CHAPTER IV - REVIEW AND ANALYSIS

Statistical Analysis

How successful were ROLLING THUNDER operations? Did the gains offset the loss in U.S. personnel and aircraft and the political repercussions, both at home and abroad? As the second year of operations drew to an end, both official and unofficial sources redoubled their efforts to answer these questions. One method was through statistical analysis of the results achieved by bombing of targets in the North. However, not all of the achievements of ROLLING THUNDER could be quantified. It would be impossible to statistically portray the effects of the bombing on North Vietnamese morale or its impact upon communist strategic policies. Similarly, the number of bridges or buildings destroyed did not reflect the diversion of manpower which was necessary to offset these losses.

During 1966, the Air Force alone engaged in 44,500 attack sorties and expended 70,108.6 tons of ordnance over North Vietnam. The results were 2,617 buildings, 1,356 bridges and ferry slips and 826 AAA, SAM and radar sites destroyed and damaged. In the transportation sector, 2,320 vehicles, 541 railroad rolling stock, 2,025 water craft and 29 aircraft were destroyed and damaged by the bombing which also resulted in 4,159 highway and railroad cuts. However, in addition to the pilots captured and killed, the USAF lost 217 aircraft during out-of-country operations (the majority of them occurring in North Vietnam); the Navy lost 122.

Enemy personnel strength in South Vietnam increased by approximately 124
40,000 during 1966 and, at the end of the year, an estimated 110,000 personnel were accepted in Viet Cong/North Vietnamese Army main force units. Most of the increase was due to the infiltration of North Vietnamese Army units into South Vietnam. Following is a monthly breakdown of infiltration figures:

<table>
<thead>
<tr>
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<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
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<td>Confirmed</td>
<td>3,482</td>
<td>6,745</td>
<td>11,537</td>
<td>90</td>
<td>400</td>
<td>10,460</td>
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<tr>
<td>Probable</td>
<td>1,785</td>
<td>2,368</td>
<td>1,324</td>
<td>391</td>
<td>2,890</td>
<td>600</td>
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<tr>
<td>Possible</td>
<td>2,070</td>
<td>2,410</td>
<td>3,900</td>
<td>20</td>
<td>3,465</td>
<td>1,315</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>7,337</strong></td>
<td><strong>11,523</strong></td>
<td><strong>16,761</strong></td>
<td><strong>501</strong></td>
<td><strong>6,755</strong></td>
<td><strong>12,375</strong></td>
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<tr>
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<th>Jul</th>
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<th>Dec</th>
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<tr>
<td>Confirmed</td>
<td>4,238</td>
<td>1,550</td>
<td>1,400</td>
<td>115</td>
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<tr>
<td>Probable</td>
<td>120</td>
<td>400</td>
<td>---</td>
<td>500</td>
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<tr>
<td>Possible</td>
<td>5,506</td>
<td>3,300</td>
<td>300</td>
<td>4,560</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>9,864</strong></td>
<td><strong>5,250</strong></td>
<td><strong>1,700</strong></td>
<td><strong>5,175</strong></td>
<td><strong>630</strong></td>
<td><strong>1,050</strong></td>
</tr>
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</table>

**CY 1966 Total**

- Confirmed: 40,017
- Probable: 10,378
- Possible: 28,526
- **Total**: 78,921

At the end of the year, it was estimated that the communists had the capability of infiltrating 7,000 - 9,000 equipped men per month through routes in Laos, Cambodia, and the DMZ. These routes were also used to bring in equipment, arms ammunition, and other supplies to continue the war of attrition. As 1966 ended, the enemy's logistic system was supplying approximately 128,000 combat and combat support persons with these items from out-of-country resources while most of his food was procured within South Vietnam and Cambodia.
Air Force Secretary's Review

The Secretary of the Air Force summarized the role of air operations against North Vietnam in 1966 as follows:

"...An important effect of US tactical airpower has been its impact on the ability of North Vietnam to support combat operations in the South with troops and material. Infiltration appears to have leveled off during the last six months of the past year. Certainly, it could have reached a much higher level had it not been for air strikes against military targets in North Vietnam, including transportation facilities and en route convoys. And even more important, the interdiction campaign has denied the North Vietnamese and Viet Cong the equipment and supplies with which they might have retained the initiative.

"North Vietnam's infiltration of troops during 1966 was achieved at a very high cost. Most important, it failed in terms of combat results, the presumed goal of the long trek south. Battalion and larger size attacks have fallen from a high of seven per month during most of 1965 to a low of less than two per month in the last half of 1966. This decrease in enemy-initiated attacks has occurred in spite of an increase in enemy battalions, and has also been accompanied by increasing enemy battle deaths and losses due to capture and defection. At the same time US casualty rates have declined. An important reason for enemy failure in combat is the fact that it is a far more difficult job to support larger scale sustained combat operations than it is to infiltrate. It is on this basis -- as well as the cost of infiltrating troops, that the air interdiction campaign must be judged.

"Estimates vary widely as to the support requirements of infiltrators once they reach South Vietnam. Consumption varies greatly with the frequency and intensity of combat. But there can be little doubt of the great leverage which air interdiction has on the cost of aggression. To stop infiltration completely by air attack alone would be prohibitively expensive for us if it could be done at all. But to render the infiltrators far less effective in sustained combat, as
DELIVERED ORDNANCE IN TONS - NORTH VIETNAM

Fig. 22
well as to exact a heavy direct cost for North Vietnam's logistic support, is not only possible -- it is being done."

PACAF Comments

CINCPAC directed that a review and analysis be made of the results achieved by ROLLING THUNDER during 1966 in order to provide the basis for 1967 targeting concepts. In response to CINCPAC's request, CINCPACAF presented its major objectives for 1967 and an evaluation of the 1966 ROLLING THUNDER program. The salient points of the 1966 review follow.

Assessment of Accomplishments

An assessment of effects of air revealed that thousands of vehicles were destroyed, including trucks, rolling stock and watercraft. In addition thousands of tons of POL were destroyed as a result of concentrated effort against the POL facilities. Movement of vital war materials had been impeded by the destruction of hundreds of rail and highway bridges. CINCPACAF noted that, "without the disruption that was achieved by air-power, the communist forces might long since have been able to marshall major forces for all-out offensives towards SVN."

Enemy Reactions

CINCPACAF noted that the enemy reactions to the ROLLING THUNDER efforts were immediate and resourceful. He pointed out that the enemy resorted to alternate means of transporting war materials, such as the use of pack animals and human portage. The enemy also increased his use of watercraft.
to counter the loss of the rolling stock and trucks and the interdicted LOC's. The North Vietnamese had demonstrated exceptional recuperative capability which they demonstrated by building by-passes and rebuilding destroyed bridges in minimum time. Additionally, he noted that the attacks against the enemy's POL facilities were offset by the increased imports of POL and the rapid dispersal of remaining POL stores. In response to our air attacks, the enemy had accomplished a major buildup of his air defense system which included a sophisticated EW/GCI network. Also, the enemy had increased significantly his SAM and AAA capabilities.

Limiting Factors

CINCPACAF noted that many factors had hampered the ROLLING THUNDER ability to counter the reactions of the enemy and to accomplish desired objectives. One limiting factor was poor weather for prolonged periods of time. This factor, together with the enemy's ability to repair and reconstruct damaged targets, limited the attempts to impede the flow of war materials. In addition, political restraints and geographical sanctuaries continued to circumscribe the efforts of airpower.

Lesson Learned

CINCPACAF pointed out that efforts in 1966 indicated that a gradual, drawn-out campaign created very little psychological impact on Hanoi's leaders and the populace. The great lie put out by the government of NVN about the victory in the south was extremely difficult to support in the face of destruction by airpower of even a few targets in the vicinity of
Hanoi and Haiphong. Hanoi's tirade against the bombing provided a true indication of the impact of air attacks on the Communist regime. CINCPAC noted that the 1967 task of bringing the war to the doorstep of the NVN government had to be continued and increased. He said there should be no circles around Hanoi and Haiphong denoting arbitrary areas of sanctuary. The target concept, instead, must be the simple one of attacking every significant military supply target. This should be done with continued careful avoidance of civilian populated areas. He felt that the exhaustion of men and material by the enemy could be accomplished through attrition of war material, pressure on Hanoi, and aggressive search and destroy operations in SVN.

Greater Targeting Freedom

CINCPACAF noted that the need for greater targeting freedom was emphasized by experience, up to the end of 1966, in the conduct of the air war in SEA. He pointed out that the basis for this requirement was a two-fold problem:

- Enemy restoration of targets.
- Weather preventing timely re-attacks.

CINCPACAF felt that such a situation created the need for targets requiring long intervals for repair. He saw the following targets as being in the category of hard-to-repair targets:

- Port unloading machinery.
- Power plants.
- Aircraft maintenance and repair facilities.
CINCPACAF noted that these types of targets would create hardships and would weigh heavily on the enemy's hopes of achieving victory.

MSQ-77

CINCPACAF noted that the requirement for all-weather attack systems would be met, in large measure, through the use of the MSQ-77. He also felt that self-contained radar fire control systems would also assist in solving the all-weather problem.

Target Mix

CINCPACAF said it was important to strive for a practical target mix, considering Air Force capabilities, that would give maximum return for effort. He presented the following targeting concept:

1. The spectre of a long war should be treated as being intolerable. The targeting should be bold and broad enough to demonstrate national determination.

2. The targeting should be made to maximize attrition of the war-supporting material in the prime distribution centers. For this purpose large supply and storage facilities in the vicinity of the Hanoi and Haiphong area must be brought under attack. Supplies must be hit before they were dispersed in small units throughout the country. Force should be concentrated when striking this target system to compound effects. To produce the maximum attrition of war supporting materials, a continuing coordinated strike campaign on supply and storage facilities should be carried out by the Navy and Air Force.

3. Targets should be selected so as to continue the attrition of the war-supporting goods and facilities at dispersed locations along the LOC's south of Hanoi/Haiphong. CINCPACAF noted that this attrition in depth
should provide profitable opportunities to diminish further the war-making capability of the enemy. He noted that this effort would range from dispersed storage areas in southern NVN to the industrial installations in the north.

4. Occasional selective strikes at key bridges would be required to impede traffic. CINCPACAF pointed out that he did not anticipate extensive interdiction effort in this direction. However, selective strikes were required to impede traffic and to permit the attrition of vehicles and in order to restrict the redeployment of the labor force occupied in repair activities.

Lucrative Targets

CINCPACAF noted that target lists forwarded to CINCPAC on 5 January 1967 contained the most lucrative targets (power, storage/supply, industry, SAM support, military installation, airfields, POL, railroads, locks) in accord with our objectives. The greatest number of targets (74) fell in Route Package VI-A, followed by 26 targets in Route Package I. He noted that the targets in Route Package VI were the key to the enemy war-making potential but most of them were currently prohibited. He felt this was an opportune time to press for a high-value target base since Communist China was preoccupied with internal problems. External supplies transiting through ports should be limited to the maximum extent and followed by attacks on the electric power system. The striking of selected industrial targets would significantly reduce Hanoi's war-supporting capabilities and also tax the Communist Bloc to provide replacement. If authority were granted to conduct close-in attrition in the vicinity of major ports, the campaign would concentrate on the Haiphong area to destroy bulk supplies.
A similar but lesser effort would be carried out in the Hanoi area. Constant pressure, day and night, would be required to make this program effective. An attrition program throughout the rest of North Vietnam should be continued to further reduce, as much as possible, any of the forces and supplies getting through the Hanoi/Haiphong area.

CINCPACAF stated that campaigns should be carefully designed to create the greatest possible psychological impact on the government and people of NVN. Attacks must be coordinated to achieve destruction of the target system in the shortest possible time, thus bringing home to Hanoi the full impact of our strength and determination. To accomplish a task of this magnitude, the broadest possible target base and sufficient flexibility, timewise, to plan for best possible weather periods were needed.

Targeting Concepts for 1967:

The following major objectives for 1967 were presented:

1. The NVN Government had to be convinced that a long war was an unacceptable and intolerable proposition.

2. War goods needed by the enemy in SVN had to be destroyed, wherever possible, at storage and distribution points in the northern part of the country with concurrent attrition along the LOC's leading to the south.

RAND Appraisal

A somewhat different appraisal of the impact of U.S. air operations against North Vietnam was contained in a RAND study published in December.
1966. With respect to the primary objective of the campaign, i.e., to reduce the level of infiltration or substantially increase the cost of infiltration of men and equipment from the north to the south, the study concluded that "although the bombing in North Vietnam and Laos raised the cost of infiltration, the level of infiltration has not been reduced sufficiently to prevent North Vietnam from helping to maintain a VC/PAVN combat force in the south strong enough to deny the prospect of a decisive military victory to the U.S. and its allies in the foreseeable future." 16/

The study addressed itself chiefly to the effects which air operations had on: (1) "The physical and organizational functioning of North Vietnam as an economic and political entity; and (2) "its 'coercive' effects, or its efficacy in reducing the Hanoi Government to agree to negotiations, on initial terms acceptable to the U.S." With respect to (1) above, the study stated the bombing had imposed severe strains which were manifested most tangibly by the massive diversion of manpower to military and other war-related unproductive activities. The country's ability to feed itself in a long war had been seriously impaired and there was evidence of urban food shortage and increasing food imports. But there was "no evidence of critical or progressive deterioration or disruption of economic activity." As far as the effects of the bombing on public morale and government control, the study made a "cautious 'guess' that they had redounded to the regime's net benefit." There was "no evidence at present that, economically and politically, Hanoi should not be able to withstand the long, hard war it professes to have in mind." 17/
The study pointed out that the main policy constraints on air operations were: (1) Keeping civilian casualties to a minimum; (2) limiting attacks to "military objectives," and (3) avoiding any actions which might provoke China or the USSR into more direct involvement. The relaxation of constraints, even to the extent of bombing all military and industrial targets not previously attacked, would be unlikely to achieve U.S. objectives unless it cut off Hanoi's access to military and economic aid imports from its communist allies. It further stated that: "U.S. failure to date to undertake a maximum effort to deny access to imports by sea and over land -- attributable evidently, mainly to the fear of provoking and activating the USSR and China -- thus emerges as the outstanding gap in the logic of U.S. coercive strategy against North Vietnam." But even if the U.S. were willing to abandon the "crucial constraint against direct maximum interdiction of imports into the DRV, ... there would still remain the question whether the physical and political effects on the DRV would make themselves decisively felt 'within an acceptable period of time.'" There would also arise the graver question of the external effects of such action in terms of Soviet and Chinese reactions." While taking certain qualifications into considerations, the study nevertheless concluded that "as long as the present constraints on objectives and operations remain as strong as recent Administration statements indicate, it becomes increasingly doubtful that the advantage of continuation or intensification of the attacks outweigh the potential net gains from cessation or, at least, drastic and demonstrative de-escalation."

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FOOTNOTES

CHAPTER I

2. Ibid.
3. Ibid.
5. Ibid.
6. Ibid.
10. Ibid.
11. Ibid.
13. Ibid.
15. Ibid.
18. Ibid.
19. Ibid.

21. Ibid.

22. Ibid.


24. Ibid.


26. Ibid.

27. Ibid.

28. Ibid.

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30. Ibid.


32. Ibid.

33. Ibid.

34. Ibid.


36. Ibid.

37. Ibid.

38. Ibid.

39. Ibid.


41. Ibid.
42. Ibid.
43. Ibid.
44. (TS) Pub., Hq PACAF (DTE), Summary of Air Operations in SEA, 10-23 Dec 1965.
45. Ibid.
46. Ibid.
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53. Ibid.
55. Ibid.
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58. Ibid.

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3. Ibid.

4. Ibid.

5. Ibid.

6. Ibid.

7. Ibid.

8. Ibid.

9. Ibid.

10. Ibid.

11. (TS) Historical Briefing, COMUSMACV, 10 Jan 1966.


13. Ibid.

14. Ibid.


21. Ibid.

23. Ibid.
24. Ibid.
27. (U) Editor's Note
29. Ibid.
30. Ibid.
31. Ibid.
32. (TS) Msg., JCS to CINCPAC et al, JCS09050-6, 26 Feb 1966; Msg., CINCPAC to COMUSMACV, 2350Z, 26 Mar 1966; and Msg., 2AD to COMUSMACV, 0237Z, 31 Mar 1966.
34. (S) Msg., COMUSMACV to CINCPAC, MAC2275, 22 Mar 1966.
35. Ibid.
36. (TS) Memo for the Record, 7AF, MACJ-3, 1 Apr 1966.
39. Ibid.
40. Ibid.
41. Ibid.
42. Ibid.
43. Ibid.
44. Ibid.
45. Ibid.

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47. Ibid.
48. Ibid.
49. Ibid.
50. (TS) Msg., CINCPAC to JCS, 0447Z, 4 Apr 1966.
51. Ibid.
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55. (TS) CHECO Report, "Rolling Thunder; March-July 1965."
57. Ibid.
60. Ibid.
62. Ibid.
63. (TS) Msg., Dep Cmdr 7AF/13AF to 7AF, 1058Z, 14 May 1966.
64. Ibid.
73. (TS) Msg., CINCPACAF to 7AF, 23 Jun 1966.
74. Ibid.
79. (S) Memo., 7AF to COMUSMACV, 3 Jul 1966.
84. Ibid.
85. Ibid.
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87. Ibid.
FOOTNOTES

CHAPTER III

3. Ibid.
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6. Ibid.
7. Ibid.
8. Ibid.
9. Ibid.
10. Ibid.
11. Ibid.
12. Ibid.
18. (S) Pub., PACAF SEA Air Operations, Aug 1966 and
19. Ibid.
22. Ibid.
24. Ibid.
29. (TS) Msg., CINCPACAF to CINCPAC, 0131Z, 15 Oct 1966 and
32. (TS) Msg., CINCPAC to JCS, 1920Z, 26 Oct 1966 and
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36. Ibid.
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52. (TS) Msg., 7AF to 355TFW Takhli, 0210Z 16 Dec 1966 and


56. (TS) Msg., CINCPAC to JCS, 0202Z, 24 Sep 66 and

FOOTNOTES

CHAPTER IV

1. (U) Editor's Note

2. (S) Ltr., 7AF, subj: Significant Events Calendar Year 1966, 2 Feb 1967.


4. Ibid.


7. (S) Ltr., 7AF, subj: Significant Events Calendar CY66, 2 Feb 67.


10. Ibid.

11. Ibid.

12. Ibid.


14. Ibid.


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32. Ibid.
33. Ibid.
35. (TS) Pub., Hq PACAF, Summary of Air Operations in SEA, dtd unk.
38. (S) Ltr., 7AF subj: Significant Events CY66, 2 Feb 1967.
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41. Ibid.
42. Editor's Note.
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CHAPTER V

1. Editor's Note.

2. (S) Pub. Supplement, Hq PACAF, Summary of Air Operations in SEA, CY66 and
   (S) Pub., 7AF, Command Status, Dec 1966.


5. (U) Statement, Secretary of the Air Force (Mr. Harold Brown),
   2 Feb 1967.


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    Appraisal of Economic and Political Effects.

17. Ibid.

18. Ibid.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<td>AA</td>
<td>Antiaircraft</td>
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<tr>
<td>AAA</td>
<td>Antiaircraft artillery</td>
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<tr>
<td>ABCCC</td>
<td>Airborne command and control center</td>
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<tr>
<td>AFCC</td>
<td>Air Force Component Commander</td>
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<tr>
<td>AOB</td>
<td>Air Order of Battle</td>
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<tr>
<td>BARCAP</td>
<td>Barrier Combat Patrol (Navy)</td>
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<td>BARREL ROLL</td>
<td>Air operations in NW Laos</td>
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<tr>
<td>BDA</td>
<td>Bomb damage assessment</td>
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<td>SIG EYE</td>
<td>High-cover radar ECM</td>
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<tr>
<td>BLUE TREE</td>
<td>Photo reconnaissance</td>
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<tr>
<td>BR</td>
<td>See BARREL ROLL</td>
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<tr>
<td>Bullpup</td>
<td>Air-to-ground missile</td>
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<tr>
<td>CAP</td>
<td>Combat air patrol (SARCAP, MIGCAP, RESCAP, etc.)</td>
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<tr>
<td>CBU</td>
<td>Cluster bomb unit</td>
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<td>Chicom</td>
<td>Chinese Communist</td>
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<td>CINCPAC</td>
<td>Commander-in-Chief, Pacific</td>
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<td>Commander-in-Chief, Pacific Air Forces</td>
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<td>CINCPACFLT</td>
<td>Commander-in-Chief, Pacific Fleet</td>
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<tr>
<td>CINCSAC</td>
<td>Commander-in-Chief, Strategic Air Command</td>
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<tr>
<td>COMUSMACV</td>
<td>Commander, U.S. Military Assistance Command, Vietnam</td>
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<tr>
<td>CTF</td>
<td>Commander, Task Force (U.S. Navy)</td>
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<tr>
<td>CTZ</td>
<td>Corps Tactical Zone, (U.S. Army)</td>
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<tr>
<td>CVA</td>
<td>Aircraft Carrier (Navy)</td>
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<tr>
<td>DIA</td>
<td>Defense Intelligence Agency</td>
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<tr>
<td>DIT</td>
<td>Dispersed or isolated target</td>
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<tr>
<td>DMZ</td>
<td>Demilitarized Zone</td>
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<td>Electronic Countermeasure(s)</td>
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<td>EW</td>
<td>Electronic Warfare or Early Warning</td>
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<td>FAC</td>
<td>Forward Air Controller</td>
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<tr>
<td>FWMAF</td>
<td>Free World Military Assistance Forces</td>
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<tr>
<td>GCI</td>
<td>Ground-controlled intercept (radar)</td>
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<td>GVN</td>
<td>Government of South Vietnam</td>
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<td>Abbreviation</td>
<td>Definition</td>
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<td>IRON HAND</td>
<td>Anti-SAM electronic operations</td>
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<td>JCS</td>
<td>Joint Chiefs of Staff</td>
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<td>LOC</td>
<td>Line(s) of Communication</td>
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<tr>
<td>MACV</td>
<td>See COMUSMACV</td>
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<td>MIGCAP</td>
<td>MIG combat air patrol</td>
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<td>MT or mt</td>
<td>Metric tons</td>
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<tr>
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<td>Nautical mile(s)</td>
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<td>North Vietnamese Army</td>
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<td>Pacific Fleet</td>
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<td>Pacific Command</td>
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<td>PIP</td>
<td>Primary Interdiction Point</td>
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<tr>
<td>POL</td>
<td>Petroleum, oil and lubricants</td>
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<tr>
<td>RHAW</td>
<td>Radar homing and warning</td>
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<td>RLAF</td>
<td>Royal Laotian Air Force</td>
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<tr>
<td>ROLLING THUNDER</td>
<td>Air strike operations in North Vietnam</td>
</tr>
<tr>
<td>RP</td>
<td>Route Package</td>
</tr>
<tr>
<td>RT</td>
<td>See ROLLING THUNDER</td>
</tr>
<tr>
<td>RVN</td>
<td>Republic of Vietnam (also GVN or SVN)</td>
</tr>
<tr>
<td>SA-2</td>
<td>Type of surface-to-air missile</td>
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<td>SAC</td>
<td>Strategic Air Command</td>
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<td>SAM</td>
<td>Surface-to-Air Missile</td>
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<td>Search and rescue</td>
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<td>Search and rescue combat air patrol</td>
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<td>STEEL TIGER</td>
<td>Air operations in S. Laos</td>
</tr>
<tr>
<td>SVN</td>
<td>South Vietnam</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
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</tr>
<tr>
<td>TFW</td>
<td>Tactical Fighter Wing</td>
</tr>
<tr>
<td>TIGER HOUND</td>
<td>Air operations in S. Laos</td>
</tr>
<tr>
<td>TOT</td>
<td>Time over target</td>
</tr>
<tr>
<td>UE</td>
<td>See BLUE TREE</td>
</tr>
<tr>
<td>USIB</td>
<td>U.S. Intelligence Board</td>
</tr>
<tr>
<td>VC</td>
<td>Viet Cong</td>
</tr>
<tr>
<td>VNAF</td>
<td>South Vietnamese Air Force</td>
</tr>
<tr>
<td>VTD</td>
<td>Variable time delay (bomb fuse)</td>
</tr>
<tr>
<td>WILD WEASEL</td>
<td>ECM-equipped aircraft (anti-SAM or gun-laying radar)</td>
</tr>
</tbody>
</table>