady situation and may not be significant at all for the NVN/VC in South Vietnam, because of the long delays enforced by weather and by the LOC in South Vietnam.

A major effect of the interdiction campaign thus far seems clearly to have been the required diversion of manpower and engineering skill to the enlargement and maintenance of the transportation system, as well as the substantial disruption of the civilian economy.

As for the effect of somewhat more effective destruction of trucks in Route Package 1, a factor 2 to 3 improvement could probably be offset by less than 1 per cent increase in gross imports and appropriate prior planning. [redacted] 50X1 suggests that the North Vietnamese have planned for a 33 per cent attrition of goods over the LOC in 1968. Of course, if the North Vietnamese have planned for 33 per cent destruction, for example, a sudden increase to 70 per cent or 80 per cent will reduce the level of combat operations below their planned capability.

For unique cargo, even a 33 per cent attrition can be significant--i.e., General Giap could not survive very many trips to South Vietnam by ordinary truck. This effect may be significant and is entirely different in nature from requiring increased effort for care of the LOC.

Granted that North Vietnam has transported the present level of supply in the face of aerial attack, how large an increase could North Vietnam make on a sustained basis and what effect would the air campaign have on such an increase? We have no direct evidence whether the system, in the face of sustained bombing, has or has not the flexibility and administrative capability to adjust to a very large increase of military goods going to the south on a continuing basis. Whether this is a relevant concern depends on the magnitude of the requirements placed on the system by the level of operations desired by Hanoi of its units in South Vietnam. The 1967 requirement estimate of about 17 STPD over the Laotian supply route is based on the rather low combat rate (about one combat day out of every 30, according to CIA) that we have observed of her forces in the south. This requirement is less than the tonnage we believe North Vietnam delivers to the borders of South Vietnam and suggests that our interdiction of her LOCs has not been the factor limiting her operations in the South, although restraints on the level of stockpiling achieved may limit the level of any stepped up combat in the future. It is possible that she is constrained to a low level of combat operations by a poor southern logistics system, or by her unwillingness to sustain higher casualty figures, or by difficulties in obtaining the necessary supplies from her allies.

We have examined many aspects of this logistic system. Though our knowledge of many parts of it is very incomplete (and must be improved as a matter of urgency), we believe that the level of supply into South Vietnam could be increased rather substantially above its present rate in the face of any bombing campaign we could reasonably mount. How far it could be increased cannot be estimated with precision, due to a lack of understanding of the distribution system in Laos and from there into South Vietnam.

Conclusions

The North Vietnamese and their allies were able to prevent degradation of their logistics system in North Vietnam and Laos, and, in fact, to improve it. We believe North Vietnam has the flexibility to increase her supply rate above the present level despite our air campaign, but do not know how large an increase (nor on what time scale) she could make on a sustained basis.

It is our judgment that with prudent planning the enemy should have been able to schedule and move supplies to South Vietnam at a rate which would accommodate the losses inflicted by the bombing campaign in North Vietnam. We believe that factors other than our air campaign in North Vietnam will largely determine the scale of the war in South Vietnam in the future.

IV. FACTORS WHICH HAVE LIMITED THE EFFECTIVENESS OF PAST INTERDICTION CAMPAIGNS

In this section we discuss the main problems and difficulties which have inhibited the effectiveness of our bombing campaigns since 1965 in limiting the flow of the enemy's war materiel to South Vietnam.

A. General Factors

The principal difficulties which are inherent to this problem are:

1. With the source of supplies out of country we cannot attack the manufacturing centers themselves.

2. The targets in North Vietnam, Laos, and in South Vietnam are diffuse and the transportation system to the borders of South Vietnam has been improved so that it is diffuse, redundant, flexible and dispersed.

3. The enemy has developed a rapid repair capability that has proved to be effective when operating against the targeting policies and the established intensities of sorties in the United States' bombing campaign.

4. North Vietnam's ability to import goods (such as rice) plus her pre-war labor surplus have helped her to find labor to meet the extra manpower needs imposed by the bombing.

B. Limitation on Military Operations

There are also important difficulties that relate to the effectiveness of our military operations and which will continue to restrict the effectiveness of the bombing: bombing accuracy which is inadequate for effective attack on bridges, railroads, trucks and roads; and an inability to operate effectively at night and in bad weather. These difficulties are of the utmost importance since we have at various times pushed our sortie rate to the maximum and we generally operate at a level which keeps all of our forces committed. Thus, any major

increases in target destruction must come from improved operations or from overcoming our difficulties with inaccurate weapons, darkness, and bad weather.

1. We have lacked the ability to attack trains effectively in the North, particularly the northeast rail line from China. The heavy AAA fire along the rail line forces us to bomb from high altitudes with

50X4

2. We have lacked the ability to maintain a sustained level of effective attack on targets requiring precise bombing such as bridges, other choke points in the LOCs, and even parked trucks. For example, at present from 10-20 sorties are required to destroy a revetted truck with bombs, depending on defenses, if the location is known approximately.

3. Opportunities to detect and attack watercraft and trucks in Route Packages 1, 2 and 3, in North Vietnam and in Laos and South Vietnam have been limited by inability to conduct effective night operations, although the enemy moves the majority of his supplies at night.

4. We have lacked the ability to detect personnel infiltrating south over the Laotian trails or through the DMZ so that air power and artillery might be used to interdict them.

5. No accurate data are available on the fraction of trucks moving at night in North Vietnam, but, despite the limitations of our night vision equipment, about 70 per cent of the truck sightings in Route Package 1 are at night. In Laos, both the Muscle Shoals sensors and FACs with Starlight scopes have verified that most trucks move at night. At present, except for a very limited number of test aircraft (Gun Ship II, several experimental Tropic Moon I and II craft, and Navy's experimental Trim aircraft), we have no weapons delivery system with night vision capability. Our high-performance aircraft have no night-vision equipment and to operate at night another aircraft must find possible truck locations and drop flares to illuminate the scene. The importance of the night-vision weapons-delivery system capability can be understood from the large difference between the recent Gun Ship II record of 76 truck kills in 10 missions in Laos and the regional average of roughly five per 10 missions.

6. Our operations have been severely limited by weather. For example, bad weather prevented air attacks on trucks in Route Packages 1, 2 and 3 on more than half the days in 1966-67. The problem of target acquisition in bad weather is more severe for our high-performance craft since they are less maneuverable (even at low speeds), forcing the pilot to pull out of his dive at higher altitudes than the low-performance craft. The latter can operate below lower cloud ceilings and they afford the pilot more time to line up accurately on a target due to their greater maneuverability. We have no radar bombing equipment which is sufficiently accurate to attack trucks, rails, trains, bridges, or similar targets effectively.

C. Possibilities for Removing Limitations on Effectiveness

There are many possibilities for easing the principal limitations on our effectiveness -- inability to bomb accurately or to operate effectively in bad weather and at night -- and some of the required technological developments are either under way or complete at the present time. Nevertheless, the improvements are not expected to be in our forces in sufficient quantity or in time to materially improve effectiveness over the next six months or so. Principal among these improvements are the Walleye TV-guided bomb (which is now in use in small numbers), Gun Ship II (one of which is in the theater) and laser-guided bombs which are now in development.

The use of Walleye is restricted to daytime, but with it the typical attack CEP of 500' is converted to a direct hit when the target is of high contrast and clearly defined. This tremendous improvement in accuracy means a consequent marked reduction in the number of sorties needed. We are now producing Walleye at the rate of approximately 200 per month and this production is scheduled to increase to approximately 600 per month in August 1968. These numbers will undoubtedly permit us to attack and destroy high-value targets with much greater confidence and much lower aircraft losses, but only at a rate of somewhat less than 20 per day.

A possibly dramatic improvement in capability against trucks may result from the deployment of Gun Ship IIs. These aircraft are equipped with night sensors and high-rate-of-fire guns, and carry large loads of ammunition. This permits them to detect and attack targets both day and night without the assistance of other aircraft. The single Gun Ship II which is now operational has exhibited a high effectiveness

against trucks, killing about seven trucks per sortie during the few days it was flown, as compared to an average of less than one truck per attack sortie for all other aircraft. Unfortunately, more of these will not reach the theater in quantity until the fall and even then will be unable to operate in a high-threat environment. In fact, it will be 1969 before we shall be able to test aircraft equipped with night sensors which are capable of operating in a high-threat environment. It is expected, therefore, that Gun Ships will operate only in Laos and even there their area of operations may be limited if the enemy greatly increases the strength of his air defenses.

Aircraft capable of attacking in relatively bad weather will increase in number due to the deployment of F-111As and small increases in the number of operational A-6 aircraft. These will continue to bomb with radar when visual acquisition is impossible. The expected accuracy of radar bombing is about the same as typical visual delivery from an altitude of about 5,000' in North Vietnam, i. e., about 500'. Improved systems are in development but will not be available in 1968.

The laser-guided bombs could also be used effectively in interdiction either in North Vietnam or in Laos. CEPs obtained through use of these bombs will probably be less than 50 feet, which will again reduce sortie requirements for high-value targets. At the present, we are making a one-time buy of approximately 300 bombs and these will not be available in the theater in substantial numbers until 1969. We believe that these weapons will be very effective and that efforts should be made to expedite their availability in very much larger quantity, say 100 per day.

The Muscle Shoals sensors have increased the rate at which trucks are sighted and have given a better understanding of traffic patterns. At present, the number of trucks killed per sighting has declined because of the increase in sightings without a corresponding increase in attack sorties. An expanded use of the Muscle Shoals development, combined with an increased allocation of strike sorties to truck interdiction in Laos, promises to increase the effectiveness of interdiction in Laos.

Infiltration of personnel through the relatively rugged terrain between Laos and the coastal plain below the DMZ in South Vietnam was to have been reduced by the use of anti-personnel minefields to confine the infiltration to trails, plus Muscle Shoals sensors along the trails, which were to be triggered by small noise makers. This portion of the barrier was hastily reconfigured and deployed in connection with the defense of Khe Sanh, where it apparently played a significant role. These sensors, on which some operational experience has now been gained, may prove quite useful in reducing the flow of materiel and manpower directly into South Vietnam across the DMZ, which could be particularly significant if sufficiently large attrition rates are achieved along the Ho Chi Minh Trail to force the North Vietnamese to rely more heavily on alternate supply routes. They afford the only real possibility of detecting personnel infiltrating on foot or by bicycle.

Muscle Shoals technology should be valuable in monitoring any agreement by the enemy to reduce infiltration and might be important either in the warning it would give us or in the confidence we might have in our knowledge of his actions during a period of protracted negotiations.

The impact of the apparently major improvements in effectiveness potentially available from these new techniques is limited not only by the small numbers of advanced weapons and systems but also importantly by the responses and modifications North Vietnam might reasonably make to the supply system.

There are many longer-term developments which could greatly improve our attack capability, but these are not considered in this report. It is our view, though, that the possibilities for technical improvement, coupled with more effective tactics, have not been exhausted even in the short run.

Conclusion

In the past, the achievements of the United States' air interdiction campaign have been seriously restricted by the technical limitations on our capability to conduct attacks at night or in bad weather, and by our inability to deliver iron bombs with sufficient accuracy to attack effectively trucks, trains, bridges and roads.

Substantial improvements in night attack capability of low-performance aircraft (using simple night vision devices and armed with guns or

CBU weapons) have been made in Laos, which is currently an area of low enough threat to permit the use of such aircraft. An increase in the number of aircraft equipped with night vision devices (especially with stabilized optics) would improve our night attack capability in Laos and South Vietnam.

In the high-threat areas in North Vietnam, where high-performance aircraft are needed for survival, no substantial improvement in operations at night or in bad weather can be expected within the next year unless new technical solutions to some of the problems can be accelerated.

Daytime attacks against point targets with suitable characteristics (e.g., high contrast) can be improved in all areas by use of the Walleye TV-guided bombs, but the planned production rate (to be achieved by August 1968) will provide only about 20 bombs per day. Laser-guided bombs show promise for both night and day, but the date of their availability in adequate numbers is uncertain.

V. EFFECTIVENESS OF SEVERAL ALTERNATIVE AIR CAMPAIGNS AND PROBABLE ASSOCIATED THREATS

Alternative bombing strategies are considered in this section.

Recognizing the limited effectiveness of the air campaigns of 1965 through 1967 in interdicting the flow of military supplies to the south and the intrinsic difficulties of improving this effectiveness, we want to assess (1) the likely effects of alternative bombing strategies on logistical interdiction and (2) the associated enemy threats against United States forces.

A. Strikes in Route Packages 1, 2 and 3, in Laos and in South Vietnam.

This alternative is close to the present policy announced by President Johnson, effective April 1, 1968. We now examine whether the abandonment of bombing in Route Packages 4, 5 and 6, and the pursuit of this policy with the available aircraft and at the level of sorties (12,000/month programmed) that have been sustained in the recent past, should increase the flow of military supplies to the south.

Even before the bombing pause in Route Packages 4, 5 and 6, we concentrated a majority (70 per cent) of our strike sorties in Route Packages 1, 2 and 3. Furthermore, it was concluded by the IDA study, which concerned itself only with bombing within North Vietnam (excluding Laos and South Vietnam) and with the problem of interdicting military supplies to the south, that the strategy of attacking trucks in Route Packages 1, 2 and 3 is relatively more effective than attacks in the northern route packages. It concluded, moreover, that by devoting all of our sorties to Route Packages 1, 2 and 3 and properly apportioning them between night and day, our present aircraft can increase the expected number of truck kills in North Vietnam by a factor of 2 to 3 over the 1967 average. We accept this conclusion and note that the President's decision of March 31 could therefore result in an average destruction rate of some 30-45 STPD if the air defenses and traffic flow in Route Packages 1, 2 and 3 remains substantially the same.

Associated with this bombing strategy are several potential gains for the enemy and a number of new threats to our forces. These threats also apply, but to different degrees, to the other restricted campaigns described under B and C below.

1. Enemy manpower now tied up in air defense in the north (about 100,000 men) and in maintaining LOCs (300,000) might be turned to other useful purposes. So long as bombing in the north can be resumed with little or no advanced warning, this manpower pool is unlikely to be released; but eventually, as enemy confidence develops in the permanence of a policy of no bombing in Route Packages 4, 5 and 6, skilled and useful manpower may become available to support military and logistic activities in the south.

2. High-value materiel stored safely in China, and tactical fighter and bomber aircraft safely based there, can be moved into North Vietnam to be more readily available as needed farther south. The 300-mile range of MIG fighters based in Route Package 6 will just reach to Route Package 1. Bombers such as the IL-28 would have operating ranges to high-value targets in I Corps such as Da Nang if based at Hanoi; if based at Vinh, air bases at Chu Lai, Quang Nai and Cu Hahn in South Vietnam, and those in Northern Thailand could also be reached.

3. Surface-to-surface missiles could be emplaced along the coast of North Vietnam without fear of attack and become a threat to possible future naval operations near the coast.

4. Within the constraints imposed by concern about a possible resumption of the air war against the North, the enemy might shift significant AAA and SAM units south into the panhandle and into Laos, further degrading our capability to interdict the LOCs.

No one can predict with certainty what threats the enemy will choose to mount, but reconnaissance flights can to a degree tell us what threats actually develop. Some moves on his part might require reexamination of our policy, or diplomatic pressure. The evolution of such potential threats must be closely monitored and clearly identified in the initial stages by increased and improved efforts in SIGINT and photo reconnaissance collection and timely analysis.

Conclusion

The reallocation of attack sorties programmed for the Northern Route Packages prior to March 31, 1968, to the attack of trucks in Route Packages 1, 2 and 3 ought not decrease and, with a properly designed campaign, could improve our interdiction capabilities against supplies flowing south, perhaps increasing the destruction of trucks in North Vietnam by as much as a factor of 2 or 3 over corresponding periods

in 1967. Nevertheless, the resultant destruction in North Vietnam would probably not materially alter the availability of military supplies in South Vietnam.

Important new or intensified threats to our air and naval forces may arise, such as enemy introduction of new weapons in North Vietnam, the movement of aircraft, and the shifting of AAA and SAM assets south. These should be identified and monitored by adequate photo reconnaissance and SIGINT collection.

B. Strikes in Route Package 1, in Laos, and in South Vietnam

The major access routes from North Vietnam into the Laos infiltration system cross into Laos over passes on the western border of Route Package 1 (Route 15 through the Mu Gia Pass, and Route 137 somewhat to the south. A third route just above the DMZ is estimated to be completed in May).

A bombing cessation in Route Packages 2 and 3, in addition to Route Packages 4, 5 and 6, with the flights reprogrammed to Route Package 1, would not seriously degrade the destruction of military supplies destined for South Vietnam, since:

a. A larger fraction of the loads in Route Package 1 are intended for South Vietnam, and

b. The truck kills per sortie are nearly the same in Route Packages 1, 2 and 3 (about 1 kill per 30 sorties).

c. An average of about 9 trucks per day were destroyed in Route Packages 2 and 3 in 1967 and 5 per day were destroyed in the first half of May, 1968.

(There is some seasonal difference in good flying weather between Route Packages 1, 2 and 3, but the differences are small. See IDA study, Volume 3, Table 4.)

(A more detailed discussion of the Laotian interdiction activity is given in Section V-C.)

In discussing alternative campaigns, we should recognize that if measured by supplies delivered to South Vietnam, the burden on the enemy's logistic system is greatest when the interdiction and distribution occur at greater distances from the source of supplies and close to the point of delivery.

By continuing attacks on Route Package 1, we would continue to deprive the enemy of a sanctuary immediately north of the DMZ from which to fire artillery or mount combat operations against our forces and from which to supply his troops in I Corps. The threats to our forces from a restricted bombing campaign of this type are as given in Campaign A, only more severe.

There is an additional threat consequent to a bombing cessation in Route Packages 2 and 3, and this is the possibility of the operation of MIGs from, for example, the airfield at Vinh, 150 miles from the DMZ, whence they could easily interfere with both interdiction efforts in Laos and Route Package 1, as well as with United States' tactical air strikes (especially the B-52s), in support of ground forces in I Corps. Moreover, confining our attacks to the smaller geographical area of Laos and Route Package 1 would permit the enemy to build up greater concentrations of AAA in these regions. Since the northernmost border of Route Package 1 contains the Mu Gia Pass and its approach roads, SAMs just across the border in Route Package 2 could interfere with our interdiction of the pass. Again, reconnaissance and contingency plans against these possibilities are essential.

Conclusion

Air strikes confined to Route Package 1, Laos and South Vietnam could at present be almost as effective as those including Route Packages 2 and 3 as well. Eventually, the enemy could increase the density of AAA in this more confined geographical area. In addition, MIGs based at Vinh (Route Package 3) might present a threat to our air operations in Laos, Route Package 1, and the DMZ. We do not know how serious these threats might be, but it seems unlikely that they would be critical.

C. Restricting Air Interdiction to Laos and South Vietnam

To our knowledge, there has been no concentrated study of a campaign in which air attacks are confined to Laos and South Vietnam. We, too, have not examined this option in the depth that it deserves; consequently, we offer here only our very preliminary views.

There are obvious and serious advantages and disadvantages associated with this option. This policy would meet the well-advertised terms under which the North Vietnamese set as the initial

target of negotiations; however, a preliminary examination reveals serious associated disadvantages. These disadvantages could be eased by adequate restrictions on actions that the North Vietnamese might be permitted to take during an extended bombing pause.

1. Interdiction of Supplies Moving South

To evaluate the effects on enemy logistics at the present time, we need to consider (a) the passes entering Laos, (b) interdiction in the Laos Panhandle, and (c) the flow directly into the DMZ.

In Laos, we may at present confine our attention primarily to the good weather period from October to May, since essentially all roads are nonserviceable during the monsoon period. However, it should be observed that the enemy is making serious attempts to establish all-weather roads in Laos and is also working on an extension to Route 101 which will cross into Laos just above the DMZ. Estimates differ on the extent to which traffic can move this year during the days of limited flying weather. However, to the extent that the Laotian roads can be utilized during the monsoon period, the enemy will (at least this year) be able to move supplies within much interference. When the extension to Route 101 is completed, the enemy's exposure to air attacks confined to Laos alone will be significantly reduced.

a. Attacks on Passes

We have not managed to keep the passes into Laos closed for extended periods of time; however, we have not put forth a maximum effort to do so. A concerted effort to close the passes on their western approaches, together with a continuing and expanded effort to destroy trucks in Laos, would make transport difficult there, perhaps to the extent that the enemy would have to rely on other means of transport. The use of bicycles and portering of goods over the passes provides an alternative when the pass is closed, but trucks, tanks, and other such vehicles cannot be portered.

Our ability to close these passes may depend to a large extent on the use of new techniques and weapons such as delayed fused bombs and aerial mines which would make it difficult to reopen them, though detailed analysis of such campaigns has not been carried out. We have

available the Mark 36 Destructor, an aerial mine, and will soon have the BLU 45 Bomblet Land Mine. However, both of these magnetic mines can at present be swept relatively easily. A capability to detonate after a random number of trucks have passed within lethal range, and delayed fusing, both of which are technically feasible, would markedly increase their effectiveness, and we recommend the incorporation of these features as rapidly as possible.

b. Interdiction in the Laos Panhandle

It should be emphasized that the principal advantage in attacking in Laos, as opposed to North Vietnam, lies in the relative weakness of the Laotian air defense. Confining our attacks to Laos and South Vietnam provides the enemy with the greatest opportunity for concentrating his AAA defenses in our area of operation, and hence for eliminating, in due time, the principal advantage of a campaign there.

Interdiction of truck traffic in Laos is discussed in considerable detail in Section III-B-2, where it is concluded that opportunities exist for applying greater than present levels of effort in air attack. This option would obviously permit the United States to devote more sorties to Laos than any of the options previously discussed, and hence produce a larger attrition rate except during the summer months. In the absence of detailed study, we are unable to estimate how large this rate might be; however, we see continued opportunities for increasing the effectiveness of interdiction in Laos and we believe that a centrally-managed campaign offers some promise in improving the interdiction of supplies. Nevertheless, we believe that the flexibility already built in the Laotian network, which is being expanded, will permit North Vietnam to provide adequate supplies to her forces in the south, at least unless we are able to employ qualitatively new technology.

c. Flow Directly into the DMZ

The flow of materiel into northern I Corps directly through the DMZ should not increase significantly over what it would have been in the more extensive bombing campaigns, since only very little of this materiel is destroyed, on the average, enroute through North Vietnam. Although present roads do not extend across the DMZ, other modes of transport might be used if necessary to increase the

flow of materiel directly into Quang Tri Province. We have not been able to reach a conclusion as to how valuable this LOC, which would have to move through difficult terrain or heavily-defended areas, could be to the North Vietnamese in supplying forces below the northern I Corps as compared with the routes available through Laos.

2. Associated Disadvantages

This option would provide a sanctuary to enemy forces just north of the DMZ and would give the North Vietnamese greater opportunities to strengthen their defensive capacity against renewed bombing and naval attacks. It would also permit a further increase in the strength of the air defenses in Laos through the deployment of AAA and perhaps SAMs.

a. Sanctuary Above the DMZ

Although we are unable to evaluate the absolute significance of a sanctuary directly above the DMZ, it is clear that this could aggravate an already serious tactical disadvantage to our forces. Not only could the enemy retire from combat in I Corps without the threat of further attack, but he could in time concentrate artillery, AAA, surface-to-air missiles, and even aircraft in Route Package 1 which would pose a serious threat to our forces operating south of or in the DMZ itself. The utilization of this sanctuary would have to be monitored closely and consideration should be given to restrictions on its use in this manner during the course of negotiations.

b. General Benefits to North Vietnam

An opportunity would be provided North Vietnam to strengthen her air and naval defenses throughout the country as a whole. All of the dangers discussed in Sections A and B preceding would be more serious in this case. These dangers would have to be monitored and the extent to which we would permit them to develop could be considered during negotiations.

Conclusion

With a well-designed campaign, supplies flowing south could be more effectively attacked in Laos than in North Vietnam except during

the summer monsoon (July, August, September). Of course, attacking supply lines in both Laos and in southern North Vietnam is more effective than in either area alone, and permits the shift of strike forces from one area to the other as the bad weather season alternates between them. However, the relatively light air defenses now in Laos permit our use of low-performance aircraft of superior effectiveness in truck interdiction. Further benefits result from the poor trafficability of the present roads during the monsoon. On balance, we believe that concentrating all our forces on a Laotian campaign would preserve the larger part of our interdiction effectiveness should diplomatic objectives require an end to strikes in Route Package 1. Attempting to close the passes into Laos, coupled with attrition of trucks on the trails, is a possible tactic which we believe warrants study in greater detail.

In time, the superior effectiveness of interdiction in Laos can be degraded if the enemy successfully introduces air defenses into Laos which force us to use less vulnerable but less effective (for interdiction) high-performance aircraft.

Careful consideration should be given to responses to various North Vietnamese military actions that might follow a limitation of our air strikes to Laos and South Vietnam. Examples of threats to consider are:

-- Increased tactical disadvantage to our troops near the DMZ in engaging an enemy operating from sanctuary.

-- Build-up of radar-controlled AAA or SAMs in Laos and the panhandle area of southern North Vietnam.

-- Escalation of North Vietnamese air activities close to the DMZ.

-- Build-up of materiels at the North Vietnam-Laos border waiting military or weather conditions in which they could be transshipped through Laos to South Vietnam.

-- Expansion and hardening of North Vietnamese air defenses.

-- Installation of surface-to-surface missiles for attack on our naval forces operating close to the shore of North Vietnam.

D. Resumption and Extension of the Air Campaign in Northern North Vietnam.

If at some time it seemed appropriate to intensify the bombing of North Vietnam, the bombing campaign might be expanded either by:

1. Resuming attacks on the target system approved before the pause but with a change of emphasis in the targeting.

2. Removing the previously applied restrictions, in particular attempting to close the port of Haiphong.

We have not yet studied these in great detail, but the following represents our preliminary views:

With respect to the first option, devoting all of our attacks in North Vietnam to the railroad rolling stock has been estimated by IDA to quadruple the current destruction rate of box cars to perhaps 3,000 to 4,000 per year and to destroy from 1.6 per cent to 19 per cent of the total flow. This great range reflects inadequate knowledge of how North Vietnam operates the railroads and hence great uncertainty in the results of more intensive attacks. Such attrition would immediately affect the rate of combat materiel flowing south but, once the enemy adjusted to the revised tactics, probably not in a major way. The air losses in such a campaign would be substantially greater than those incurred in an effort at interdicting truck traffic in Route Packages 1, 2 and 3, since past losses per sortie in Route Packages 4, 5 and 6 have been over three times those in 1, 2 and 3.

If a more intense campaign against the rail bridges, yards, and choke points were successful in creating substantial delays, the enemy might shift to transport by trucks. The highway system in the northern parts of North Vietnam is flexible, and it has been estimated by IDA that the enemy could maintain the highway system by employing about 100,000 men even though she would have to take truck losses on the order of 10,000 per year if very substantial air strikes were directed

against trucks. Yet, the success of such a campaign would for some time to come be severely limited by our inability to hit point targets, especially at night and in bad weather.

The removal of all target restrictions would make available targets of undeniable military value. These include the Defense Headquarters, certain communications centers, and the civilian airport. In addition, goods stockpiled in Haiphong, Hanoi, and other populated areas could also be attacked. The destruction of these supplies would certainly affect the civilian part of the economy and disrupt the flow of military supplies to the South. Except insofar as North Vietnam would be forced to employ resources, both goods and men, in support of the civilian sector, it is uncertian that there would be any major or lasting effect on the military capability. The studies of this option that we have examined have not been adequate to persuade us either that the destruction of these facilities and supplies would have a major and lasting effect on North Vietnamese military operations, or that the limitations on the effectiveness of our forces are fully understood.

Mining of Haiphong could have a very substantial initial impact on the civilian population, particularly if carried out in the fall months when blue water lightering is somewhat unreliable. It could disrupt the distribution of POL for military uses and cause a major change in the way in which trucks and similar equipment are delivered. But the mining effort could be essentially countered both by intensive lightering and by use of the overland routes. The railway-highway system is estimated to have the capacity to carry the 5,000 STPD of goods now imported by sea even in the face of fairly intense air attacks, but the employment of this system alone would undoubtedly put severe strains on the total logistics system. Note, too, that North Vietnam is estimated to have on hand a 9-month supply of POL.

An all-out attack on the lighters could be expected to destroy some fraction (estimated by IDA to be about 10 per cent) of the goods entering Haiphong, but almost all of this would be civilian goods. The attrition rate of our aircraft could be expected to be high, perhaps as much as 1 per cent to 5 per cent per sortie because of the concentrated enemy air defense in the Haiphong area.

The maximum cost to the civilian economy could be exacted by combining a mining campaign and attacks on the barges and lighters which would be used to off-load ships, attacks on Hanoi and Haiphong, and more intensive attacks on the Northeast Railroad. These attacks would be costly to the enemy not only in terms of goods but also in civilian casualties. The accuracy of our systems, particularly when the bombing is conducted from the altitudes required by the air defense, is poor enough that large civilian casualties would be expected.

An alternative to mining Haiphong is a naval and air blockade of the Gulf of Tonkin. It may be possible to maintain such a blockade even in the event of a Soviet naval attempt to counter it, but we have not studied this possibility in great detail; nevertheless, it would involve a direct confrontation with the Soviet Union and China and produce an adverse reaction from many of our friends. As in the case of mining, North Vietnam would still have the option of importing by land.

Conclusion

A resumption of the bombing campaign, eliminating restricted areas, could exact a small additional cost to the North Vietnamese effort through revised target emphasis and a major cost to the civilian economy through attacks on the waterways. A campaign with no restriction with respect to populated areas would permit attacks on several high-value military targets. An unrestricted campaign on the transportation system, including the mining of Haiphong, would temporarily disrupt some military supply, but would affect primarily the civilian sector; after a period of readjustment, it would probably affect the military capabilities of North Vietnam to support its operations in South Vietnam, but only marginally.

Insofar as interdiction is concerned, none of the studies we have seen of possible expanded campaigns makes a convincing case for a campaign of expanded scope in the northern route packages.

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Comments on -- The Effects of Air Strikes in North Vietnam and Laos

The PSAC report is a very good job. It reads very much like one of our reports. I would quarrel with some of their comments on the probable effectiveness of alternative RT programs, but I find the overall tone, and analysis very much in keeping with our position. Section IV, "factors that limit the effectiveness of past interdiction programs," is especially interesting because it goes into the shortcomings of our weapons systems and disorders some of the systems underdevelopment.

First sentence

Second, "air strikes confined to Route Package I, Laos, and South Vietnam. Could at present be as effective as those including Route Packages II and III as well".

Third, "with a well-designed campaign, supplies flowing south could be more effectively attacked in Laos than in North Vietnam. (Although the report admits attacking supply lines in both Laos and southern North Vietnam would be better.) I think they are too optimistic regarding the prospects for a successful interdiction campaign in Laos.

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THE WHITE HOUSE

WASHINGTON

May 16, 1968

Dear Dick,

Enclosed for your information and use is a copy of the draft report of my Ad Hoc Vietnam Panel.

The report results from an intensive study, analysis and debate by the panel. The conclusions and recommendations, but not the details of the draft, have been reviewed and unanimously agreed to by the entire President's Science Advisory Committee.

Since this is a draft report, I would appreciate your not giving the document further distribution.

Sincerely yours,

Donald F. Hornig
Special Assistant to the President
for Science and Technology

Honorable Richard A. Helms
Director
Central Intelligence Agency
McLean, Virginia

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