Air Campaign Planning Handbook

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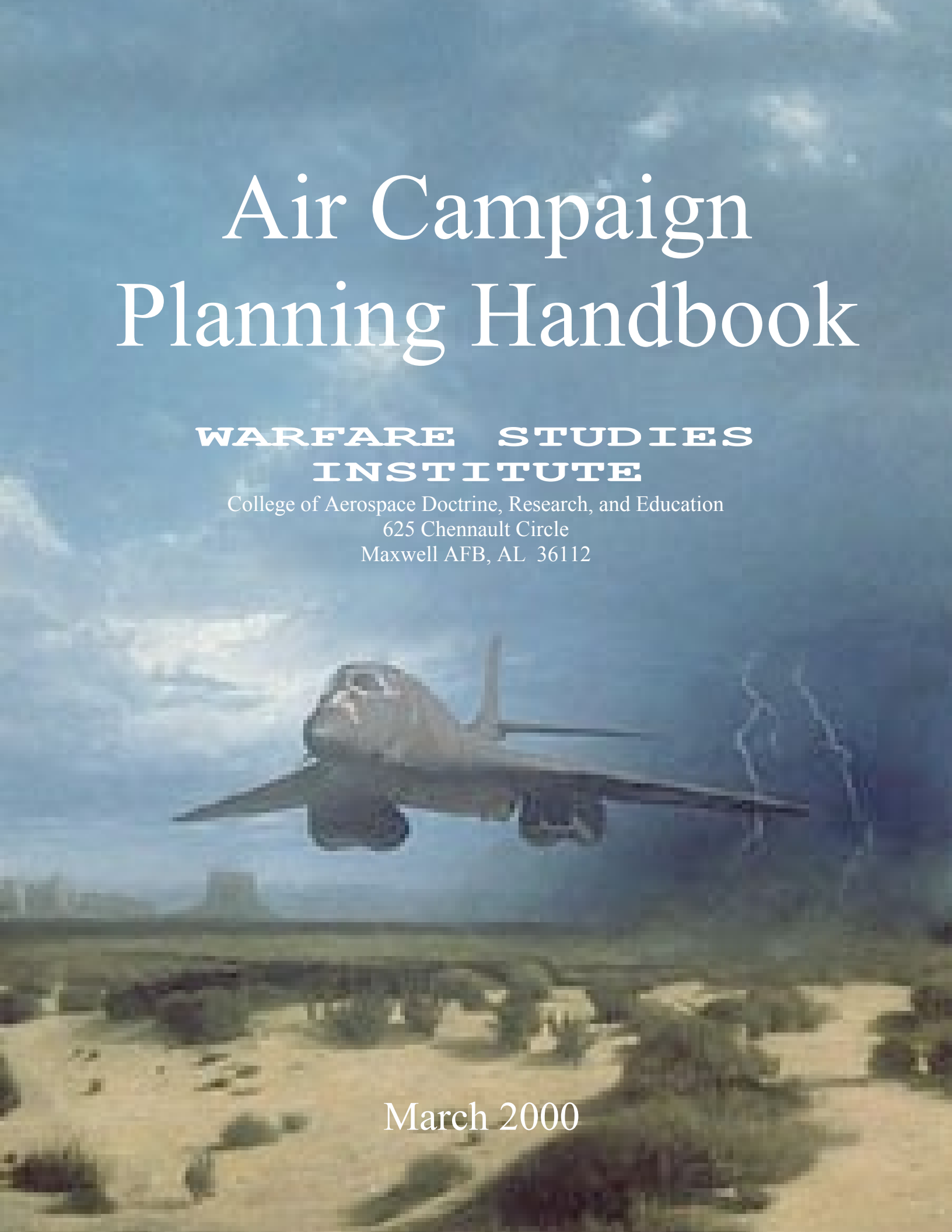

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Preface

To be prepared for war is one of the most effectual means of preserving the peace.

--George Washington

War is not an affair of chance. A great deal of knowledge, study, and meditation is necessary to conduct it well.

--Frederick the Great

If I always appear prepared, it is because before entering on an undertaking, I have meditated long and have foreseen what may occur. It is not genius which reveals to me suddenly and secretly what I should do in circumstances unexpected by others; it is thought and preparation.

--Napoleon

"What is campaign planning? Why is campaigning important to me? How do I develop a campaign plan?" The JDACC Air Campaign Planning Handbook will help you find answers to these questions. This handbook, by design, focuses on planning air warfare at the operational level of war; it does not prescribe tactics, techniques, and procedures for executing air attacks. Execution of the plan is critically important and must be thoroughly considered, but before execution, you as a campaign planner must think through the operational-level issues. The campaign plan provides the link that ensures tactical operations will achieve the desired strategic objectives. This handbook presents a way to focus on issues at the operational level of war that make execution meaningful in achieving the theater and national-level goals.

Joint Pub 1-02, *The Department of Defense Dictionary of Joint Terms*, defines a campaign plan as "a plan for a series of related operations aimed to accomplish a common objective, normally within a given time and space." Campaigns of the American military are joint. The development of campaign plans is based on our past experiences, as reflected in our doctrine and values, that have proven to be the foundation for success on the battlefield. Values to consider include integrity, competence, physical and moral courage, and teamwork. The US armed forces form the team—a joint team.

The value of campaign planning to you may not be so obvious. Campaign plans are practical guidance for the *employment* of forces at the *operational* level of war. In a major war a campaign may be one of a series of campaigns needed to support a strategy that accomplishes the national objectives. Campaigns tie national strategy and objectives to battles and engagements. Battles and engagements "generally provide the campaign its shape. At the same time the campaign gives them meaning."[1] Just as a conductor directs the timing, tempo, and synchronization of an orchestra, so too the campaign plan directs the conduct of tactical operations to achieve strategic goals.

How do you develop a campaign plan? This handbook describes a five-stage[2] process for developing campaigns from an air perspective. This is the same process described in Air Force Doctrine Document (AFDD) 2, *Global Engagement: Air and Space Power Organization and Employment* and is substantively the same process described in Joint Pub 3-56.1, *Command and Control for Joint Air Operations*. It embodies historical analysis, experience, theory, and

[1] Fleet Marine Force Manual (FMFM) 1-1, *Campaigning*, 25 Jan 90, 25.

[2] We use the term "stage" throughout this handbook, while Joint Pub 3-56.1 uses the term "phase" to describe the five parts of the campaign planning process. We chose to use "stage" for educational purposes to eliminate confusion with the phases of a campaign.

doctrine. Section I is an overview of the air campaign planning process as taught at JDACC. Section II provides the Joint Air Operations Plan Format that was extracted from Joint Pub 3-56.1. Section III includes some of the planning tools, a list of terms and definitions useful in the development of campaign plans, and a bibliography of material pertinent to campaign planning.

Finally, remember that campaign planning is an art. Every campaign is unique and it would be impossible to develop exhaustive guidelines relevant to every contingency. This handbook is intended only to provide a conceptual framework for those developing their ability to employ the campaign planner's art.

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The Air Campaign Planning Process

Introduction

History is not kind to nations that go to sleep. Pearl Harbor woke us up and we managed to win, although we are already forgetting the dark days when victory was uncertain, when it looked as though the scales might be tipped the other way.

--George C. Kenney

Adherence to dogma has destroyed more armies and cost more battles than anything in war.

--J. F. C. Fuller

Planning for campaigns and major operations is a continuous process.

> Combatant commanders translate national and theater strategy into strategic and operational concepts through the development of theater campaign plans. **The campaign plan embodies the combatant commander's strategic vision** of the arrangement of related operations necessary to attain theater strategic objectives. **Campaign planning encompasses both the deliberate and crisis action planning process**. If the scope of contemplated operations requires it, campaign planning begins with or during deliberate planning. It continues through crisis action planning, thus unifying both planning processes.[3]

In the post-Cold War era, we must be ready both for major theater warfare and for a wide variety of military operations other than war (MOOTW). While we have historically focused on planning for war, our military profession is increasingly changing its focus to a complex array of MOOTW. The process used to plan the participation of aerospace forces in those operations is not unique to or constrained by the size of the operation. If air operations of any type are contemplated, the stages of this process can be effectively employed to develop a campaign plan.

While Operation DESERT STORM was clearly planned and fought as a war, planning for Operation PROVIDE COMFORT was primarily a humanitarian effort combined with a more typical combat operation. Airlift support of refugee relief in Rwanda, Hurricane Andrew disaster relief, and airdrops during Operation PROVIDE PROMISE are all examples of operations not involving combat. Operation JOINT ENDEAVOR in the Balkans combines elements of combat, humanitarian assistance, and peace operations. While obviously different in scope, planning for contingencies like these can benefit from the methods described in this handbook.

The air campaign planning process[4] begins when you receive your tasking. Normally the air and space plan will be developed concurrently with the associated ground, naval, and special operations plans. All functional planning is an integral part of, and designed to support, the theater campaign plan. It is important to remember that point. You must make every effort to coordinate your ongoing planning effort with both planners in superior and lateral headquarters.

The process taught at JDACC and described in this handbook is graphically depicted in figure one:

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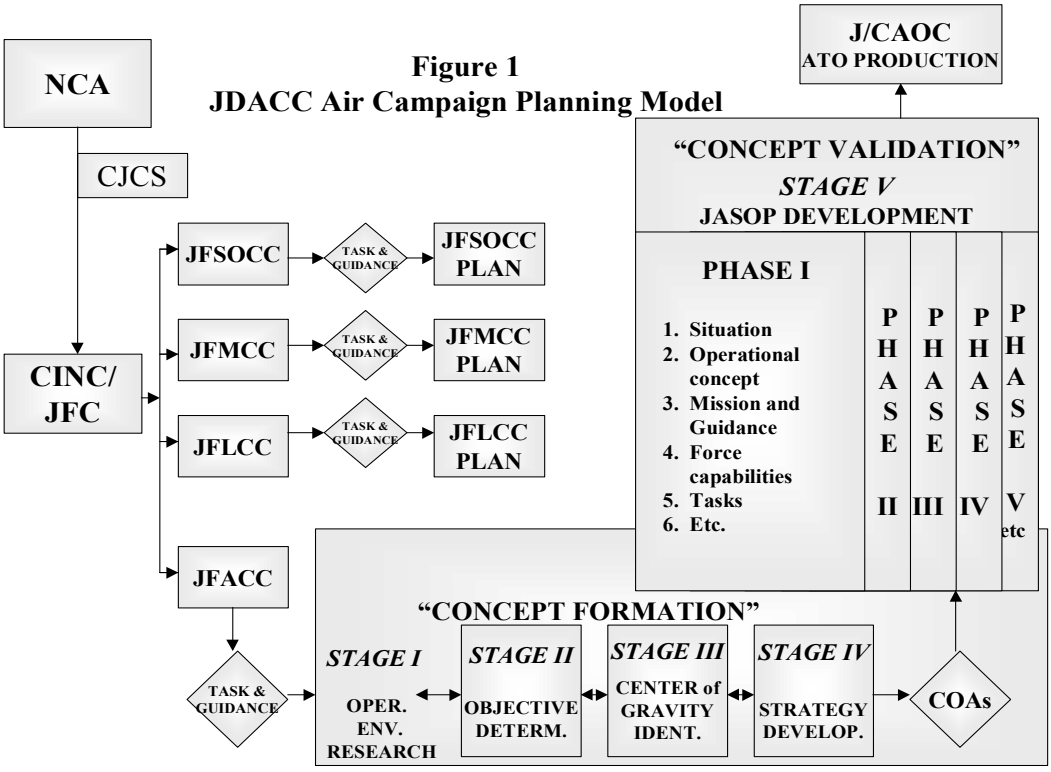
[3] *Joint Doctrine Capstone and Keystone Primer* (emphasis in original), 30 May 95, 3.

[4] May be referred to hereafter as "the process."



Source: JDACC Faculty. See "Terms and Definitions" for explanation of abbreviations.

The air campaign planning process has five stages. They are: **operational environment research, objective determination, center of gravity identification, strategy development, and joint air and space operations plan development**. The purpose of the stages is to help you, as a planner, take an *objectives-,* or *output-* or *effects*-based approach to planning. That is, **planning in which the effects achieved on targets flow from the commander's intent and desired objectives**. Traditionally, air planners have focused on the *inputs* to the battle: the number of aircraft, sorties, or ordnance delivered. Often, these inputs have been used to drive strategy. This "input-based" planning method was tactically focused, answering questions about *how* and *how many* assets should be used in a given campaign. This type of planning is still necessary, but should always be guided by answers to questions like, *"what must we do achieve to meet the commander's objectives?"*

The figure shows both the simultaneously parallel and sequential nature of the planning process. Certain tasks must be completed before others can begin, but in many areas it is to your advantage to work tasks in parallel. The five stages are presented in an order that is intended to optimize the process in an absolute *worst-case planning environment: very limited information and time available in an undeveloped theater*. Operational environment research (OER) includes prior knowledge brought to planning at its inception and so logically begins the process, even though it must continue throughout. Center of gravity (COG) analysis is really a refinement of certain aspects of OER, but you should evaluate the criticality, vulnerability, and feasibility of COGs in the light of the objectives for a particular contingency. So it's important to know your objectives *before* you identify COGs, at least in a worse case situation.

Say, for example, that you are a Roman planning a war with Carthage. Is your objective to punish Carthage for incursions into Roman Hispania (as at the beginning of the Second Punic War), to save Rome itself from Carthagenian invasion (as in the middle years of that war), or to totally destroy Carthage (as at the end of the war)? Carthage's COGs will remain the same across

all the campaigns (and if you did your COG analysis well, you'll find them all), but the differing objectives chosen for each will greatly influence the *COGs you choose to affect*. Similarly, strategy development should normally take place after determining objectives and analyzing COGs. *Strategies driven by tactical capabilities, not linked to clear, concise, attainable objectives, and not designed to achieve effects on enemy COGs appropriate to those objectives, have almost always been defeated*. The US pursued such a strategy in Vietnam and lost. Lastly, joint air and space operations plan (JASOP) development—the detailed planning necessary to make your campaign plan executable—must flow from your chosen objectives, COGs, and strategies, and so occurs last.

This order is not sacrosanct**, however*. Given more time, people, and information, the stages can be accomplished in any order suited to your planning environment. OER and COG identification have occasionally been combined, as have objective and strategy development. JASOP development is often an entirely separate process, accomplished long after the "concept formation" stages (I-IV) have finished. *We cannot overemphasize, though, that **the process is iterative. This is one of its most valuable aspects. New information will often force you to re-evaluate the products of earlier stages. This is especially so if you accomplish JASOP development separately from the other four stages. It is *always* a good idea to re-evaluate the assumptions made in the "concept formation" stages, if you have the time. In an ideal environment, it won't matter what order the stages are accomplished in, because the products of each will be re-evaluated several times during the process. You need continuous feedback, especially during the concept formation stages.

The concept of phasing operations over time is a key to the planning process. This concept assists you in thinking through the entire plan and in defining requirements in terms of forces, resources, and time. The major operations planned by each component must also be synchronized in time and space within the campaign plan in ways that exploit the synergistic effects of joint forces. Perhaps most important is the building-block nature of the component plans in relation to the theater campaign plan. Each component plan is related to the others. Component planning must not take place in a vacuum. All planning focuses on the goal of *achieving the theater objectives,* which mandates close cooperation and constant communication between planning teams. The individual stages in the process, as taught at JDACC, will be developed in detail in the remaining portions of section I.

Getting Started. Assemble and review the available planning documents and guidance--get a handle on the scope of the task. For example, refer to:

- Theater Campaign Plan (if available)
  - Annex A: Task Organization
  - Annex B: Intelligence
  - Annex C: Operations
  - Annex J: Command Relationships
- Intelligence and Logistics Estimates
- Joint Strategic Capabilities Plan (JSCP)
- Joint Publications

Each stage has desired products. At some point, the plan must be integrated and the products of each stage must be checked for their coherence with the products of other stages. If you are fighting with a coalition of nations, as you probably will be, you must take allied thinking, policy, objectives, and capabilities into account in every one of the five stages.

Getting Organized. The Joint Force Air Component Commander (JFACC), if appointed, has the responsibility of unifying joint and combined air operations for the Joint Force

Commander (JFC).[5] The extent of the JFACC's authority over theater air forces is determined by the JFC. **The process' final product, a Joint Air and Space Operation Plan (JASOP) forms the aerospace portion of the JFC's theater campaign plan and must fully support it.** The air campaign plan is the vehicle the JFACC uses to document his/her plan for unifying joint and combined air and space operations. Because the air campaign plan encompasses operations utilizing all aerospace weapons and supporting systems, the team developing the plan should represent all the supporting commanders providing resources to the campaign. Team members may be drawn from other Air Force commands and agencies, theater component commands (land, naval, or special operations forces [SOF]), other unified or specified commands, and allied nations, as appropriate.

Team Leadership. The team leadership requirement depends on the desired outcome of the planning effort.

a. If a completed, executable plan is required, then the team leader must be a senior decision maker with the authority to make hard decisions as they need to be made during the planning process.

b. If the plan is designed to present options to be selected at a later date, then the team leader might be a senior staff officer who can manage the planning effort.

Ad Hoc Versus Standing Committees. The right people may not always be available at the tasked headquarters. With the shrinking size of peacetime headquarters, staffs may not have all the disciplines and expertise needed to develop an executable campaign plan. The size and composition of the team and the unique nature of each contingency may make it impossible to establish a set structure or specific by-name team membership. Nonetheless, you will probably need expertise from *at least* the following specialties:

[5] For simplicity's sake, references to *combined* forces or components may be omitted from further discussion. The same principles set forth in the text apply to combined as well as joint operations.

- Specific weapon systems
- Plans
- Targeteering/Weaponeering
- Logistics plans
- Intelligence collection and analysis
- Counterintelligence
- Munitions (effects and disposal)
- Doctrine and strategy
- Air refueling
- Airlift (intra- and intertheater)
- Modeling/operations research
- Space Operations
- Information Warfare:
  - Information Protection
  - Information Attack
  - Deception
  - Psychological Operations
- Political-military Affairs
- Weather
- Judge Advocate General (JAG)
- Public Affairs (PA)
- Administrative support

This list of potential team members is not intended to be all-inclusive, nor is it intended to direct team composition. Team members may be able to cover more than one function since all functions may not be required simultaneously. Team composition prior to hostilities may be different from that needed for monitoring and executing the plan.

Operations (J3) or Plans (J5) should normally be the office of primary responsibility (OPR). It will work either way. Each function has its strengths as OPR for the planning process. J5 personnel have experience in the process of managing multidiscipline plan development and will be able to integrate the air campaign plan into the deliberate planning process. J3 personnel are current and skilled in the application of aerospace power and will be able to make the plan flow smoothly into the air tasking order (ATO) process. Ideally, the

team should draw upon the strengths of both plans and operations personnel.

During planning you can subdivide the team into working groups responsible for developing different stages or parts of the campaign. As an alternative, you can keep the team together and task other staffs to prepare different inputs. As soon as air objectives are identified, you can form a working group to focus on specific objectives. The method of work can take many forms and is beyond the scope of this volume.

Work will expand to fill available time. Set a schedule and stick to it. You will never have perfect information. You will almost always have conflicting information. You must build a plan based on your professional analysis and on your gut feelings or intuition (let's call that your "air sense"). If you do not know and cannot find out some important piece of information, make an educated assumption (documenting it as an assumption) or use a notional value. Refine the plan later.

Stage I: Operational Environment Research

You will usually find that the enemy has three courses open to him, and of these he will adopt the fourth.

--Von Moltke, the Elder

One falls into a feeling of security by mental laziness and through lack of calculation concerning the intentions of the enemy. To proceed properly it is necessary to put oneself in his place and say: What would I do if I were the enemy? What project would I form? Make as many as possible of these projects, examine them all, and above all reflect on the means to avert them. But do not let these calculations make you timid. Circumspection is good only up to a certain point.

--Frederick the Great

The result of research on the operational environment is termed "**intelligence preparation of the battlespace**."[6] In this stage, you gather information on the theater of war (a.k.a. the "operational environment" or "battlespace"). The goal of this stage is to understand the theater, enemy forces, and friendly forces as thoroughly as possible. This stage is normally supported by the Intelligence (J2) division or function, with Logistics (J4) and Plans (J5) assistance. Most effort in this stage should be focused on gaining information about enemy and friendly capabilities and the environment in which the conflict will take place. Intelligence inputs should begin with theater and national-level Intelligence Estimates of the Situation and Air Intelligence Estimates of the Situation, if available. Use these estimates as references to help sift the tremendous amounts of information J2 probably already has. You can find additional sources in the *Register of Intelligence Publications (S)* (a catalog of finished intelligence products) or on Intellink. In all cases, search open sources in print, broadcast media, and the internet. Important clues to the way an adversary thinks or acts may be found in open literature, history, and other cultural products. Examples of information needed include (but are not limited to):

[6] ACCPAM 10-751, FM90-36, etc., *Targeting: The Joint Targeting Process and Procedures for Targeting Time-Critical Targets*, 1 May 96, 4.

- History
- Geography
- Weather
- Culture
- Political systems
- Economy
- Religion
- Infrastructure
- International relations
- Connections to allies

- Forces:
  - Orders of battle
  - Recent war experience/ training
  - Doctrine/strategies
  - Support capability
- Geopolitical objectives
- Potential strategies
- Leadership personality/training

J3 and J5 usually contribute friendly elements of information. This should include information on available forces, command relationships (US and multi-national), rules of engagement (ROE), applicable treaties and agreements, base-use and over-flight rights, and similar matters. Force lists should be available in the Joint Strategic Capabilities Plan (JSCP), crisis action messages, service planning documents (e.g., the Air Force War and Mobilization Plan (WMP)), related operations plans (OPLANS), and in the theater campaign plan (if available). Remember that while you are working on the requirements for your campaign, forces

must be within existing or projected capabilities. Under the regional planning concept, all forces apportioned to your theater are available for planning purposes. If the Joint Chiefs of Staff (JCS) apportionment does not meet your requirements, ask for what you need. Treaties, agreements, and individual country rights agreements can usually be identified through the theater/unified command Judge Advocate General.

Logistics. "Logistics sets the campaign's operational limits."[7] Logistics experts contribute an examination of friendly and enemy logistic capabilities and contribute significantly to the selection of beddown locations for forces. Friendly logistics information is available from J4 in the Logistics Estimate of the Situation. Information on the enemy will come from J2 or national-level agencies (whom J2 can help you contact).

LOGISTICS IN CAMPAIGN PLANNING:
The Historical Perspective*

Unless we understand the events of **yesterday**, the difficulties of **today** are distorted and the successes of tomorrow may be delayed indefinitely. Operators need to understand basic logistics from the historical perspective in order to avoid repeating the errors of the past. Our operators' ignorance of logistics could lead to serious shortfalls in combat sustainability. From a historical perspective [*this example from World War II*] may be the most important logistics lesson available.

This story is told by Col Harold L. Mack, US Army (Retired), the logistics planner who personally developed the lines-of-communications plans for Operation Overlord (the Normandy invasion). The following passage, extracted from an Air Force logistics management study, reveals the primary military objective of the operation:

What's not well known about Operation Overlord is that the direct military objective of Overlord was neither strategic nor tactical, but logistical. The primary objective of the plan read: "To secure a clear lodgment on the continent from which further offensive operations can be developed." Since it was clear the war would be a battle of industries, we had to be able to rapidly deliver our industrial output to the front lines. The primary need, then, was for port facilities. The Normandy location was selected because of physical characteristics and its location between two major port groups—Cherbourg and South Brittany. Until ports could be taken, refitted, and opened, the beach had to handle the influx of troops and supplies.[1]

Colonel Mack relates,

There can be little question that a shortage of gasoline and ammunition, and other supplies, was primarily responsible for

Complete analysis of friendly and enemy logistics is essential for effective synergy between operations and support. This analysis should provide a model for planning the expansion of friendly logistics infrastructure, while highlighting the enemy's critical logistic nodes for future targeting. Factors to consider include in-place peacetime assets, war reserve stocks, host-nation support capabilities, air base conditions and capabilities, air and sea port capabilities, existing logistics infrastructure, and its ability to expand.

"Knowing oneself and the enemy allows employment of friendly strength against the enemy's weaknesses and avoids exposing friendly weakness to the enemy strengths."[8] But **beware of myopic viewpoints or ethnocentrism**. Do not "mirror-image" the enemy's strategy, doctrine, and thinking in your own terms. Try to evaluate enemy intentions by placing yourself in the enemy's position. **View the world through the enemy's eyes**.

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[7] Joint Pub 1, *Joint Warfare of the US Armed Forces*, 11 Nov 91, 46.

[*] Adapted from Col Gene S. Bartlow, USAF, "The Operator-Logistician Disconnect," *Airpower Journal*, Fall 1988, 23.

[8] Joint Pub 1, 35.

Evaluate enemy courses of action (COAs) as the enemy would, not how you would react in a similar situation. Finally, be aware of the biases and premises that underlie both your own decision making as well as the enemy's. Common sense and rationality may have different meanings in different cultures.

Most American leaders in the 1960s—military and civilian—thought that a "rational" North Vietnamese regime would see the futility of opposing overwhelming American material superiority and give up its efforts to conquer South Vietnam if "persuaded" by a finite amount of military pressure. The North Vietnamese, however, thought of each defeat suffered as only a temporary setback in the quest for a united Vietnam. That regime did a better job of analyzing us, realizing that we would withdraw if made to pay a high enough price in a war that was only marginally important to us. We "mirror-imaged" our adversary and suffered defeat in large part because of it.

our failure to inflict a decisive defeat on the Germans before the close of 1944.[2]

He further states that,

After months of planning, it became evident that, based on the original Overlord plan . . . we could not land and move enough tonnage to meet the demands of the various armies on their combat missions. The facilities, particularly the railroads and ports which would be captured . . . had not the capacity to enable us to move the tonnage needed to supply the armies in the field . . . .

I was always intrigued by the possibility of utilizing the excellent ports and railroads on the southern coast of Brittany fronting on the Bay of Biscay. Quiberon Peninsula, jutting out into the bay, seemed to offer excellent beaches for the landing of supplies because it could be approached from different directions in any kind of weather. One of the best freight railroads in France ran along the coast and, straight from there, east to Paris and Germany.[3]

A major change in Overlord would thus be required:

It involved the capture of Lorient, either the capture or isolation of Saint-Nazaire, and the reduction of the German installations on the islands facing the coast—a combined military and naval operation of major proportions." After many strategy meetings the plan "then was changed to include the capture of Quiberon Bay . . . . The operation was given the code name Chastity and was a very closely guarded secret.[4]

The Chastity mission was assigned to Gen. Omar N. Bradley's 12th Army Group. For various reasons, General Bradley and his subordinate, General Patton, relegated the logistics plan to a low priority:

As a result, Lorient and Quiberon were not captured; the Chastity plan of supply was never put into operation, and, although St. Malo and Brest finally were captured, proved to be completely useless from a logistical standpoint . . . .

While General Bradley planned classical campaigns, slow and methodical,

Level of Conflict. We must determine the **importance of the conflict from the perspective of each of the participants**. A conflict that is limited in nature to us—in which US national existence is not threatened—may be viewed as total war by the enemy or even by an ally (asymmetrical political objectives). For instance, an ally may place greater importance on resolution of the conflict than on protection of US national interests. Consider, for example, the spectrum of US interests in the Balkans, Korea, or the Middle East. The possibility of conflict in these regions, or the lack thereof, causes greater national anxiety to some of our allies in those regions than it does to the US. The survival of the US as a nation is not at stake in those simmering regional conflicts, but the survival of other nations could most certainly be imperiled. The comparative level of conflict must be addressed from national, allied/coalition, and enemy perspectives.

The Country X and the JFACC Estimate of the Situation conceptual tools (found in

Section II) are designed to help analyze the combat environment. These tools may prove helpful in providing some structure for your planning and thinking, but should not be considered as all inclusive nor used as complete checklists for air campaign planning.

General Patton displayed a quality of original thinking, improvising, hitting hard and fast, and anticipating in advance the enemy moves. General Patton later wrongly claimed, however, that the indications were that it was a deliberate withholding of gas from his army by higher authorities. He was wrong in this respect. There just wasn't enough to go around . . . .

Unfortunately for all concerned, his genius was curtailed and his victorious advance stopped because of the initial failure to carry out the Chastity plan, needed to keep him supplied. By September 1st, his army was short of everything—gas, rations, blankets, winter clothing."[5]

General Bradley "underestimated the logistical need for obtaining the use of Quiberon Bay and the railroads running east from there. These were most costly mistakes."[6]

It was the combat operators who failed to give logistics a coequal status with strategy and tactics. Or, as Rear Adm Henry E. Eccles pointed out, "Strategy and tactics provide the scheme for the conduct of military operations; logistics provides the means therefor."[7]

Logistics thus became a critical factor in one of the most important military campaigns of the World War II European theater. There are many historical lessons to be learned in logistics; we must learn and never forget them.

Notes

1. Lt Col David C. Rutenberg and Jane S. Allen, eds.*, The Logistics of Waging War, American Military Logistics, 1774–1985* (Gunter AFS, Ala.: Air Force Logistics Management Center, 1986), 84.
2. Col Harold L. Mack, *The Critical Error of World War II*, National Security Affairs Issue Paper no. 81-1 (Washington, D.C.: National Defense University Press, February 1981), 1.
3. Ibid., 3–4.
4. Ibid., 4–6.
5. Ibid., 8, 12, and 13.
6. Rutenberg and Allen, 90.
7. Rear Adm Henry E. Eccles, *Logistics in the National Defense* (Harrisburg, Pa.: Stackpole Company, 1959), 19.

Stage II: Objective Determination

We must perceive the necessity of every war being looked upon as a whole from the very outset, and that at the very first step forward the commander should have the end in view to which every line must converge.

--Carl von Clausewitz

The argument has been advanced that the Air Force should be concerned with land objectives, and the Navy with objectives on and over the water. That distinction is to deny the peculiar quality of the air medium, the third dimension. The air is indivisible; it covers land and sea.

--Gen Carl A. Spaatz

What are objectives? In campaign planning we are concerned specifically with military objectives. They constitute the aim of military operations and are linked to political objectives. For our purposes, **objectives are simply what we want to accomplish**.

Theater objectives should be obtained from the CINC/Joint Force Commander (JFC). **Objectives must be clear, concise, measur-able, attainable and must directly support the national-level objec-tives**. If the objectives you are given do not meet these criteria, then you must ask for more guidance. Do not stop planning while you wait, however. Make your best guess as to the commander's intent, make assumptions where necessary, and press on. The following guidelines may help in developing air objectives:

a. The sources of higher-level objectives (national and theater) are usually J3 and J5. Addi-tional guidance may often be found in the JSCP, JCS crisis action alert/planning/ warning/ execution orders (if available), and the CINC's theater campaign planning guidance.

b. Identify the theater objectives airpower can accomplish or support.

c. Develop clearly defined air objectives that achieve or support the theater objectives through the use of air and space power.

OBJECTIVE DETERMINATION
The Korean War—A case of changing political and national objectives while engaged in combat.

The Korean War clearly demonstrates the linkage between the political and military objectives. The political objectives changed three times during the conflict, mandating major revisions of and limitations to the campaign plans.

OBJECTIVE: Free the Republic of Korea

The Democratic People's Republic of Korea invaded the Republic of Korea on 24 June 1950. President Harry S Truman heeded the request of the United Nations Security Council that all members "furnish such assistance to the Republic of Korea as may be necessary to repel armed attack and restore international peace and security in the area."[1] This translated into guidance to United Nations Command Far East Command, then commanded by Gen Douglas MacArthur, "to drive forward to the 38th parallel, thus clearing the_Republic of Korea of invasion forces."[2] MacArthur accomplished this by first heavily reinforcing the remaining pocket of South Korean resistance around Pusan with United States military forces. Using these forces he pushed northward and executed the highly successful amphibious landing of two divisions behind enemy lines at Inchon. Airpower was used to wage a comprehensive interdiction campaign

d. Air objectives should logically flow from theater and national objectives. **If you cannot tie an air objective to either theater or national objectives, do not commit resources to it** unless you believe an objective has been overlooked. In that case, work up the chain of command to gain additional guidance and approval to add the objective. Some intermediate air objectives (those necessary to achieve the end goals of a primary objective) may not appear to be directly related to the theater objectives. They are, however, appropriate air objectives and should be included in the air plan. For example, some level of air and space control gained through counterair and counterspace operations will probably be a necessary prerequisite for a primary objective dealing with strategic paralysis.

e. **End States**. The politicians and commanders who direct use of military force must define the conditions desired for successful resolution of the conflict as well as what they want the region fought in to be like *after* the conflict. Such conditions define the desired *end-state* of the con-flict

against the enemy's overextended supply routes. United Nations forces achieved the original objective by October 1950.

OBJECTIVE, CHANGE 1: Free All of Korea

In view of the success at Inchon and the rapid progress of United Nations forces northward, the original objective was expanded. "We regarded," said Secretary of Defense Marshall, "that there was no . . . legal prohibition against passing the 38th parallel."[3] The feeling was that the safety of the Republic of Korea would remain in jeopardy as long as remnants of the North Korean Army survived in North Korea.[4] This was expressed in a UN resolution on 7 October, 1950 requiring "all necessary steps be taken to ensure conditions of stability throughout Korea."[5] MacArthur then extended the counteroffensive into North Korea. However, the enemy's logistic tail extended northward into the People's Republic of China. Because the United Nations and United States did not want to draw China into the war, targets in China were off-limits. For this reason, use of airpower was limited largely to close air

> The joint campaign plan is **based on the commander's concept**. The formulation of the commanders concept is the intellectual core of the campaign plan, which presents a broad vision of the required aim or end-state (the commanders intent) and how operations will be sequenced and synchronized to achieve conflict termination objectives (including required post-conflict measures).[9]

If the end-state is vague or unclear, you have the responsibility to go back to the commander and seek additional guidance. For example, the guidance should be more than just "win the war." What does that mean? Clausewitz warns us not to take the first step in war without also considering the last. What should the environment look like after the war is over? What constitutes

[9] Joint Pub 1, 47.

success? This defines the desired end state and the goal towards which all objectives should be directed. "From the envisioned end state, we can develop the operational objectives which, taken in combination, will achieve those conditions."[10]

f. **Restraints and Constraints**. The development of suitable military objectives, and the military strategy to achieve those objectives, is often **restrained** or **constrained** by external considerations. Such limits may be imposed by political authority, legal considerations (law of armed conflict), rules of engagement, or moral beliefs. All must be accounted for within the scope of the campaign plan.

Restraints prohibit or restrict certain military actions, such as the prohibition imposed on MacArthur in Korea against bombing targets north of the Yalu River in 1950 or Hitler's order (arguably in the hope of gaining a favorable negotiated peace with Great Britain) putting a temporary halt on the overrunning of France in 1940. Restraints may be constant, as the laws of warfare, or situational, as rules of engagement.

support. United Nations forces advanced to near the Chinese border. The second objective was achieved, temporarily at least, by November 1950.

OBJECTIVE, CHANGE 2: Seek Cease-Fire, Resolve by Negotiation

On 26 November 1950, the Chinese Communists launched a massive counterattack that shattered the United Nations forces, forcing a retreat from North Korea. MacArthur realized he was in a no-win situation and requested permission to attack targets in China. The Joint Chiefs of Staff's (JCS) guidance was neither to win nor to quit; they could only order him to hold. They vaguely explained that, if necessary, he should defend himself in successive lines and that successful resistance at some point in Korea would be "highly desirable," but that Asia was "not the place to fight a major war."[6]

On 14 December, at the request of the United States, the United Nations adopted a resolution proposing immediate steps be taken to end the fighting in Korea and to settle existing issues by peaceful means. "On 9 January 1951, the Joint Chiefs of Staff informed MacArthur that while the war would be limited to Korea, he should inflict as much damage upon the enemy as possible."[7] Limiting the conflict to Korea negated our ability to use naval and airpower to strategically strike enemy centers of gravity located within China. On 11 April 1951, Truman explained the military objective of Korea was to "repel attack. . . to restore peace. . . to avoid the spread of the conflict."[6] The political objectives and the military reality placed MacArthur in a difficult situation. MacArthur proved unwilling to accept these limited objectives and was openly critical of the Truman administration. Truman relieved him of command.

The massive Chinese attacks mounted in January and April of 1951 failed because of poor logistical support. United Nations forces sought to exact heavy casualties upon the enemy rather than to defend specific geographical objectives. As the Chinese and North Koreans pressed forward, their lines of communication were extended and came under heavy air interdiction attack. By May 1951, United Nations forces had driven forward on all fronts. With communist forces becoming exhausted, negotiations for a cease-fire began on 10 July 1951. The quest for the third objective finally ended on 27 July 1953 with implementation of a cease-fire that is still in force.

Notes

1. Robert Frank Futrell, *Ideas, Concepts, Doctrine*, vol. 1 (Maxwell AFB, Ala.: Air University Press, 1989), 293.
2. Ibid., 297.
3. Ibid.
4. Ibid.
5. Ibid.

[10] FMFM 1-1, 35.

6. William Manchester, *American Caesar* (New York: Dell Publishing, 1983), 617.
7. Futrell, 302.

8. Ibid.

> **Constraints**, on the other hand, **obligate the commander to certain military courses of action**, such as Hitler's insistence that Stalingrad be held which resulted in the loss of the Sixth German Army in 1943, or the political demand for a symbol of American resolve which necessitated the defense of Khe Sanh by the 26th Marines in 1968, although the position was of questionable military significance.[11]

Keep in mind that restraints and constraints may change during the planning phase. Such changes are more common during execution of the campaign due to operational considerations (success or failure on the battlefield), unanticipated occurrences (the political effectiveness of SCUDs during DESERT STORM, for example), or less tangible factors such as excessive combat casualties. DESERT STORM was a highly successful coalition campaign that also experienced extremely low friendly casualty rates, thus establishing a new and expected norm that could impose restraints in future conflicts.

g. Often, defeating the enemy forces is not the sole, or even the primary, object of war. According to Clausewitz, "war is an act of force to compel our enemy to do our will."[12] In war the object of using force is to influence the enemy to accept the end-state we desire. The destruction of enemy military forces is not, and never has been, the objective of war. Sun Tzu said, "Generally in war the best policy is to take a state intact; to ruin it is inferior to this. To capture the enemy's army is better than to destroy it. To subdue the enemy without fighting is the acme of skill."[13] Destruction of enemy forces should only be pursued in so far as they present an obstacle to achieving the desired end-state.

h. Air forces, to be effective in war, must successfully fight two battles. On the one hand, they must gain control of the air. On the other hand, air forces can have decisive effect through other offensive operations, including independent efforts and attacks supporting a surface scheme of maneuver. Remember that air and space power can impact all three levels of war (strategic, operational and tactical) and can perform independent, parallel, and supporting operations in sequence or simultaneously. Airpower's versatility is derived from this unique ability. The second battle involves war-winning offensive operations. Independent and supporting air operations may only be prosecuted with maximum effectiveness if enabled by control of air and space. Independent and supporting operations can be conducted without complete control of the air or space environments, but the expected gains must outweigh the risks.

Air objectives at the strategic and operational levels should be clearly spelled out and should directly support achieving the commander's objectives. Objectives for air operations in support of another component are best identified in conjunction with the supported component's requirements. The air campaign plan should clearly show the link between air objectives at the theater and national levels.

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[11] FMFM 1-1, 9-10.

[12] Carl von Clausewitz, *On War*, ed. and trans. by Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, c1976), 75.

[13] Sun Tzu, *The Art of War*, trans. Samuel B. Griffith (London: Oxford University Press, 1963), 77.

Stage III: Center of Gravity Identification

> *Center of Gravity: That characteristic, capability, or locality from which a military force, nation, or alliance derives its freedom of action, physical strength, or will to fight. It exists at the strategic, operational, and tactical levels of war.*
>
> --Joint Pub 0-1, Basic National Defense Doctrine

> *Direct attack of the enemy's strategic centers of gravity (by air, missile, special operations, and other deep-ranging capabilities) is closely linked to the joint theater campaign. Such attacks may be part of that campaign (as in Operation DESERT STORM), or comprise a joint campaign of their own (as in the Combined Bomber Offensive against Germany), closely coordinated with and affected by theater campaigns.*
>
> --Joint Pub 1, Joint Warfare of the Armed Forces of the United States

Within the framework of the five stage process, Stage I, Operational Environment Research, almost naturally flows into a more detailed, in-depth study of **yourself and your adversary** known as **center of gravity (COG) analysis**. This analysis should provide you with as clear a picture as possible of how an adversary functions; of his strengths, and of his possible vulnerabilities to dislocation and exploitation by air power. At the same time, the analysis should also point out your own vital strengths and their critical vulnerabilities to be defended.

Clausewitz was the first to apply the term "*center of gravity"* to warfare. He described a center of gravity as, "**the hub of all power and movement, on which everything depends**."[14] Clausewitz clarifies this description by stating that "the ultimate substance of enemy strength must be [traced back to the fewest possible sources, and ideally to one alone."[15]

Other writers have used terms such as "vital centers," "key nodes," "decisive points," or "critical vulnerabilities" to approach the same concept. They were partly right. The "hub of power and movement" itself is the "center of gravity." Take the "hub" away and the enemy system ceases to function or the enemy ceases to act against you. That "hub" has certain characteristics, *among them critical vulnerabilities*.[16] These vulnerabilities will naturally flow into target sets. From these target sets, individual targets can be identified and attacked as required to support the campaign's objectives. Given proper analysis, successfully attacking those targets will decisively affect the center of gravity.

Centers of gravity can take many forms. In the Pacific Theater during World War II, for example, the entire Japanese national self-concept was bound up in the person of the Emperor. The Japanese endured unbelievable sacrifice to keep him on the throne and only surrendered when the Emperor himself became convinced—through the impact of the atomic bombings—that his people had sacrificed enough. In this case, the COG was an individual, the Emperor himself, although he was not a target of direct attack.

During Vietnam, the will of American leadership to continue the war was a strategic center of gravity and it was made vulnerable through manipulation of public opinion by the North Vietnamese and opponents of the war at home. During Desert Storm, a component of Iraqi fielded forces—the Republican Guard—was both a strategic and an operational COG. This force provided Saddam Hussein with his most potent regional strike force in the theater (operational level) and kept him in power back home (strategic level).

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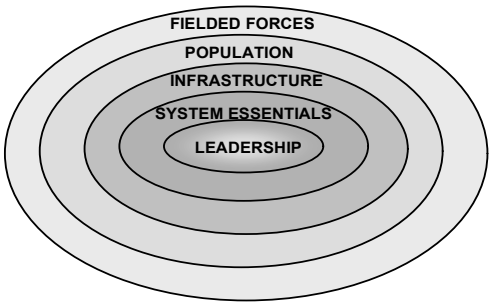
[14] Clausewitz, *On War*, p 595-6.

[15] Ibid. p 617.

[16] Remember that a center of gravity is a *source of power*; it is *not* a weakness. However, this does not preclude it, or certain portions or characteristics of it, from being *vulnerable* to attack. Like Achilles in Greek mythology or Samson in the Bible, a thing may be immensely strong and still be critically vulnerable in some exploitable way. While these vulnerabilities are *not the centers of gravity themselves* (they are characteristics of it), COG analysis seeks to find them and identify ways to exploit them.

Conceptual Models. There are a number of conceptual tools to help you perform center of gravity analysis. *Country X as a Candidate for Air Attack* (See Section II, page 54) is one format tool that can aid in center of gravity analysis. It provides a systematic method for identifying and analyzing centers of gravity. This tool has proven useful as a means not only of identifying *enemy* centers of gravity, but also in helping *prioritize* the associated target sets. The tool is equally useful for determining *friendly* centers of gravity—those essential areas that we must defend. In short, it is one method for translating conceptual air objectives into real-world target sets that we can apply air and space power against.

Colonel (Ret.) John Warden's *Strategic Ring* *Model* is another conceptual analysis tool. The five or fewer rings are not sacrosanct; you can use more or fewer rings to suit your particular situation. However, o*rganizing all possible centers of gravity within an enemy system into categories can be a valuable planning aid.* In analyzing a country, the centers of gravity within these rings can be further classified--using a using similar methodology. For example, offensive air capability (within the fielded military forces ring) might be further classified--using a method--to identify types of airfields and their associated critical elements such as command/control, maintenance, logistics, POL at the airfields, etc. In this manner it is possible to analyze potential target systems in great detail.



THE STRATGIC RING MODEL

SOURCE: John Warden, Brief: *Planning to Win*, Venturist Inc., 1998

Another powerful COG analysis tool is Dr. Joe Strange's CG-CC-CR-CV model. Dr. Strange defines a center of gravity (CG) as "primary sources of moral or physical strength, power and resistance."[17] The ability of a CG to perform certain functions at the strategic, operational or tactical level is what makes it a center of gravity. Strange labels these functions "critical capabilities" (CC). He defines them as "primary abilities which merits a Center of Gravity to be identified as such in the context of a given scenario, situation, or mission."[18] Disabling a Critical Capability will alter the nature of the COG in such a powerful manner that the COG is crippled and ceases to be a primary source of strength.

Critical Requirements (CR) are "essential conditions, resources and means for a Critical Capability to be fully operative."[19] A thorough systems analysis of each of a COG's Critical Capabilities will reveal many requirements that the CC needs in order to function. These

staff should:

1. Identify enemy and friendly centers of gravity

2. Identify those "critical capabilities" inherent in each center of gravity which enable it to function as a center of gravity (i.e., what things must each CG be able to do to exert the moral or physical power which makes it a CG).

3. Identify those "critical requirements" which enable each of the "critical capabilities" to be realized. (Example: if "mobility" is listed as a critical capability for a RED armored corps at the operational level, then "an effective POL supply and resupply system" would be an associated "critical requirement". Likewise, if "mobility during the **day**" were listed as a RED critical capability, the "a reasonably effective air defense system" would be another associated "critical requirement"—given, of course, the existence of a powerful BLUE air interdiction capability.

4. Identify "critical requirements" or components thereof which are deficient, or vulnerable (or potentially so) to friendly neutralization, interdiction or attack. These are the enemy's "critical vulnerabilities".

5. Devise a strategy, campaign plan, or plan of attack which takes maximum advantage of one **or more** enemy "critical vulnerabilities".

From: *Centers of Gravity and Critical Vulnerabilities*. Dr Joe Strange. P. 146

[17] Strange, *Centers of Gravity and Critical Vulnerabilities*
[18] Ibid. p. 43.
[19] Ibid. p. 43.

requirements must be evaluated to determine if they are *critical* to the CC. Only those requirements that, if removed, result in disabling the CC can be labeled as Critical Requirements.

Dissecting these Critical Require-ments will reveal some CRs or elements of them that are "deficient, or vulnerable to neutralization, interdiction or attack (moral/physical harm) in a manner achieving decisive results—the smaller the resources and effort applied and the smaller the risk and cost, the better."[20] These are Critical Vulnerabilities (CV). Because these vulnerabilities are critical, successful prosecution of one of them will cause a chain reaction back up through the CR-CC-CG chain that results in the neutering of the CG. Thus, CVs indicate the types of target sets that should be pursued in order to affect an enemy center of gravity.

Other Models. The Strategic Ring Model, Dr. Strange's model and Country X are only three of many analytical models available for evaluating enemy strengths and vulnerabilities. They are just among the simplest to use (and easiest to present). Another is Jason Barlow's National Elements of Value Model.[21] In this model, friendly and enemy systems are analyzed within the framework of seven categories: (1) leadership, (2) industry, (3) armed forces, (4) population, (5) transportation, (6) communication, and (7) alliances. The model has some of the disadvantages of Warden's strategic rings, but has the advantage of empha-sizing the "interlinking and variable lines of influence"[22] between and within the seven categories.

Staff or national-level intelligence experts can help you find and use more sophisticated and detailed tools. One of these, among the most useful available, is **nodal analysis.** Unfortunately, the details are well beyond the scope of this handbook. Nodal analysis is a very in-depth study of the *interconnections between system elements* and between a system and surrounding systems, which seeks to discover those "key nodes" within the system that, if removed, cause it to fail. If time and resources permit, you should attempt to conduct nodal analysis before choosing specific targets within a system. To use nodal analysis effectively, you must know the *effect* you wish to have upon the system and *how that effect supports higher-level objectives.* National-level agencies can help you with this process.

Whatever tools you use, they should help you produce a structured picture of all enemy and friendly centers of gravity. Using the air objectives from Stage II and perhaps a broad indication of strategy from the JFC as a filter, **select those centers of gravity that can be exploited with air and space power to accomplish campaign objectives and derive appropriate target sets from them**. *At this stage you are not selecting individual targets, but broad categories or sets of targets that represent critical vulnerabilities within your chosen COGs*. Leave the details of individual target selection and development until Stage V.

Independent COG analysis. Remember that this is a dynamic process. New information may force you to change which center of gravity or target set you've decided to affect. The NCA or JFC may change an objective or rule out a strategy. When this occurs, the logic of completing an unbiased center of gravity analysis independent of friendly objectives and strategies becomes clear. Changes in objectives and strategies can then be incorporated without the need to re-accomplish the entire analysis. An independent, thorough, and objective COG analysis is ideal if you have lots of time and information resources at your disposal.

Intelligence analysis is crucial throughout the process to extract the information most useful for defeating the enemy. "Intelligence should be timely, objective, responsive, complete, accurate and relevant."[23] As in Stage I, J2, J3, and J4 are key players during this stage with major contributions from intelligence targeteers for enemy COGs. Logistics and operations will help with assessments of friendly COGs. It may be useful to ascertain *what the enemy is defending.* He may have gone through the same process of determining his own COGs and their vulnerabilities, and will try to defend what he perceives as vulnerable.

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[20] Ibid. p. 43

[21] Maj Jason B. Barlow, *Strategic Paralysis, An Airpower Theory for the Present*, (Air University Press, Maxwell AFB AL, Feb 94), Chapter 5.

[22] Barlow, *Strategic Paralysis*, 63.

[23] Joint Pub 2-0, *Doctrine for Intelligence Support to Joint Operations,* 5 may 95, III-2.

Centers of gravity exist at all three levels of war. In fact, using Strange's model, the critical requirements of a higher-level COG often *become* COGs at the lower levels. For example, during World War II Royal Air Force Fighter Command was a Strategic COG for the British war effort. Their ability to quickly respond to Luftwaffe air attacks was a critical capability that established Fighter Command as a COG. In order to have that quick response, the British relied on their early warning system, comprised of forward observers, RADAR and decoded German message traffic. The British early warning system becomes an Operational level British COG.

The critical capability that defined the British early warning system was the ability to provide advance notification of German attack. A critical requirement of the system was the RADAR system employed by the British. German failure to recognize RADAR as a tactical level COG had serious operational and strategic implications for the German military effort against Great Britain.

	COG	Critical Capability	Critical Requirement
Strategic	Fighter Command	Respond Quickly	Early Warning System
Operational	Early Warning System	Notify Defenses Early	RADAR
Tactical	RADAR	Employ GCI Functions	Control of Electromagnetic Spectrum

Surface forces inevitably focus on tactical and oper-ational centers of gravity—usually only those immediately in front of them. It is in their nature: they fight in a linear battlespace. In most cases, they must fight their way through enemy surface forces in order to reach strategic COGs. Air-power, on the other hand, regardless of its parent service, has the inherent capability to rapidly and precisely strike centers of gravity at all levels of war, wherever they exist, simultaneously. In order to achieve the CINC's objectives, the campaign planner must ask the following:

- which COGs do I try to affect?
- how do I affect them?
- to what extent do I affect them?
- When do I affect them?"

The answers come from a comprehensive center of gravity analysis.

Types of attack. As campaign planners, your COG analysis should yield an understanding of which enemy systems are critical to his resistance of your will, which of these are vulnerable to attack, and which are feasible to attack. Attack, [24] of course, does not always imply physical destruction of a COG or its components. Centers of gravity may be attacked **directly** or **indirectly** (or in a combination of the two). ***Direct*** *attack*, as its name implies, involves *attacking the COG itself or engaging it in decisive combat*. ***Indirect*** *attack involves causing the same or similar effect by attacking a COG's supporting or related elements*. Another indirect technique involves attacking targets that may produce a new, more accessible COG. For example, if an individual national leader is identified as a COG, direct attack on his/her person might accomplish the objective of ending the war. If, however, such an attack is not allowed by national policy or the law of armed conflict, then you might have the *same effect* by attacking the leader's ability to communicate with the components of his system. During Desert Storm the Iraqis had a significant secure fiber-optic telecommunication system. The destruction of critical nodes within this system forced the Iraqis to use alternate methods to communicate—radio and courier. These methods were less efficient, but—more importantly—were susceptible to exploitation by friendly forces through monitoring and electronic combat.

[24] "Attack" encompasses assault by physical (e.g. bombs, infantry) and non-physical means (e.g. computer attack).

It is important to remember that center of gravity analysis is not crisis-dependent. It can be performed at any time and should yield substantially the same results. *The enemy's COGs are independent of friendly strategic and operational objectives and strategies*. Also remember that the process is ***iterative*** and information that becomes available after COG analysis is "complete" should compel you to re-validate your center of gravity analysis.

Parallel Attack. Centers of gravity should be attacked as systems. Airpower is unique in its ability to affect every facet of a COG. If POL is the COG, it can be attacked from the point where it comes out of the ground all the way to the point where it goes into a combat vehicle (or into an enemy leader's electrical generator). There may also be key elements in a COG's target set that look like they could bring down the COG if attacked independently, but which should be attacked in parallel with other elements (resources permitting) in order to stress the entire target system. This has the added benefit of reducing the impact of errors in your analysis caused by fog and friction, and further reduces the enemy's reconstitution potential. Hedge your bets by attacking as much of the system as you can afford—until you achieve your objective.

COGs and targets. Also note that *COG analysis does not lead to an exhaustive list of targets*. There are some targets, often unrelated to enemy COGs and their critical vulnerabilities, that must be struck, either to enable attacks elsewhere within the enemy system or to defend your own centers of gravity. An example of an enabling attack might be suppressing enemy air defenses (in a case where those defenses were not themselves identified as a COG) in order to strike a COG-associated target set deep in the enemy's country. An example of a defensively motivated attack would be Coalition efforts to suppress SCUD launches during Desert Storm. The SCUDs themselves represented a minuscule part of Iraq's military capability, but they were used to strike at one of *our* COGs: the US-Arab Coalition. Of course, attacking such targets diverts resources from attacks on enemy COGs, which have the potential to cause cascading enemy deterioration. Nonetheless, such attacks are often necessary. An intelligent enemy will attempt to cause you virtual attrition by forcing you to divert resources from attacks on his COGs. Anticipate this during planning by doing a thorough analysis of your *own* centers of gravity.

Friendly Centers of Gravity. Do in-depth COG analysis for your own side, but ***from the enemy's perspective***. This will tell you what to defend and may affect decisions about what to attack. Your analysis of enemy capabilities should tell you what friendly assets and capabilities the enemy can successfully attack and help you identify what types of defense are necessary. Often, the best defense is a good offense. Strike his capability to strike you before he uses it, but remember that each such attack may be stealing resources you could otherwise use to attack his COGs. Of course, if the enemy cannot attack a friendly center of gravity, don't waste resources defending it, but *don't underestimate the enemy either!* Remember the principle of the offensive: defense may keep you from losing, but offense is needed to win.

In summary, centers of gravity are those things from which an actor in a conflict derives his power or freedom of action. We analyze them in order to determine critical vulnerabilities within them that will yield the most effective use of air and space weapons in achieving a campaign's operational and strategic objectives.

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Stage IV: Strategy Development

> *Strategy is the employment of battle to gain the end in war; it must therefore give an aim to the whole military action, which must be in accordance with the object of the war; in other words, strategy forms the plan of war.*
>
> --Clausewitz

> *The strategist is he who always keeps the objective of the war in sight and the objective of the war is never military and is always political.*
>
> --Alfred Thayer Mahan

What is strategy? From a military perspective, strategy can be thought of as the orchestration of means to accomplish ends. As campaign planners, we are concerned with linking military strategy with national strategy to achieve national objectives. We accomplish this at the operational level of war, where **campaigns link tactical level engagements (the means), to achieve the military strategic objective (the ends).**

> Strategy is the use of armed force to achieve the military objectives and, by extension, the political purpose of the war. To those engaged in the direction and conduct of war, strategy often appeared more simply. . . as a system of expedients. But strategy is also based on, and may include, the development, intellectual mastery, and utilization of all of the state's resources for the purpose of implementing its policy in war.[25]

Understanding the term strategy is complicated by the fact that it has a variety of meanings. Making this point while addressing the Army War College in 1939, Colonel Ned B. Rehkopf said, "Everyone who writes on the subject of strategy finds it necessary to define his understanding of the meaning of the word. As a result there are as many definitions as there are writers. Admiral Castex, for example, quotes nineteen different definitions and then makes up one of his own."[26] If anything, the number of meanings has grown since 1939.

For our purposes, strategy is **how** forces are employed to accomplish military objectives. The operation or campaign plan communicates the CINC's/JFC's strategy. "The joint air strategy states how the JFACC plans to exploit joint air capabilities/forces to support the JFCs objectives."[27] **The product of this stage of planning is a clear statement of how the JFACC intends to achieve each air objective**.

Air strategy at the operational level uses terms like *control, paralyze, isolate, neutralize, attrit, delay, disrupt, decapitate*, etc. A strategy statement links the strategy to the objective(s) it is designed to achieve. For example, the objective, "reduce enemy military capabilities to defensive only" could be met by any of the following strategy statements: "Paralyze the enemy's warfighting ability to prevent further aggression by precisely striking vital targets;" or, "isolate enemy leadership from their fielded forces to prevent coordinated military operations by attacking lines of communication;" or, "attrit the enemy's fielded military forces to eliminate their offensive capability by channeling and destroying them as they advance." Often the JFACC's strategy will be a combination of several strategies. For example, in some circumstances, the three sample strategy statements above could be combined to form an overall strategy statement to achieve the objective.

The following may be useful to the planner in identifying an air strategy to accomplish the air objectives.

a. As with objective determination, the sources for strategy guidance are usually the J3 and J5 functional areas.

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[25] Peter Paret, ed., *Makers of Modern Strategy: From Machiavelli to the Nuclear Age* (Princeton, N.J.: Princeton University Press, c1986), 3.

[26] Russell F. Weigley, *The American Way of War: A History of the United States Military Strategy and Policy*, (Bloomington IN, Indiana University Press, 1977), xv.

[27] Joint Pub 3-56.1, Command and Control for Joint Air Operations, 14 November 1994, III-4.

b. National strategy is the foundation for operational strategy. National and theater strategy statements should be analyzed in developing air strategies. The National Security Strategy of the United States, the National Military Strategy, and the JSCP are all sources of strategy statements and concepts. The theater and/or operational strategy should be available from the theater CINC/JFC and be outlined in the Theater Campaign Plan.

c. This review of national and theater strategy will indicate whether the commander's objectives and strategy anticipates an independent, parallel and/or supporting air strategy. It will probably involve all three. Does the CINC's vision for employing airpower include strategic attack options? Does his strategy require sequential air operations, or will air superiority and force application missions all occur simultaneously? The latter probably offers the best chance for imposing shock throughout an enemy system. It is part of your purpose as airmen to present the best ways to employ air and space power. If you can offer the CINC better alternatives for achieving national and/or theater objectives, then build your case and present it. The staff feedback loop may be useful. The airman's vision, at the heart of the campaign planning process, is essential to ensure proper and effective employment of air and space forces.

Air and space power expands the options for the conduct of war. Historically, surface warfare has pursued one of two general strategies—annihilation or attrition. Annihilation requires the destruction of the enemy's armed forces and the complete overthrow of the opponent. Attrition seeks to exhaust the enemy or erode his military strength to the point where he agrees to abide by your will.[28]

Since it has the ability to bypass fielded forces and directly attack other essential components of the enemy's power system, air and space power makes

[28] For a discussion of annihilation and attrition strategies and America's use of them, see Weigley, *American Way of War*.

another strategy available—**parallel warfare**.[29] **The goal of parallel warfare is to control the enemy's power structure in such a way as to render him unable to oppose your will**. It recognizes that destruction of targets is not the goal in war. Rather, the aim is to impact targets in such a way as have predetermined desired effects. This concept opens up a great many more possibilities to exploit the unique advantages gained by operating in four dimensions (two horizontal, the vertical, and time).

This "new" strategy, while an intellectual extension of the *Blitzkrieg* concept into the vertical dimension, has only quite recently become possible due to technological advances in precision, stealth, and information dominance. During World War II, so called "precision daylight bombing" required air armadas numbering hundreds of aircraft, dropping tens of thousands of bombs to attack a single target. By the Vietnam era, the number of bomb droppers required had been reduced significantly—perhaps 10 to 20 sufficed. However, in order to overcome advances in enemy air defense capabilities, force packages nearing 100 aircraft were still required to protect and support the strike aircraft attacking a target. In the Gulf War, one stealth aircraft could achieve equivalent results more effectively by dropping one precisely guided weapon. Today, with even more advanced weaponry, defense-negating technology, and information systems, one aircraft can impact several targets in a single strike. A modest force structure can thus attack many segments of the enemy's essential systems simultaneously. The effect sought is enemy paralysis. When the enemy realizes he is powerless to resist, he will likely comply with our desires. Even if he does not, this paralysis will greatly facilitate—even enable—other components' efforts to impose our will. Since widespread destruction of civilian targets is not required

STRATEGY DETERMINATION: A COMMANDER'S VISION*

Gen George C. Kenney, Commander, Allied Air Forces Southwest Pacific and Commander, Fifth US Air Force*

The commander's concept is his supreme contribution to the prospect of victory on the battlefield whether he is at the tactical or operational level. Without a sound and dominating concept of operation, no amount of command presence, personal flair, years of rectitude, demonstrated integrity, advanced degrees, perfectly managed assignments, warrior spirit, personal courage, weapons proficiency or troop morale can hope to compensate.[1]

If air strategy is how the JFACC plans to use aerospace power to achieve his air objectives and the air campaign plan is how he communicates this strategy, then the JFACC's vision is the foundation on which it is built. His vision, of course, must be in concert with the JFC's and support his campaign plan. At the same time, the specialized competence of the JFACC, as an airman, plays a key role in the effective employment of aerospace power.

General Kenney provides an excellent example of this concept. When Kenney reported for duty in July 1942, he had a vision of how he wanted to prosecute the war in the Southwest Pacific Area (SWPA). He successfully communicated that vision to the theater commander, General MacArthur. In his second meeting with MacArthur, after a whirlwind tour to assess his forces, he proposed a general course of action to gain air supremacy over the theater. MacArthur readily approved his plan. Kenney was acutely aware of the need to continue attacking Japanese shipping at every feasible opportunity to support Navy operations. But, he was able to convince the theater commander that these efforts were not going to achieve any significant results until the air war was won.

[29] See Col David A. Deptula, *Firing for Effect: Change in the Nature of Warfare*, Aerospace Education Foundation, 1995.

* Adapted from Maj Charles Westenhoff, "Aggressive Vision," *Airpower Journal* 3 (Fall 1989), 35–49.

to achieve the desired effect, this strategy reduces the human suffering and long recovery periods of former wars (and the financial burden often borne by the US can be avoided).

As non-lethal weapons and information warfare capabilities mature, the ability to control essential enemy systems without widespread destruction will increase and the parallel strategy of war will become even more effective.

General Kenney's vision for the theater included solving the logistical problems associated with an AOR that spanned immense distances. Because his squadrons were locally outnumbered, they could be easily overwhelmed any time the Japanese chose to concentrate their forces. He had to simultaneously build up his in-theater forces while also prosecuting an air war over New Guinea from bases primarily in Australia.

As the campaign began (August 1942), Kenney used what he had to create the conditions for success. In other words he had to apply operational art. Prior to his arrival, air operations had mostly consisted of sending whatever bombers were available against whatever target was handy. General Kenney changed all that beginning with his little “big raid” against Rabaul on 7 August. By massing his available bomber forces, thirteen B-17s got through to the target—the primary Japanese air base at Vunahanau southeast of Rabaul. Kenney had taken the first step in implementing his vision. The next step was to stop the advance of Japanese forces in New Guinea and establish an Allied foothold on the northern coast. The battle for Buna became an example of a joint/combined operation to gain forward air bases. In perspective, Kenney established temporary, local air superiority to create conditions for later air supremacy. The next key step to implementing his vision of the theater was the Battle of the Bismarck Sea. In order to continue occupying their forward bases in New Guinea the Allies needed to stop the Japanese from reinforcing their forces on the island. Kenney's air forces were the only operationally effective arm available. Imperial General Headquarters in Japan ordered two fresh divisions, originally intended for the Solomons, diverted to Rabaul to load up for New Guinea. Japanese staffs planned a convoy operation for early March 1943. Kenney's combined Royal Australian Air Force (RAAF) and Fifth AF aircraft succeeded in destroying eight of eight freighters and four of eight destroyers. In so doing, he defeated not only the convoy but the Japanese strategy as well. After this battle, Japanese planners never again attempted to reinforce their New Guinea forces with large ships. “Without bulk

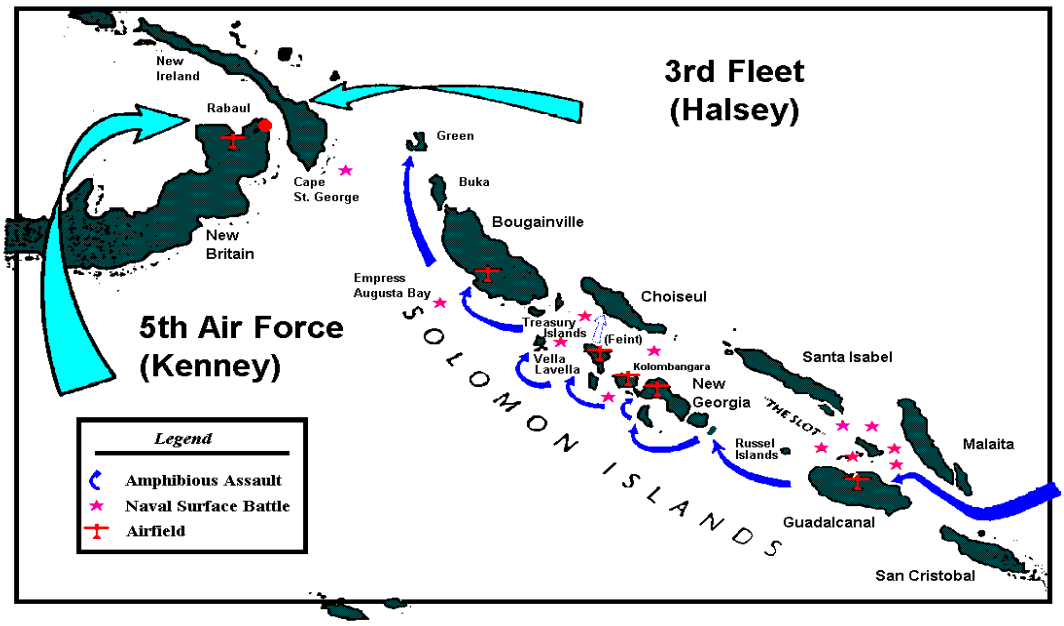

Figure 3 The Solomons Campaign, 1942-3
Source: Air Command and Staff College

shipping, Japanese air forces in New Guinea lacked the means to sustain the long fight for air superiority."[2] Deficient shipping weakened the Japanese land forces as well. "Finally, the burden of resupplying ground forces in New Guinea in the face of the Allied air threat increasingly tasked Japanese submarine forces."[3]

Control of the air, and thus the sea, allowed MacArthur and his small amphibious force to begin a series of enveloping operations, spearheaded and guarded by air from a succession of forward bases—a concept of operations that Winston Churchill would call "triphibious" warfare. The most important result of the Battle of the Bismarck Sea was qualitative, not quantitative. Japan could replace 12 or so ships, but the Japanese strategy couldn't be repaired or salvaged. In simple numerical terms, Kenney should have been out of business in the air war. Before this battle, his monthly losses always exceeded his replacements, while Japanese air strength in New
Guinea continued to grow until September 1943. Numbers of available forces became key considerations when, in Napoleon's traditional campaigns, mass armies overwhelmed smaller armies. But, in modern campaigns, comparing numbers of assets available for battle can be simplistic. Availability is a matter of degree for modern forces, especially air forces. Operational decisions of force disposition, command and control, equipment, training, and tasking are key to making forces both effective and available for a given mission. And Kenney addressed all these factors to achieve decisive results.

Kenney's operational approach (or vision) is best illustrated by counterair operations. In response to the Battle of the Bismarck Sea, Japanese air forces attacked Kenney's three largest air bases in overwhelming strength during April. Within four days they attacked each base once. But, when Kenney rebuilt his force and mounted his counterair campaign in August, he attacked each Japanese base in numerous waves for several days—the target bases did not recover. Both forces put overwhelming numbers over their targets, but the Allied operation, quick-turning from forward bases, was persistent enough to produce decisive results.[4]

Since numbers did not decide the outcome of the New Guinea campaigns, something else—some qualitative difference—must have been important. It wasn't simply airplanes and crews. The difference wasn't tactics either, a fact that Kenney's crews attested to.[5]

The value in studying Kenney's SWPA campaign to understand strategy determination has been stated clearly in Major Westenhoff's *Airpower Journal* article.

> *The only qualitative edge Kenney could employ to offset his strategic and tactical disadvantages was his own operational skill. And, as one examines his actions, a pattern becomes evident: concentration*

on one objective, surprise, moving forces, logistics, throwing every useful asset into the right fight at the right time . . . Kenney's operational decisions flesh out the principles of war with remarkable consistency.

It was not that Kenney consciously applied the principles of war. The point, for us, is that these principles help us understand his brilliance. Perhaps more important, studying concrete examples such as Kenney's campaigns builds a broader understanding of the principles of war, making them more useful and campaign lessons more memorable. By applying the principles of war, not as rote but as a means to recognize good and bad military operations, anyone with sufficient expertise in air power might plan sound operations with effective results.

In the final analysis, General Kenney had an operational perspective on his theater that paid tremendous dividends in joint operations as well as air campaigns. He saw the possibilities of airlift, forward bases, and antishipping operations, and MacArthur approved his proposals. Soon after the Battle of the Bismarck Sea, MacArthur would state that the purpose of operations in his theater was to advance the line of air bases.[6] Kenney's vision provided MacArthur with a broader, more effective view of his theater and its strategic possibilities. His vision of possibilities—his drive to control the air over New Guinea from the start—provided a coherent direction for tactical, operational, and strategic choices. Kenney's unity of purpose provided the aim and momentum for MacArthur's command and its course to victory. The unity of purpose shared by these commanders, especially as it contrasted with the fragmented efforts of their opponents, was the foundation for joint success.

Notes

1. Gen William E. DePuy, "Concepts of Operation: The Heart of Command, the Tool of Doctrine," *Army*, August 1988, 26–40.
2. Toshiyuki Yokoi, "Thoughts of Japan's Naval Defeat," in *The Japanese Navy in World War II: In the Words of Former Japanese Naval Officers*, ed. and trans. Dr David C. Evans (Annapolis, Md.: Naval Institute Press, 1986), 514.
3. Gavin Long, *The Six Years War: A Concise History of Australia in the 1930–45 War* (Canberra, Australia: Australian War Memorial and the Australian Government Publishing Service, 1973), 292.
4. Wesley F. Craven and James L. Cate, eds., *The Army Air Forces in World War II*, vol. 4 (Chicago: University of Chicago Press, 1950; Washington, D.C.: Office of Air Force History, 1983), 159–61, 178, 80.
5. Edward T. Maloney, ed., *Fighter Tactics of the Ace's S.W.P.A.* (Corona Del Mar, Calif.: World War II Publications, 1978, passim; Lex McAulay, *Into the Dragon's Jaws* (Mesa, Ariz.: Champlin Fighter Museum Press, 1986), 11.
6. General Headquarters Warning Instructions 2, 6 May 1843, quoted in John Miller, Jr., *Cartwheel, The Reduction of Rabaul* (Washington, D.C.: Government Printing Office, 1959), 29.

Stage V: Joint Air and Space Operations Plan Development

> *The art of war requires the intuitive ability to grasp the essence of a unique battlefield situation, the creative ability to devise a practical solution, and the strength of purpose to execute the act.*
>
> --Fleet Marine Force Manual 1, *Warfighting*

Joint Air and Space Operations Plan (JASOP) Development details how joint air forces will support the JFC's campaign plan. Look in Section II of this handbook for a suggested JASOP format. During this stage of the process you should apply some basic planning philosophies. First, plan for the worst-case scenario, using the Commander's Estimate of the Situation and the JFC's/CINC's guidance. Second, do not plan on the margin. The enemy will probably be a moving target, so don't expect him to dig in for the duration as in DESERT STORM. Friction and the fog of war will quickly overwhelm you if you don't have reserves and options. Excess sortie generation capability over and above planned rates is usually the airman's "reserves." The bigger the margin you plan for, the longer you can maintain your planned course before you are forced to change it.

a. The Joint Air and Space Operations Plan **harmonizes the various air and space power functions**. It integrates the efforts of the other services, nations, and components that use the air. You must gain a thorough understanding of service, joint, and coalition airpower doctrine, limitations, and capabilities to be able to achieve theater objectives.

b. The plan **identifies desired effects, targets, and measures of effectiveness (MOEs)** in as much detail as time and available intelligence allow. **Target selection should always be based upon the effects you wish to have on enemy centers of gravity (or critical elements within them), which in turn should be based upon your overall objectives for the conflict**. Remember that physical destruction of a target will often be possible, but may not be the best way to achieve theater objectives. Non-destructive disruption or neutralization may provide the required wartime results and better support the overall theater end - state. You should also develop measures of effectiveness for your desired effects that tell you when you've achieved them and to help simplify re-attack decisions. Selecting desired effects, the means to achieve them, and the MOEs for them is an integral process called **effects-based targeting**. In effects-based targeting, the actual targets struck and the means to strike them are less important than the underlying contribution striking them makes toward achieving your theater objectives. The alternative method of targeting ("input-based"),

> Focuses on *inputs* to the battle; it concentrates mechanically on the number of sorties and ordnance delivered. The [effects-based] approach is based upon *outputs*. . . . Given a desired *systemwide* failure, what component will
> provide the necessary failure when destroyed? The process is analogous to determining what will cause a bridge to collapse, for example, rather than asking about the effects of destroying a single supporting pier [Emphasis in original].[30]

You should start the target selection process by knowing the COG you want to affect, the effect you want to achieve against that COG, and the objective(s) that the effect supports. Analysis of the COG should have yielded a set of potential targets that are vulnerable to some form of air, space, or information attack. From this set, you can now compare your capabilities against the list of targets to select a match

[30] Maj Stephen M. Rinaldi, *Beyond the Industrial Web: Economic Synergies and Targeting Methodologies*, Air University Press, Maxwell AFB AL, Apr 95, p 34.

that has the best chance of achieving the desired effect. For every target you thus decide on, determine the **"3 D's" of effects-based targeting:** the ***level of disruption,*** the ***distribution,*** and the ***duration of the effect***. These criteria will help guide your measures of effectiveness for that target. The level of disruption can be expressed quantitatively (e.g. "70% degradation") or functionally ("no emissions from system X," "units operating autonomously"). The distribution expresses *how widely you want to affect the target*. This can be expressed geographically or functionally. Duration, of course, is *how long* you want to affect the target. In all cases, the "3 Ds" should support your desired effect. Some questions to ask during the target selection process include:

- Will affecting this target or target set satisfy an objective?
- How will we know when we've reached the goal?
- Can this target be attacked by air or space power?
- Can we afford to attack this target? What is the risk?
- What will be the impact on US public opinion? World opinion? Allies? Neutrals?
- Can we attack this target set with minimal collateral damage?
- Have we considered the Principles of War and the Tenets of Air and Space Power?

c. In concert with target set selection, the plan must identify **combat assessment criteria**, including the **Measures of Effectiveness**[31] (also called "measures of merit") and the Essential Elements of Information (EEIs) that Intelligence should collect to support these MOEs. **Measures of Effectiveness are used to *define success***. Generally, a MOE should answer the question, **"how do I know when I have achieved the objective?"** MOEs can take many forms. They can reflect levels of destruction, such as "destroy unit X" or "reduce the Republican Guards Divisions to 50% combat potential." They can convey functional effects, such as "sector X of the enemy air defense system rendered unable to effectively impede friendly air operations for X days." However, to be useful as a gauge of combat effectiveness, a measure of effectiveness ***must*** **be meaningful, reliable, and observable.** To be meaningful, the MOE must be tied to achievement of the campaign's operational and strategic objectives. To be reliable, it must accurately express the intended effect. In other words, what does a "50% reduction in combat potential" *mean* in terms of the conflict's objectives? If you are going to use quantitative measures, they must reliably convey the effect you wish to achieve. If a MOE cannot be observed by intelligence collection methods, it probably cannot be used as an effective measure of success or failure on the battlefield. It is extremely important to *have a plan for intelligence collection that supports your MOEs. W*hat must your intelligence, surveillance, and reconnaissance (ISR) assets observe and analyze? What assessment limitations will you likely have? For instance, will you be able to measure if combat vehicles have been destroyed, hardened shelters have been rendered useless, or a unit has been made combat-ineffective? You must document the criteria associated with the MOE analysis of each target set.

d. The plan must **prioritize target sets**, providing guidance on which targets are most important to the campaign. Keep in mind, though, that priority does not necessarily dictate the order in which you attack targets. Theater objectives, available forces, doctrine, and the immediate situation may dictate the order in which attacks occur. Some targets are "perishable" and must be attacked within a limited time window to be fully exploited. Other targets must be struck first to *enable* attacks on other parts of an enemy system. Some targets should be struck in parallel with other targets in order to have the maximum system-wide impact. There is no magic formula for dealing with this tension between priority and time-sensitivity. This is one reason "operational art" is called an art.

[31] "Effectiveness" refers to the measure of both the immediate, physical, or direct effects of a mission, as well as the operational-strategic purposes, that the mission actually achieved.

e. The plan should **identify the level of effort** to be used against targets. This is not the same thing as priority. Here you must decide if a given target is important enough to delay attacking other targets, or even delay the start of another phase, until you've achieved the desired effects. In some cases, limited resources may force you to move on when the allocated level of effort has been expended against less important targets, regardless of the effects achieved. Tasks with high associated levels of effort will probably be the determining factors in your phase transition decisions.

f. The plan must **identify phasing and synchronization**. A phase is a period during which large portions of your forces are involved in similar or mutually supporting activities. They are usually defined by the accomplishment of *one or more related goals or objectives*. Transition from one phase to another indicates a shift in emphasis for the campaign. For airmen, this will often—but not always—involve a shift in apportionment. *All phase objectives, missions, and tasks must accord with and help achieve the theater commander's objectives*. Air and space missions must be phased and synchronized within the JASOP. The JASOP itself must also be phased

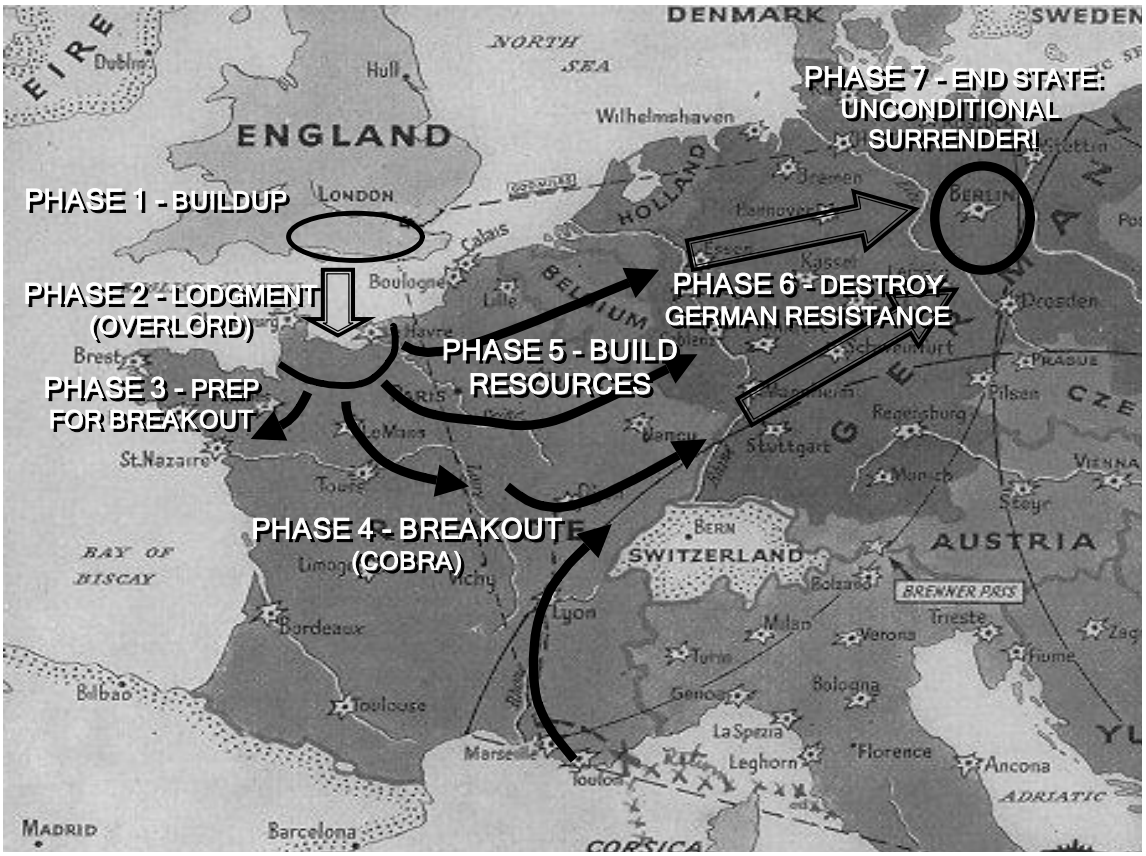

Figure 4. Phases of a Campaign: Eisenhower, 1944–45
Source: Gen Dwight D. Eisenhower, *Crusade in Europe* (Garden City, N.Y., 1948

and synchronized with the plans of the other components to ensure smooth coordination of air, space, and surface operations. The JFC may or may not provide guidance on phasing, but if he does, this must also be incorporated in your planning (1) Early phases normally have air and space control as high priorities. Depending on the enemy threat, you should consider the need for defensive counterair to protect friendly centers of gravity and deploying

forces as soon as you enter the theater. This is usually fairly easy to plan for. Planning for offensive counterair operations will require much more in-depth analysis of your enemy as a system. You must determine the numbers and types of platforms, sorties, and munitions needed to strike enemy air and space assets and suppress enemy air defenses. Similarly, you must define the level of theater or local air and space control required to achieve your theater objectives.

Remember, air and space control are not usually ends unto themselves, but they *enable* you to do other things.

(2) Another early priority for air and space planners is determining how to dislocate and exploit the enemy system as quickly as possible across the full spectrum of its operations. The airman's most valuable tool in this effort is strategic attack. Strategic attack (SA) consists of those operations designed to have war-wide effects by striking directly at the enemy's centers of gravity, without first having to engage their fielded forces. SA usually represents the most efficient use of airpower, since it is designed to have the most far-reaching impact with the least expenditure of resources. Some level of SA will be required in almost any contingency, even if it does not involve the physical destruction of targets or is deliberately limited in time and scope. Planning for strategic attack, however, requires the most intricate analysis of enemy systems and centers of gravity. You must determine *why, when, how, and for how long* you intend to affect your targets. Planning for SA usually involves the toughest decision making, too. You must weigh such factors as legality, political and moral

PHASING, SEQUENCING, AND SYNCHRONIZATION

The Campaign for Europe 1944–1945

On 12 February 1944 Gen Dwight D. Eisenhower received the directive for planning and executing a forced entry onto the continent of Europe, with the goal of defeating Germany. The directive framed the scope of the undertaking. It provided the task, designated command relationships, assigned logistics responsibilities, and defined the relationship to Allied forces in other areas. At the same time, the directive specified the re-establishment of governments in liberated countries.[1] Clearly one military *operation* could not accomplish all of the tasks. Such an undertaking would require several linked operations designed to achieve the task; in other words, a *campaign.* The operations comprising a campaign normally cannot be accomplished all at once; they are phased.

Phasing is the method of dividing a campaign into manageable parts. Each phase has objectives designed to accomplish the overall campaign objectives. Phases constitute the building blocks of the campaign. A classic example was the Allied plan for invasion of Europe in June 1944. This campaign plan was laid down at staff meetings prior to D day and "never abandoned, not even for a moment."[2]

The phases for the plan were as follows (illustrated in Figure 4):

1. Build up combat and support forces in Great Britain.
2. Secure lodgment on the coast of France.
3. Build resources for a breakout.
4. Drive to German border/Rhine river, destroying German forces west of the Rhine.
5. Build resources for operations in Germany.
6. Launch a two-pronged envelopment of the Rhur; destroy German resistance.
7. Force unconditional German surrender.

Eisenhower's plan demonstrated an important characteristic of phasing. If planned properly, phases will break out *sequentially* into blocks of tasks, accomplished during a given period of time, aimed at achieving a common goal or set of goals, and all designed to support the campaign's ultimate *end state*. A phase's goals are necessary preparatory steps for the following phases. During Eisenhower's

campaign, for example, Allied leaders Bradley and Montgomery expanded the Allied bridgehead immediately after D-Day and built up forces (Phase 3). This had to happen before General Patton could lead his tanks out of the bocage country at the beginning of Phase 4 (Operation Cobra). Each phase built upon the phases before it and each intermediate step was necessary in order to achieve the final end state: Germany's unconditional surrender.

Of course, friction and the "fog of war" inevitably take their toll, so some tasks or goals designed to be achieved concurrently are delayed or accelerated, changing the entire campaign's timeline. Following the Normandy breakout, Montgomery's progress up the Belgian coast toward the Rhine was slow and deliberate—slower than Eisenhower would have liked. Patton's progress, on the other hand, was so fast that his fighting units outran their logistical support. The delays involved in re-aligning the various armies' efforts and sorting out logistics gave the Germans the opportunity to launch their Ardennes counter-offensive (the "Battle of the Bulge") in December 1944.

Sequencing and synchronization of operations are important elements of phasing. Sequencing, or arranging parallel operations in discrete blocks of time, aligns phases to support the broad scheme of the campaign. Synchronization aligns the component forces used in a given phase with the common goal or goals within each. For example, "In the spring of 1944 all Allied air power in Britain was placed temporarily under the direction of General Eisenhower, and he instructed it to isolate the proposed invasion beaches... [from interior lines of communication] by ruining the transportation systems."[3] The immediate need to support the D-Day campaign's lodgment and was deemed temporarily more important than pursuing the (related but separate) objectives of the Combined Bomber Offensive.

In the overall phasing of the campaign plan for Germany, consider how each major offensive phase was preceded by a logistics buildup: first in Britain, then on the Normandy beaches for breakout, and finally along the western German border. This sequencing was essential to ensure adequate support for the thrusts across the Rhine. As Patton's run to Rhine proved, logistics often sets the tempo of a campaign, as well as its limits.

Notes

1. Directive to Supreme Commander Allied Expeditionary Force, 12 February 1944.
2. Gen Dwight D. Eisenhower, *Crusade in Europe* (Garden City, N.Y.: Doubleday, 1948), 229.

constraints, the prospect of collateral damage to targets, and potential use of SA resources for pressing battlefield needs against the potential benefits of attack.

(3) Counterland missions are often driven by ground force operations, but can be conducted as independent air operations, or with surface operations acting in support of air (as in the Battle of Khafji, for example). Interdiction, from an airman's point of view, is more efficient in preparing and shaping the battlespace than is close air support (CAS). Interdiction may be used deep within enemy territory to achieve decisive operational or strategic effects without friendly troops having to come in contact with the enemy. Indeed, an enemy's fielded forces (or some part thereof) are often an operational-level center of gravity and so affecting them can have decisive *strategic* consequences. (Whether the sorties intended to impose these effects fall into the "SA" or "counterland" apportionment boxes is largely irrelevant.) Interdiction and strategic attack operations will have longer-lasting effects than CAS will. However, in a given period of time, CAS may be your most important mission. And *if CAS is the theater commander's number one priority, then it is also* ***your*** *number one priority.* The needs of those supported drive the level of effort and the phasing of these supporting operations. Even though these are *supporting* operations, air and surface forces acting as a team usually have a profound synergistic effect against enemy surface forces. Even though aerial interdiction may halt (or even destroy) an enemy surface force by itself, the effects are multiplied exponentially if the

3. Russell F. Weigley, *The American Way of War* (New York: Macmillan, 1973), 343–344.

enemy is also forced to maneuver against you (and consume resources).

(4) When conducting counterland operations, keep in mind the importance of the ***psychological effects of airpower upon enemy surface forces***.[20] The JFACC should consider making the destruction of enemy morale an objective of those phases involving direct action against enemy surface forces. Some things to consider when planning to affect enemy morale include,

(a) Plan to *keep enemy forces under air attack (or threat of attack) around the clock for a protracted period*. Even if your air forces are just transiting the battlespace over enemy troops, there is a psychological advantage to be gained from enemy troops just seeing or hearing them overhead. For this reason, also resist planning cease-fires or other temporary halts in the air campaign unless resource or other constraints mandate them.

(b) *Deny food and water to enemy forces* by attacking depots, interdicting LOCs and destroying "soft" supply vehicles. Experience has shown that round-the-clock armed reconnaissance/strike sorties along enemy supply routes can prove so intimidating to enemy drivers that they will refuse to drive resupply missions.

(c) *Consider using area effects*, such as heavy bombers provide, *to impose shock effect* against stationary enemy troops. In Vietnam and the Gulf War, the B-52 was the aircraft most feared by enemy troops, even if its strikes did relatively little physical damage to troop concentrations.

(d) *Make the enemy believe his air defenses are impotent*. Experience shows that forces are demoralized when aircraft are perceived to be able to strike them with relative impunity.

(e) *Condition enemy troops not to operate their weapons and other equipment*. Attempt to convince the enemy through PSYOP and military action that if he flies, fires, communicates, radiates, moves with his vehicles, or remains with his weapons, *he will die.*[32]

(5) Once the war fighting phases have accomplished the theater commander's objectives, there will be some sort of transition or draw-down to an end state. Recent history has proven that end state operations are much more involved than simply "packing your bags and going home." Air forces have had to perform each of the airpower functions during this phase. You should be mindful of this and plan accordingly.

(6) A last, but important, note on phasing. If you have thought through your campaign properly, your **phases will be sequential**, at least in the planning stages. By sequential, we mean that each discrete phase during your campaign will accomplish clear, attainable and measurable objectives that accord with the JFACC's and the theater commander's overall objectives for the campaign. In the past, planners made the mistake of confusing airpower functions, like "air superiority" (counterair) or "interdiction," with phase objectives. This led to confusion, as phases necessarily overlapped once the battle was underway. The result was planning and apportionment chaos. Parallel warfare, properly practiced, teaches that there are advantages to pursuing several objectives simultaneously. In the critical first few hours or days of a major conflict, you will probably have several major things to accomplish at once. For example, following a surprise ground attack by an enemy with weapons

[32] This section paraphrases Hosmer, *Psychological Effects of U.S. Air Operations*, xxx-xxxi.

of mass destruction (WMD) capability, you will need to stop his advance, gain some degree of air/space control, and neutralize his WMD capability. At the same time, you will probably also want to isolate the enemy government directing the attack from its fielded forces and disrupt command and control within those forces to facilitate the other things you are doing. These, then, would become your objectives for that phase of your campaign. If you broke phase objectives out by function, you would have three or four phases running
simultaneously. How then would you broker target priority or apportionment between them? In practice, of course, some objectives will be accomplished sooner than planned, some later. You may be able to use assets freed from already completed tasks to pursue objectives originally intended for later phases. Over a short time, fog and friction may blur the breaks between your phases.

g. Finally, the JASOP **indicates force requirements** necessary to achieve the objectives. As you determine what effects you must achieve and what level of effort you need to get to those objectives, you must turn those decisions into types and numbers of platforms, sorties, and/or munitions. These numbers will then drive the types and numbers of supporting assets you will need to prosecute the campaign. Once you have identified the *total force* required, J4 and J5 functions should "reality check" your planning against force availability, deployment timing, beddown, and sustainment requirements.

h. The discussion above gives you the "what" of joint air and space operations plan development. The "how" is best described in the JASOP format found in Section II of this handbook. This format is based on Joint Pub 3-56.1, Appendix A. You will have derived most, if not all, of the information you need to complete the first two paragraphs in the JASOP format from the preceding concept development stages of the campaign planning process (Stages I through IV). You may need to rearrange this information. Paragraph three defines the tasks required to turn the concept into a realistic, achievable plan. This corresponds to your work in Stage V.

Section II

Joint Air and Space Operations Plan (JASOP) Format

The Joint Air Operations Plan Format uses the same format as the JFC campaign plan, but from an airpower point of view. Each air operations plan will differ with each area of responsibility (AOR)/joint operations area (JOA), situation, and joint force. A sample format extracted from Joint Pub 3-56.1 follows:

SECURITY CLASSIFICATION

Copy No

Issuing Headquarters

Place of Issue

Date/Time Group of Signature

JOINT AIR OPERATIONS PLAN: (Number or Name).

REFERENCES: Maps, charts, and other relevant documents.

COMMAND RELATIONSHIPS. Briefly describe the command organization (composition and relationships) for the JFC's campaign and the air operations envisioned. Detailed information may be included in the command relationships annex. Cover component commanders, Area Air Defense Commander (AADC) and Airspace Control Authority (ACA) identities, and others as required.

1. **Situation**. Briefly describe the situation that the plan addresses (see JFCs estimate). The related CONPLAN or OPLAN should be identified as appropriate.

a. **Guidance**. Provide a summary of directives, letters of instruction, memoranda, treaties, and strategic plans, including any campaign/operation plans received from higher authority, that apply to the plan.

(1) Relate the strategic direction to the JFCs requirements.

(2) List the strategic objectives and tasks assigned to the command.

(3) Constraints—list actions that are prohibited or required by higher authority (ROE and others as appropriate).

b. **Adversary Forces**. Provide a summary of pertinent intelligence data including

information on the following:

(1) Composition, location, disposition, movements, and strengths of major adversary forces that can influence action in the AOR/JOA.

(2) Strategic concept (if known), should include adversary's perception of friendly vulnerabilities and adversary's intentions regarding those vulnerabilities.

(3) Major objectives (strategic and operational).

(4) Adversary commanders idiosyncrasies and doctrinal patterns.

(5) Operational and sustainment capabilities.

(6) Vulnerabilities.

(7) Centers of gravity and decisive points.

NOTE: Assumed information should be identified as such. Reference may be made to the intelligence annex for more detailed information.

c. **Friendly Forces**. State here information on friendly forces not assigned that may directly affect the command.

(1) Intent of higher, adjacent, and supporting US commands (e.g., USTRANSCOM, USSTRATCOM, USSOCOM, USSPACECOM).

(2)Intent of higher, adjacent, and supporting allied or other coalition forces (e.g., NATO, Spain, Italy, Egypt).

d. **Assumptions**. State here assumptions applicable to the plan as a whole. Include both specified and implied assumptions.

2. **Mission**. State the joint air task(s) and the purpose(s) and relationship(s) to achieving the JFCs objective(s).

3. **Air Operations**.

a. **Strategic or Operational Concept**. (Based on the relevant major elements of the JFC strategy.) State the broad concept for the deployment, employment, and sustainment of major air capable joint forces including the concepts of deception and psychological operations during the operation or campaign as a whole. (This section is a summary of details found in the annexes.)

(1) Joint force air organization.

(2) Joint force air objectives.

(3) Beddown overview.

(4) Operational missions.

(5)Phases of joint air operations in relation to JFC operation or campaign plan.

(6)Timing and duration of phases.

b.**Phase I**. Provide a phase directive for each phase. Instead of the format below, you may consider using the phase directive format found on page 46.

(1) Operational Concept. Include operational objectives, plan of attack, and timing.

(2) General missions and guidance to subordinates and components supporting and supported requirements. Ensure that missions are complementary.

(3) Capabilities/forces required by role or capability. Should consider land, sea, air, space, special operations, and multinational.

(4) Tasks of subordinate commands and components.

(5) Reserve Forces. Location and composition. State be prepared missions. Include guidance on surge sorties if used as reserve capability.

(6) Mobility. Consider transportation, ports, lines of communication, transit and overflight rights, reinforcement, reception and onward movement, and host-nation support arrangements.

(7) Deception.

(8) Psychological Operations. Ensure joint air operations will support established psychological operations.

c. **Phases II-XX**(last). Cite information as stated in subparagraph 3b above for each subsequent phase. Provide a separate phase for each step in the operation at the end of which a major reorganization of forces may be required and another significant action initiated.

d. **Coordinating Instructions**. If desired, instructions applicable to two or more phases or multiple elements of the command may be placed here.

4. **Logistics**. Brief, broad statement of the sustainment concept for the joint air operations with information and instructions applicable to the joint air operations by phase. Logistic phases must be consistent with operational phases. This information may be listed separately and referenced here. This paragraph should address:

a. Assumptions (including coalition requirements).

b. Supply aspects.

c. Maintenance and modifications.

d. Medical service.

e. Transportation.

f. Base development.

g. Personnel.

h. Foreign military assistance.

i. Administrative management.

j. Lines(s) of communication.

k. Reconstitution of forces.

l. Joint and multinational responsibilities.

m. Sustainment priorities and resources.

n. Inter-Service responsibilities.

o. Host-nation considerations.

5. **Command, Control, and Communications**.

a. **Command**.

(1) **Command Relationships**. State generally the command relationships for the entire joint air operations or portions thereof. Indicate any transfer of forces contemplated during the joint air operations, indicating the time of the expected transfer. These changes should be consistent with the operational phasing in paragraph 3. Give location of commander, JAOC, and command posts.

(2) Delegation of Authority.

b. **Communications**.

(1) **Communications**. Plans of communications. (May refer to a standard plan or be contained in an annex.) Include time zone to be used; rendezvous, recognition, and identification instructions; code; liaison instructions; and axis of signal communications as appropriate.

(2) **Electronics**. Plans of electronic systems. (May refer to standard plan or may be contained in an annex.) Include electronic policy and such other information as may be appropriate.

(3) **Combat Camera**. Plans for combat camera. (May refer to a standard plan or may be contained in a combat camera annex.) Include digital still photo and motion video imagery transmission to the Pentagons Joint Combat Camera Center.

(4) **Armament Delivery Recording (ADR) (bomb and gun camera imagery).** Plan for ADR. (May refer to a standard plan or may be contained in a combat camera

annex.) Include imagery transmission to the Pentagons Combat Camera Center.

(Signed) (Commander)

ANNEXES: As required

DISTRIBUTION:

SECURITY CLASSIFICATION

Section III

JDACC Planning Tools

JDACC Phase Directive Format

This format serves two purposes. First, it is a good guide to developing a specific phase of the aerospace portion of a campaign plan. Second, it provides a road map to guide the AOC team in the development of a Master Air Attack Plan (MAAP) and the ATO. It helps convey how you want to run a particular phase of the campaign from an aerospace perspective.

REFERENCES: Theater Campaign Plan and the Joint Air and Space Operations Plan (JASOP).

1. **Situation**. Identify the current phase. Note changes or additions to the situation contained in the Theater Campaign Plan or JASOP. Items in this section should discuss important changes in friendly or enemy dispositions, intent, or likely courses of action (e.g., describe new strategic guidance, new center of gravity information, a change in assumptions, an expected enemy counter-move, etc.).

2. **Guidance**.

a. **Phase Objectives**.

(1) **Theater**. State the CINC's/JFC's objective(s) that apply, or will be accomplished, in this phase. Add any new guidance received that differs from the published theater campaign plan.

(2) **JFACC**. State the JFACC's air objective(s) that apply, or will be accomplished, in this phase to support the overall theater objectives.

b. **Concept of Operations**.

(1) State the **strategies** planned to accomplish the theater and air objectives which apply to this phase. State in terms of discrete tasks, missions, or effects and identify which objective(s) these support. These will become the discrete missions/tasks to be elaborated in Section 3.

(2) **Prioritize the different missions** in terms of their relative importance in accomplishing the phase's objectives. Also identify any operations that may have to be accomplished first, or in a definite sequence, in order have the optimum impact.

(3) Identify the **measures of effectiveness**/merit (MOEs/MOMs) that are your criteria for success in this phase. State how you will measure that you've achieved each of your phase objectives. This will help you determine when this phase should end and another begin.

(4) Define the required "**level of effort**" for each of your intended missions/operations: those criteria you use to determine when to stop current operations because of a lack of success or changed circumstances.

(4) List **"on-order" or "be prepared to" operations**. Discuss on-order operations you want planned and ready to execute (e.g., "SCUD hunting," noncombatant evacuation operations (NEO)). State the objectives, execution criteria, type and number of assets, and priorities. Discuss the criteria for abandoning this operation. State circumstances that would indicate a need to stop and re-plan.

c. **Timing**.

(1) State **anticipated phase length**: the beginning and ending-dates based on C day and/or D day. Include any major assumptions made to determine the timeline.

(2) Relate this phase to **other components' phases**. State elements which are dependent on other components' actions or which could cause timing shifts in this phase.

d. **Force Capabilities and Requirements**.

(1) **Mission Capabilities**. State any aircraft, platform, or mission capabilities and special munitions or other requirements needed in this phase. Examples might be, "this phase requires a minimum of two squadrons of night/all weather ground attack fighters capable of delivering PGMs," or, "this phase requires a minimum of one squadron of air defense fighters capable of night/all weather operations." State aircraft capabilities required from other components, services, or coalition members.

(2) **Sortie Generation**. Define sortie rates and planned duration for each mission area. Low sortie rates are used to build up reserves, to reconstitute or to prepare for surge operations. Normal rates can be sustained indefinitely. Surge rates can only be flown for a limited time. Duration normally should be the number of days to fly at each rate. Sortie rates as a percentage of the normal or surge rate are one possible way of defining desired sortie rates.

(3) **Reserves**. Provide guidance on surge sorties, if they are to be used as reserve capability. Identify units or numbers of aircraft (if any) to be kept in reserve and for what potential tasks. State which planned "be prepared to" or "on order" missions these are associated with.

(4) **Specialized Capabilities/Requirements:**

(a) **Intelligence/Surveillance/Reconnaissance (ISR).** Identify essential elements of information needed to support phase objectives/MOEs, priorities for collection, ISR assets required, protection needed, and other relevant items. Coordinate requirements with intelligence collection managers.

(b) **Airlift**. Identify how the theater airlift requirements will be accomplished. Identify airlift priorities that are/have been established by the JFC. State requirements for aerial ports of debarkation (APOD), transit and overflight rights, reception, host-nation base support, and so forth.

(c) **Air Refueling**. Outline and prioritize requirements. Air refueling priorities are

based on the supported mission requirements.

(d) **Electronic Combat**. Give guidelines on how to employ EC assets. Some information may already be covered adequately elsewhere.

(e) **Deception**. Describe any deception operations planned for or supported by JFACC-assigned assets. Include objectives, tasks, types and quantities of assets, timing, and MOEs. Follow applicable need-to-know guidelines.

(f) **Psychological Operations**. Describe joint PSYOP planned for or supported by JFACC-assigned assets. Include objectives, tasks, types and quantities of assets, timing, and MOEs. Include any known air and space tasks that will support the JFSOCC. Follow applicable need-to-know guidelines.

(g) **Information Attack**. Describe any information attack operations planned for or supported by JFACC-assigned assets. Include objectives, tasks, types and quantities of assets, timing, and MOEs. Follow applicable need-to-know guidelines.

(h) **Information Security**. Describe any information security measures or requirements. Follow applicable need-to-know guidelines.

3. **Missions**. State the specific missions or tasks you must accomplish to achieve the phase objectives. Devote one section to each discrete mission. To demonstrate how the contents of this section relate to Section 2, a phase objective might be, "halt enemy ground advance." The phase MOE (paragraph 2.b.(3)) for this might be, "all forward progress of enemy ground formations larger than battalion size stopped on or short of phase line x." A discrete mission carried out to accomplish this might be, "stop the 805th Shock Corps on or short of phase line x." Provide guidance to subordinate units and identify the JFACC's supporting and supported requirements for accomplishing this mission. Include details on apportionment and allocation. **For each mission**, consider at least:

a. **Phase objective(s)** the mission supports.

b. **Mission intent and description**.

c. **Measure(s) of Effectiveness** (MOE). Identify any essential elements of information (EEIs) required in order to measure accomplishment.

d. **Specific target sets/targets** associated with this mission.

(1) **Desired effects** against these target sets/targets.

(2) **MOEs** for these target sets/targets.

e. **Resources required/recommended** to accomplish this mission.

(1) Required/recommended **platforms or capabilities** (e.g., "requires stealth aircraft," "requires F-15E delivery platform," or "requires Commando Solo capability").

(2) Required/recommended **munitions** (e.g., "requires deep-penetrator guided munition," or "best suited for cruise missile attack").

(3) **Other requirements** specific to this mission (e.g., "requires out-sized lift capability to support," or "requires 24-hour JSTARS monitoring to measure MOEs").

f. **Restraints**. Identify those ROE, political, legal, moral, or other factors that might prohibit or restrict certain military courses of action used to accomplish this mission, if any.

g. **Constraints**. Identify those ROE, political, legal, moral, or other factors that might compel or obligate certain courses of action, if any.

h. **Apportionment**. Apportionment categories can be valuable management tools in certain circumstances, but do not express the underlying missions, tasks, or effects to be achieved with airpower, so do not use this section out of the context of rest of the mission statement.

(1) State any apportionment previously decided upon by the JFC.

(2) State the **priority** given this mission, relative to other missions listed, as a guide to those deciding daily apportionment once execution begins.

(3) State the relative weight of effort, expressed in **percentages** and divided into "traditional" functional categories, to be **devoted to this mission**. Categories are as follows: Strategic Attack, Counterair (Offensive (OCA), Defensive (DCA), Suppression of Enemy Air Defenses (SEAD)), and Counterland (Interdiction, Close Air Support (CAS)).

(Example: "15% of this phase's total air effort is to be devoted to this mission. This mission is the phase's number two priority. It will be further apportioned, 30% to Strategic Attack (4.5% of total phase effort), 30% (4.5%) to Counterair (10% (1.5%) to OCA, 10% (1.5%) to DCA, 10% (1.5%) to SEAD), and 40% to Counterland (20% (3%) to Interdiction, 20% (3%) to CAS).)

i. **Allocation**. Allocation is usually determined on execution by Air Operations Center planners. Give any specific allocation directions these planners will need to carry out the mission (such as identifying specific units, for instance, if they are required for accomplishment.)

4. **Remarks**. Include any additional remarks that would help the AOC planners execute the plan.

JFACCs Estimate of the Situation

This format is based on data found in the *JFACC Primer*, February 1994. It is a tool that may be used by the JFACC's staff in contributing to the CINC's Estimate of the Situation. This format outlines a systematic approach to propose Courses of Action (COAs) for solving a military problem.

1. **OBJECTIVE(S)**. State the objective(s) assigned to you by higher authority or deduced by you from instructions from that source. These are usually stated from the point of view of the theater commander. In every case the first duty of a commander receiving a mission is to satisfy himself that he understands what is required of his command as a part of the larger team.

a. **National Objectives**. Overarching goals of the United States as articulated by the National Command Authorities.

b. **Supported Theater Objectives**. Objectives developed by the theater commander to achieve the National Objective(s).

c. **Assigned Air and Space Objectives**. Objectives specifically assigned to the JFACC by the JFC or those objectives which the JFACC can assume are required to conduct air operations. Each COA developed will have its own specific objectives.

2. **SITUATION AND COURSES OF ACTION**. Develop several courses of action (COAs) which can be undertaken by aerospace forces. Each COA should be substantially different in some respect. One COA may use interdiction as the primary means to destroy the enemy's fielded forces, whereas in another COA, interdiction may only serve as a supporting function. Another method to differentiate COAs is to change the phasing of air operations.

a. State **commanders intent**.

(1) Identify desired **end state.**

(2) Strategy (Blueprint or pattern); describe the underlying logic.

b. State the **military objectives**. For each objective:

(1) Clearly state the objective.

(2) State how the objective supports theater and NCA objectives.

(3) Specify tasks to be achieved and associated standards of performance.

c. **Force assumptions** (critical in a force projection scenario into an immature theater):

(1) Total air forces potentially available to support COA (Air Force, SOF, Navy, Marine Corps, Army aviation, air defense artillery, and allied forces).

(2) Intelligence, surveillance, and reconnaissance (ISR) assets required, both national and theater.

(3) Surface forces required to support the COA.

d. **Estimate requirements**:

(1) Sorties and munitions required (by type aircraft where appropriate) to accomplish each task.

(2) Time required to accomplish each task, given the priority and phasing of the task.

(3) Time permitting, sketch out the master air attack plan (MAAP).

(4) Essential supporting tasks from other components (e.g., air base protection, logistical support, maneuver to support interdiction, etc.).

e. **Logistics** required to support:

(1) Deployment schedule and strategic lift requirements.

(2) Daily logistics requirements (e.g., POL, weapons, water, spare parts, etc.).

(3) Intratheater lift requirements, both surface and air

f. **Force capabilities and relative combat potential**. Consider the order of battle for both sides. This paragraph ends by describing the relative combat strength of the opposing forces.

(1) **Friendly Forces**. Factors to be considered are:

(a) Command, control, and communications (C3).

(b) Air/Space

{1} Order of battle for air and space forces under your command and/or control (include Navy, Marine, and coalition as appropriate).

{2} Operating capacity of friendly airfields.

{3} State of supply (POL, weapons, water, etc.) and replacements.

{4} Effect of weather on flying and sortie generation capability.

{5} Logistics support available from allies/sister services (POL, water, surface transportation, etc.).

{6} Range of friendly aircraft and refueling capabilities.

(c) Ground/Naval.

{1} Order of battle.

{2} Specify type (mechanized, light infantry, etc.).

{3} Include coalition and SOF.

{4} Flow of forces into theater.

{5} Organic air defense capability.

{6} Availability of air and sea ports of debarkation.

{7} Potential naval operating areas.

(2) **Enemy Forces**. Consider, from the enemy viewpoint, factors similar to those given in (1) above.

(a) C3.

(b) Air/Space.

{1} Air, air defense, and space order of battle.

{2} Operating and reconstitution capacity of enemy airfields.

{3} Effect of weather on flying and sortie generation capability.

{4} Logistics support available and lines of communication.

{5} Range of enemy aircraft and refueling capabilities.

{6} Mobile and fixed missile forces.

(c) Ground/Naval.

{1} Order of battle (specify type).

{2} NBC weapons, delivery and manufacturing capability.

{3} Organic air defense capability.

{4} Potential naval operating areas.

(3) **Relative Combat Strength**. Compare the opposing forces from the point of view of the factors indicated above, and also from the point of view of physical condition, morale, amount of recent operations, doctrine, training, and combat experience.

(a) Air/Space forces

{1} Ability to conduct offensive air operations. Consider your ability to counter IADS from a technological and aircrew proficiency standpoint. Consider your ability to ability to conduct accomplish the CINC's/JFC's objectives with air and space assets.

{2} Enemy ability to conduct offensive air operations.

{3} Ability to conduct air and space reconnaissance operations.

(b) Land forces.

{1} Based on the current force structure and the planned force structure.

{2} Ability of enemy to conduct offensive operations.

{3} Vulnerability to air interdiction.

(c) Maritime forces.

{1} Ability to gain and maintain sea control in theater and for strategic lines of communication.

{2} General vulnerability to air and sea threats.

g. **Air component COAs**. State all feasible and acceptable COAs open to the commander that can potentially accomplish the mission.

3. **ANALYSIS OF OPPOSING COURSES OF ACTION**. The air commander next assesses the intangible or abstract factor: the skill of the enemy commander. It is rarely possible to obtain direct information on the enemy's objectives, at least in time to use this information. Since they are a vital factor in the outcome, it is often necessary to deduce them.

a. **Enemy Air/Space Options**. State concisely the reasonable alternatives that enemy air/space forces may adopt to oppose your mission. Given that it is impossible to foresee or construct the actual plan that the enemy air commander will follow, all reasonable and probable hostile alternatives for his employment of air power should be concisely stated and considered.

b. **Enemy Ground/Naval Options**. Identify all reasonable surface force COAs that would support their objectives. Include guerrilla force options.

c. **WMD Options**. Include likely delivery options (aircraft, terrorist, artillery, cruise missile, ballistic missile, etc.).

d. **Analysis of Enemy Alternatives**. Analyze each alternative given above and determine its practicability and the preponderance of its advantages over its disadvantages. State whether each alternative has a reasonable chance of success and whether if successful it will accomplish the enemy's probable objective. In analyzing each potential enemy alternative, it is important to maintain the enemy's point of view and not let your own wish be father to the thought.

e. **Most Probable Course(s) of Enemy Action**. Identify the alternative(s) available to the enemy which appear most suited to the enemy's probable intention. Include justification. When no one hostile plan appears to have a pronounced advantage over the others from the enemy viewpoint, select the one that seems most disadvantageous to friendly forces.

4. **COMPARISON OF OWN COURSES OF ACTION**. Compare each friendly COA with each enemy COA given above and determine its practicability and the preponderance of its advantages over its disadvantages. Determine likely enemy responses to each friendly COA. For each friendly COA assess its chance of success, whether if successful it will accomplish the strategic objective(s), and whether if successful it will favor future action of your own and supporting forces.

5. **DECISION**. State, in general terms, the plan for your command as a whole. The aim of the whole estimate of the situation is a sound decision. It should also be the basis for the subsequent air campaign plan.

Country X as a Candidate for Air Attack

This format, based on a historical example, can be used for the systematic study of a country as a candidate for a potential air campaign. This format is a tool that may aid your Center of Gravity Analysis. The format is based on a research paper written by Capt Thomas D. White for the Air Corps Tactical Schools academic year 1937-38. The paper, *Japan as an Objective for Air Attack,* is on file with the Air Force Historical Research Agency, Maxwell AFB, Alabama. Its "national structure" categories may have served as the basis for Warden's Strategic Rings. These categories have been modified in our version to reflect their current nomenclature. Many "antiquated" notions about the strategic employment of airpower have also been "cleaned up" in our version. The applicability of this format to analysis of pre-industrial nations remains somewhat limited.

Section I: Introduction

1. **PURPOSE**.
This study format is designed to analyze the economic, political, and military structure of X as a candidate for air attack. All sections will not apply in all cases.

2. **SCOPE**.
Determine the scope of your study based on the available guidance. For example: This investigation is made with the point of view cited from within X. No speculation is included as to possible locations of forward bases. Likewise the specific strength of the required air force has not been considered.

3. **GUIDANCE**.
The national structure of a country may be divided into five general classifications:

a. Fielded military forces.

b. Population.

c. Infrastructure.

d. System essentials.

e. Leadership.

Each of the above elements, as they exist in X, will be considered in the following sections as a possible candidate for air attack.

4. **MAPS**.

(X) maps have been appended.

Section II: Air Force Objectives

5. **GENERAL PRINCIPLES**.

a. The socioeconomic structure of modern nations is highly integrated. The rapid parallel destruction of selected critical vulnerabilities associated with a nation's centers of gravity may bring a succession of collapses in related areas until the entire system's structure collapses or the concerted pressure persuades the enemy's leadership to end the conflict.

b. A vital objective of air forces is affecting such centers of gravity. Air and space forces so employed exploit to the maximum their outstanding capability to reach and affect distant surface targets of whatever character; aerospace power accomplishes the objectives of strategy by assuming the strategic offensive.

c. Since aerospace forces can fly over natural obstacles and fielded military forces, they can reach and affect any center of gravity known to exist within the enemy national territory. Affecting such centers of gravity may be constrained by the number of individual targets needed to achieve the desired effects, by limitations in friendly capabilities, by political or moral considerations, and by the opposition of air defenses.

6. **AIR DEFENSE**.
It is axiomatic that air defenses can reduce the efficiency of, but not prevent, air attack.

7. **IDEAL AEROSPACE OBJECTIVE**.
From the above it follows that the ideal objective for aerospace attack are undefended centers of gravity of the enemy national structure, consisting of a number of individual targets.

8. **US OBJECTIVE IN WAR WITH X**.

a. The political and economic history of this country indicates that in a war, the US national objective would be to force political acquiescence on the part of our adversary.

b. Achievement of political acquiescence involves the acceptance and observation by an enemy of certain expressed policies and limitations of action and does not necessarily require the occupation of enemy territory. If acceptance of terms can be forced without such physical occupation and with equal effectiveness and greater economy, then such occupation is unnecessary.

9. **APPLICATIONS OF PRINCIPLES TO THIS STUDY**.
Succeeding sections of this study will endeavor to prove:

a. That X is a highly structured, modern nation, integrated into the world economy, and therefore, in general, vulnerable to air attack.

b. That within X there are centers of gravity consisting of a finite number of targets or target systems.

c. Affecting such centers of gravity with air and space forces can accomplish, or make a decisive contribution to, the probable national objectives in a war between the United States and X.

Section III: Environment

10. **GEOGRAPHICAL**.
Description of the key physical characteristics of the country being studied, to include location, size, climate, regional significance, and topography.

11. **POPULATION**.
Most recent population figures available, giving significant ethnic and socioeconomic breakdown.

12. **NATIONAL CHARACTER**.
Description of the culture, religion, political systems, and recent history of the country.

13. **ECONOMY**.
Description of the key elements of the economy of the subject country. Including, as a minimum, the economic system, government economic policy, international trade, and domestic economic base.

14. **POLITICAL-MILITARY FOUNDATION**.
Leadership personality and training, government structure, national defense organization, and international relations.

15. **SUMMARY**.
Briefly summarize the preceding information directly relating to the suitability of the subject country as a candidate for air attack.

Section IV: Fielded Military Forces

16. **NATIONAL MILITARY POLICY**.
Statement of the expressed and de facto national military policy of X derived from official statements, military actions, and all-source intelligence. Include at a minimum:

a. Doctrine.

b. Influence of geographic and economic factors.

c. Perceived greatest threat.

d. Other planning factors.

17. **DEFENSE ESTABLISHMENT**.
Describe the organization of the armed forces and relative importance of each service in their national strategy.

18. **COMMAND, CONTROL, AND COMMUNICATIONS**.
Examine the mechanisms or systems the various branches of the military use to control their operations. Determine their control philosophies (highly centralized control? *Aufstragstaktik*?) and the relative importance of these in their doctrine and operations. Also examine the ability of X's military to gather and interpret intelligence information, as well as its ISR assets (indigenous and external).

19. **WEAPONS OF MASS DESTRUCTION (WMD)**.
Examine the nature, numbers, and force organization of WMD assets, if organized as a military force.

20. **SPACE**.
Provide capabilities, numbers, organization, mission, and employment concepts of X's military or military-capable space forces and extra-theater ballistic weapons.

21. **AIR**.
Provide capabilities and total numbers of aircraft and theater ballistic weapons by mission, organizational structure, key elements, and employment concepts. (Provide map of air bases as appendix if required.) If separate naval or land air arms exist, describe them here.

22. **LAND**.
Provide the overall capabilities and size of the land forces (including trained reserves and internal security organizations with land combat capabilities), organizational structure, missions, and employment concepts. If separate air or naval land or amphibious forces exist, describe them here.

23. **SEA**.
Provide capabilities and numbers of naval forces, manpower, organizational structure, missions, and employment concepts. (Provide map of naval bases as appendix if required.)

24. **UNCONVENTIONAL WARFARE**.

Examine the nature, capabilities, number, organization, and employment concepts of X's special operations, unconventional warfare, irregular, and terrorist forces.

25. **SUMMARY**.
Summarize the strengths and weaknesses of the armed forces. Should address comparative advantages/disadvantages with other regional powers or potential adversaries. Answer the question, "Can the armed forces perform their mission?"

26. **ARMED FORCES AS A CANDIDATE FOR AEROSPACE ATTACK**.
Are the armed forces a national strategic center of gravity that should be attacked to achieve US national objectives? (Justify.) Also look for operational centers of gravity *within* the armed forces.

27. **ARMED FORCES COUNTERAIR/COUNTERSPACE CAPABILITY**.
Assessment of the ability of the armed forces of X to oppose an air campaign should include potential enemy offensive counterair capability and geographic influences in addition to air defense capability.

Section V: Population

28. **FOOD SUPPLY**.
Examine the structure and connections of the food industry in country X. Examine external trade, the distribution system, dietary requirements, etc. Address the vulnerability of the food supply and distribution system.

29. **CLOTHING**.
Examine the structure, importance, and vulnerability of the textile and garment industry.

30. **SHELTER**.
Examine the vulnerability of the populace to deprivation of shelter through attacks on housing structures. Seasonal weather conditions will be a factor.

31. **PUBLIC HEALTH**.
Examine the vulnerability of the populace to disruption or deprivation of the health care system. While most of the items studied in this category will not be moral or legal targets, it is important to understand their "connectivity" to other elements of X's economy.

a. Hospitals/direct health care. Assess the importance of the direct health care system in maintenance of the population's health and morale.

b. Sanitation/water supply. Assess the effect of attacks on the water supply and sanitation systems.

c. Public Utilities. Assess the vulnerability of the population's health to indirect or tangential attacks on supporting utilities, like electricity, communications, and sanitation.

32. **AGRICULTURE**.
Direct attack of the agricultural activities of any nation is almost always impractical. However, indirect attack on food processing capability and disruption of lines of communication should be considered as an additional impact when assessing infrastructure.

33. **BASIC INDUSTRY**.
Analyze the concentration of basic industries geographically and economically, with emphasis on potential population vulnerabilities.

34. **INFORMATION**.
Analyze the importance of cultural, political, and economic information flow on the well-being and morale of the populace. Is the population potentially vulnerable to manipulation of opinion or information? If so, where and how?

35. **SUMMARY**.
Attacks on population targets must be carefully examined for potential public perception problems as well as such factors as time lags for attacks to show effect, resources required, cost effectiveness, etc. In many cases, the results of this part of the analysis can be used to *rule out* targets or decide which elements of X's systems *not* to attack.

Section VI: Infrastructure

36. **COMMUNICATIONS**.
Assess the extent to which X depends upon its communication systems.

a. Telecommunications. Assess the degree of dependence on conventional telephone, cellular phone, fiber optic and microwave networks. Assess the system for vulnerabilities and the impact on other industries/systems of disruption in all or part of the telecommunication system.

b. Broadcast Media. Assess the dependence on and vulnerability of radio, broadcast television, cable, and other broadcast networks to potential air attack. Assess the impact on other industries/systems of disruption in all or part of the broadcasting system.

c. Information flow. Analyze the systems with which X's leadership, population, and economy share information and determine potential vulnerabilities within those systems. Assess how important the connectivity of such systems as computer networks are to the functioning of the leadership, economy, etc.

37. **ELECTRICAL POWER**.
Determine the extent to which the leadership, population, and industry depend on electrical power. Examine the power production and distribution networks for dispersal/concentration of generating capacity, interconnections, and possible choke points.

38. **ROADS**.
Assess the relative importance of the road system compared to other modes of transportation. Should include an analysis of ability to utilize excess capacity during emergencies and reconstitution potential.

39. **RAILROADS**.
Assess the relative importance of railways in comparison to other modes of transportation. Include number of potential choke points, availability of rolling stock, and reconstitution potential at a minimum.

40. **SHIPPING**.
Assess the relative importance of merchant shipping, both international and internal, in comparison to other modes of transportation. Include size of the merchant marine, availability of port facilities, and reconstitution potential at a minimum.

41. **CIVIL AVIATION**.
Assess the relative importance of air transportation for essential services in comparison to other modes of transportation. Numbers and capabilities of civil aviation assets available, major domestic and international airports, and reconstitution potential at a minimum.

42. **SUMMARY**.
Summarize the potential effect of attacks on infrastructure, emphasizing the synergistic effects in combination with attacks on other target sets.

Section VII: System Essentials

43. **PETROLEUM, OIL, AND LUBRICANTS (POL)**.
Determine the primary source of POL, whether domestically produced or imported, and the extent of stockpiles. Assess the demand, both civil and military. Examine potential vulnerabilities of the production and distribution systems.

44. **STRATEGIC MATERIALS**.
Search the available data to determine if there is a single commodity, or small group, of such vital importance that destruction/disruption of production or reserves would constitute a decisive factor in the collapse of Xs national structure or will to fight.

45. **MILITARY PRODUCTION**.
Determine the source of military equipment, whether imported or indigenously produced. Analyze the potential vulnerability to determine whether or not any of its elements should be effectively attacked.

46. **WMD**.
Examine the sources of raw materials and the production system for X's weapons of mass destruction program, if one exists. Determine potential vulnerabilities or bottlenecks. Be sure to examine sources and production capabilities external to X along with indigenous production.

47. **SUMMARY**.
Briefly indicate the likelihood of achieving campaign objectives by striking key target sets identified by your analysis of enemy system essentials.

Section VIII: Leadership

48. **KEY PEOPLE/INSTITUTIONS**.
Identify the leadership of the country by name and position, if possible, and assess relative influence. Examine potential vulnerability to attack. Examine possibilities for indirect attack if direct attack is not feasible or legal.

49. **CONTROL SYSTEMS**.
Identify and analyze the systems, organizations, and individuals responsible for maintaining the leadership's control of the military and the general population. Examine for potential vulnerabilities.

50. **OPPOSITION.**
Identify and analyze patterns of opposition to X's ruling regime. Examine each group's importance, popularity, degree of hostility, extent of control, physical resources, and any other relevant factors. Examine legal, quasi-legal, and underground groups. If an opposition group controls large portions of X, consider conducting a full leadership analysis (i.e., run through each portion of this section), if not a complete, independent *Country X* study for each such group.

51. **COMMUNICATIONS**.
Identify the key communications systems used by the leadership to exercise control. Examine for potential vulnerabilities.

52. **STRATEGIC CAPABILITIES/ASSETS**.
Identify and analyze those systems, capabilities, or organizations that give the leadership unique prestige, power projection, or coercion/intimidation capabilities, both at home and abroad. These will vary greatly from country to country, but understanding them is vital to fully appreciating (and affecting) the country's leadership. This section may (and probably will) include things examined in other sections, but they should be examined here for the unique advantages they give the leadership. This may include such things as elite military organizations (especially if used to keep the leadership in power), weapons of mass destruction programs, long-range aircraft and missiles, unique economic strengths or market niches; the list is almost endless. One or more of these, however, will almost always be a center of gravity. Examine for potential vulnerabilities.

53. **EXTERNAL POLITICS/ALLIANCES**.
Identify and analyze the country's role in its region and the world, as well as its relationships with other individual nations. Identify any traditional antagonisms, historical or cultural connections, systems of alliances, etc. If the leadership's perspective on these relationships differs from that of the populace or significant groups within it, identify the differences and their importance. Examine these relationships for potential vulnerabilities or exploitable aspects.

54. **SUMMARY**.
From the above analysis, identify key leadership targets and determine the feasibility and effectiveness of attacking them.

Section IV

Terms and Definitions

The following section includes terms you are likely to encounter while developing an air campaign plan. They were extracted from Joint Pub 3-56.1, *Command and Control for Joint Air Operations*, 14 November 1994, and are for academic use only.

air defense. All defensive measures designed to destroy attacking enemy aircraft or missiles in the Earths envelope of atmosphere, or to nullify or reduce the effectiveness of such attack. (Joint Pub 1-02)

air interdiction. Air operations conducted to destroy, neutralize, or delay the enemy's military potential before it can be brought to bear effectively against friendly forces at such distance from friendly forces that detailed integration of each air mission with the fire and movement of friendly forces is not required. (Joint Pub 1-02)

air operations center. The principal air operations installation from which aircraft and air warning functions of combat air operations are directed, controlled, and executed. It is the senior agency of the Air Force Component Commander from which command and control of air operations are coordinated with other components and Services. Also called AOC. (Joint Pub 1-02)

airspace control authority. The commander designated to assume overall responsibility for the operation of the airspace control system in the airspace control area. (Joint Pub 1-02)

airspace control order. An order implementing the airspace control plan that provides the details of the approved requests for airspace control measures. It is published either as part of the air tasking order or as a separate

document. Also called ACO. (Joint Pub 1-02)

airspace control plan. The document approved by the joint force commander that provides specific planning guidance and procedures for the airspace control system for the joint force area of responsibility. Also called ACP. (Joint Pub 1-02)

air superiority. That degree of dominance in the air battle of one force over another which permits the conduct of operations by the former and its related land, sea and air forces at a given time and place without prohibitive interference by the opposing force. (Joint Pub 1-02)

air support request. A means to request pre-planned and immediate close air support, air interdiction, air reconnaissance, surveillance, escort, helicopter airlift, and other aircraft missions. Also called AIRSUPREQ. (Joint Pub 1-02)

air tasking order. A method used to task and disseminate to components, subordinate units, and command and control agencies those projected sorties/capabilities/forces to targets and specific missions. Normally provides specific instructions to include call signs, targets, controlling agencies, etc., as well as general instructions. Also called ATO. (Joint Pub 1-02)

air tasking order/confirmation. A message used to task joint force components; to inform the requesting command, and the tasking authority of the action being taken; and/or to provide additional information about the mission. The message is used only for pre-planned missions and is transmitted on a daily basis, normally 12 hours prior to the start of the air tasking day or in accordance with established operation plans for the theater of operations. Also called ATO CONF. (Joint Pub 1-02)

allocation. In a general sense, distribution of limited resources among competing requirements for employment. Specific allocations (e.g., air sorties, nuclear weapons, forces, and transportation) are described as allocation of air sorties, nuclear weapons, etc. (Joint Pub 1-02)

allocation (air). The translation of the apportionment into total numbers of sorties by aircraft type available for each operation/task. (Joint Pub 1-02)

allocation request. A message used to provide an estimate of the total air effort, to identify any excess and joint force general support aircraft sorties, and to identify unfilled air requirements. This message is used only for pre-planned missions and is transmitted on a daily basis, normally 24 hours prior to the start of the next air tasking day. Also called ALLOREQ. (Joint Pub 1-02)

allotment. The temporary, change of assignment of tactical air forces between subordinate commands. The authority to allot is vested in the commander having combatant command (command authority). (Joint Pub 1-02)

apportionment (air). The determination and assignment of the total expected effort by percentage and/or by priority that should be devoted to the various air operations and/or geographic areas for a given period of time. Also called air apportionment. (Joint Pub 1-02)

area air defense commander. Within a unified command, subordinate unified command, or joint task force, the commander will assign overall responsibility for air defense to a single commander. Normally, this will be the component commander with the preponderance of air defense capability and the command, control, and communications capability to plan and execute integrated air defense operations. Representation from the other components involved will be provided, as appropriate, to the area air defense commander's headquarters. Also called AADC. (Joint Pub 1-02)

campaign plan. A plan for a series of related military operations aimed to achieve strategic and operational objectives within a given time and space. (Joint Pub 1-02)

close air support. Air action by fixed and rotary-wing aircraft against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces. Also called CAS. (Joint Pub 1-02)

close support. That action of the supporting force against targets or objectives which are sufficiently near the supported force as to require detailed integration or coordination of the supporting action with fire, movement, or other actions of the supported force. (Joint Pub 1-02)

interdiction. An action to divert, disrupt, delay, or destroy the enemy's surface military potential before it can be used effectively against friendly forces. (Joint Pub 1-02)

joint air operations. Air operations performed with air capabilities/forces made available by components in support of the joint force commander's operation or campaign objectives, or in support of other components of the joint force. (Joint Pub 1-02)

joint air operations center. A jointly staffed facility established for planning, directing and executing joint air operations in support of the joint force commanders operation or campaign objectives. Also called JAOC. (Approved for inclusion in the next edition of Joint Pub 1-02)

joint air operations plan. A plan for a connected series of joint air operations to achieve the joint force commanders objectives within a given time and theater of operations. (Joint Pub 1-02)

joint force air component commander. The joint force air component commander derives authority from the joint force commander who has the authority to exercise operational control, assign missions, direct coordination among subordinate commanders, redirect and organize forces to ensure unity of effort in the accomplishment of the overall mission. The

joint force commander will normally designate a joint force air component commander. The joint force air component commanders responsibilities will be assigned by the joint force commander (normally these would include, but not be limited to, planning, coordination, allocation, and tasking based on the joint force commanders apportionment decision). Using the joint force commanders guidance and authority, and in coordination with other Service component commanders and other assigned or supporting commanders, the joint force air component commander will recommend to the joint force commander apportionment of air sorties to various missions or geographic areas. Also called JFACC. (Joint Pub 1-02)

joint integrated prioritized target list. A prioritized list of targets and associated data approved by a joint force commander and maintained by a joint task force. Targets and priorities are derived from the recommendations of components in conjunction with their proposed operations supporting the joint force commanders objectives and guidance. Also called JIPTL. {Joint Pub 1-02)

joint special operations air component commander. The commander within the joint force special operations command responsible for planning and executing joint special air operations and for coordinating and deconflicting such operations with conventional non-special operations air activities. The joint special operations air component commander normally will be the commander with the preponderance of assets and/or greatest ability to plan, coordinate, allocate, task, control, and support the assigned joint special operations aviation assets. The joint special operations air component commander may be directly subordinate to the joint force special operations component commander or to any nonspecial operations component or joint force commander as directed. Also called JSOACC. (Joint Pub 1-02)

joint targeting coordination board. A group formed by the joint force commander to accomplish broad targeting oversight functions that may include but are not limited to coordinating targeting information, providing targeting guidance and priorities, and preparing and/or refining joint target lists. The board is normally comprised of representatives from the joint force staff, all components and, if required, component subordinate units. Also called JTCB. (Joint Pub 1-02)

joint target list. A consolidated list of selected targets considered to have military significance in the joint operations area. (Joint Pub 1-02)

list of targets. A tabulation of confirmed or suspect targets maintained by any echelon for informational and fire support planning purposes. (Joint Pub 1-02)

master air attack plan. A plan that contains key information that forms the foundation of the joint air tasking order. Also called the air employment plan or joint air tasking order shell. Information which may be included is joint force commander guidance, joint force air component commander guidance, support plans, component requests, target update requests, availability of capabilities/forces, target information from target lists, aircraft allocation, etc. Also called MAAP. (Joint Pub 1-02)

mission. 1. The task, together with the purpose, that clearly indicates the action to be taken and the reason therefore. 2. In common usage, especially when applied to lower military units, a duty assigned to an individual or unit; a task. 3. The dispatching of one or more aircraft to accomplish one particular task. (Joint Pub 1-02)

sortie. In air operations, an operational flight by one aircraft. (Joint Pub 1-02)

sortie allotment message. The means by which the joint force commander allots excess sorties to meet requirements of his subordinate commanders which are expressed in their air employment/allocation plan. Also called SORTIEALOT. (Approved for inclusion in the next edition of Joint Pub 1-02)

strategic mission. A mission directed against one or more of a selected series of enemy targets with the purpose of progressive destruction and disintegration of the enemy's war-making capacity and his will to make war. Targets include key manufacturing systems, sources of raw material, critical material, stockpiles, power systems, transportation systems, communication facilities, and other such target systems. As opposed to tactical operations, strategic operations are designed to have a long-range, rather than immediate, effect on the enemy and its military forces. (Joint Pub 1-02)

tactical control. Command authority over assigned or attached forces or commands, or military capability or forces made available for tasking, that is limited to the detailed and, usually, local direction and control of movements or maneuvers necessary to accomplish missions or tasks assigned. Tactical control may be delegated to, and exercised at any level below the level of combatant command. Also called TACON. (Joint Pub 1-02)

target analysis. An examination of potential targets to determine military importance, priority of attack, and weapons required to obtain a desired level of damage or casualties. (Joint Pub 1-02)

targeting. 1. The process of selecting targets and matching the appropriate response to them, taking account of operational requirements and capabilities. 2. The analysis of enemy situations relative to the commanders mission, objectives, and capabilities at the commanders disposal, to identify and nominate specific vulnerabilities that, if exploited, will accomplish the commanders purpose through delaying, disrupting, disabling, or destroying enemy forces or resources critical to the enemy. (Joint Pub 1-02)

target list. The listing of targets maintained and promulgated by the senior echelon of command; it contains those targets that are to be engaged by supporting arms, as distinguished from a list of targets that may be maintained by any echelon as confirmed, suspected, or possible targets for informational and planning purposes. (Joint Pub 1-02)

target system. 1. All the targets situated in a particular geographic area and functionally related. 2. A group of targets which are so related that their destruction will produce some particular effect desired by the attacker. (Joint Pub 1-02)

Abbreviations and Acronyms

ACC	Air Combat Command
AF	Air Force
AFDD	Air Force Doctrine Document
AOC	Air Operations Center
ATO	Air Tasking Order
CA	Counterair
CADRE	College of Aerospace Doctrine Research and Education
CAOC	Combined Air Operations Center
CAS	Close Air Support
CINC	Commander-in-Chief
CJCS	Chairman, Joint Chiefs of Staff
CL	Counterland
COA	Course of Action
COG	Center of Gravity
DCA	Defensive Counterair
DOD	Department of Defense
EEI	Essential Element of Information
ETO	European Theater of Operations (World War II)
FMFM	Fleet Marine Force Manual
JAG	Judge Advocate General
JAOC	Joint Air Operations Center
JASOP	Joint Air and Space Operations Plan
JCS	Joint Chiefs of Staff
JDACC	Joint Doctrine Air Campaign Course
JFACC	Joint Force Air Component Commander
JFC	Joint Force Commander
JFLCC	Joint Force Land Component Commander
JFMCC	Joint Force Maritime Component Commander
JFSOCC	Joint Force Special Operations Component Commander
JSCP	Joint Strategic Capabilities Plan
MAAP	Master Air Attack Plan
MOE	Measure of Effectiveness
MOM	Measure of Merit
MOOTW	Military Operations Other Than War
NCA	National Command Authorities
NBC	Nuclear, Biological, Chemical
OCA	Offensive Counterair
OER	Operational Environment Research
OODA	Observe, Orient, Decide, Act
OPLAN	Operations Plan
OPR	Office of Primary Responsibility
PA	Public Affairs
POL	Petroleum, Oil, and Lubricants
PTO	Pacific Theater of Operations (World War II)
ROE	Rules of Engagement
RAAF	Royal Australian Air Force
RAF	Royal Air Force
SEAD	Suppression of Enemy Air Defenses
Strat.	Strategy/Strategies/Strategic
SWPA	Southwest Pacific Area
WMD	Weapons of Mass Destruction
WMP	War and Mobilization Plan

Bibliography

Selected References

Air Campaign Planning (WWII-Korea-Vietnam)

Air Campaign Planning (Gulf War-1991)

Air Campaign Planning (General)

Compiled by Melrose M. Bryant (AU Library)
and
the Joint Doctrine Air Campaign Course Faculty

May 1998

WWII-Korea-Vietnam

Books

Clodfelter, Mark. *The Limits of Airpower: The American Bombing of North Vietnam*. New York: MacMillan, Inc., 1989.

Condensed Analysis of the Ninth Air Force in the European Theater of Operations: An Analytical Study of the Operating Organization of Tactical Air Power as Developed by the Ninth Air Force in the War of Western Europe. Reprint prepared and edited by Col William B. Reed et al. Washington, D.C.: Office of Air Force History, 1984.
Book call no.: 940.544 U58c 1984
Chapter II. A Critical Review of Ninth Air Force Operations, 7-48.
Chapter V. Conclusions and Recommendations: Internal, 105-43.

Copp, DeWitt S. *Forged in Fire: Strategy and Decisions in the Air War Over Europe 1940-45*. Garden City, N.Y.: Doubleday, 1982. The Air Force Historical Foundation.

Crane, Conrad C. *Bombs, Cities, and Civilians--American Airpower Strategy in World War II*. Lawrence, Kans.: University Press of Kansas, 1993. Modern War Studies, 208.
Book call no.: 940.544973 C891b

Fabyanic, Thomas A., Lt Col, USAF. *Strategic Air Attack in the United States Air Force: A Case Study*. Manhattan, Kans.: Military Affairs/Aerospace Historian, Kansas State University, 1976. Also published as Air War College Research Report, (AU Document call no. M-U 32983 F136s.)
Book call no.: 358.42 F136s
Chapter III. World War II: The European Test, 46-96.
Notes, 186-92.

Fredette, Raymond H. *The Sky on Fire: The First Battle of Britain, 1917-1918*. Washington, D.C.: Smithsonian Institute Press, 1976.

Futrell, Robert F. *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force, 19071960*; 1961-1984. Revised edition. Vols. 1 and 2. Maxwell AFB, Ala.: Center for Aerospace Doctrine, Research, and Education; Air University Press, 1989.
Book call no.: 358.0973 A298i 1989
AWPD-1: Air Planning for War, Vol. 1, 10814.
Volume 1, Chapter 4. Air Force Thinking and World War II, 127-89.
Notes, 180-89.
Volume 2, Chapter 4. Insurgency and War in Southeast Asia, 255-331. Notes, 323-31.

_____. *The United States Air Force in Korea, 1950-1953*. Revised edition. Washington, D.C.: Office of Air Force History, 1983.
Book call no.: R 951.9 F996u 1983
References to air campaign planning found throughout text.
Bibliography, 713-17.
Notes, 719-71.

Hansell, Haywood S., Jr., Maj Gen, USAF, Retired. *The Air Plan that Defeated Hitler*. Atlanta, Ga.: Higgins-McArthur/Longino & Porter, Inc., 1972.
Book call no.: 940.5442 H249a
1975 edition includes bibliographical references and index.

Hansell, Haywood S., Jr., Maj Gen, USAF, Retired. *The Strategic Air War Against Germany and Japan: A Memoir*. Washington, D.C.: Office of Air Force History, 1986.
Book call no.: 940.544973 H249sa
Chapter I. Integrating Strategy, Air Doctrine, and War Plans, 1-41.
Chapter II. Planning the Strategic Air War for Europe, 43-82.
Chapter IV. Planning the Strategic Air War Against Japan, 135-74.
Appendix: The German Electric Power Complex as a Target System, 275-86.
_____. *Strategic Air War Against Japan*. Maxwell AFB, Ala.: Air University, Airpower Research Institute, 1980.
Book call no.: 940.544973 H249s
Part I, Chapter 2. Strategic Purposes, Plans and Preparations for the Air Offensive Against Japan, 915.
Part II, Chapter 3. Pacific Strategy, 1724.
Appendix A. Organizational Charts.
Appendix B. The B-29 Test Specifications.
Appendix C. Extracts from USSBS.
Appendix D. Twentieth Air Force Staff Meeting Minutes.
Appendix E. Report by Joint Staff Planners.
Appendix F. Details of Campaign Against Japan.
Appendix G. Graphs Showing Probable Hits.
Appendix H. Correspondence.
Appendix I. Maps of the Pacific.
Jackson, W. G. F. *The Battle for Italy*. New York: Harper & Row, 1967.
Book call no.: 940.542 J14b
Preface, 11-16.
Chapter 12.Resetting the Stage, 219-29 (The Air Plan, 225).
See index under subjects: British Joint Planners; DIADEM Plan; Strangle Plan.
Lavalle, A. J. C., (Ed.), et al. *Tale of Two Bridges and the Battle for the Skies over North Vietnam*. Washington, D.C.: GPO, 1976.
Book call no.: 959 A2981u vol. 1 no. 12
References to the planning of air campaigns found throughout the text; see index, 191-93.
McFarland, Stephen L. *America's Pursuit of Precision Bombing, 1910-1945*. Washington, D.C.: Smithsonian Institute Press, 1995.
Mets, David R. *Master of Airpower, General Carl A. Spaatz*. Novato CA: Presidio Press, 1988.
"Going to War" 105-37
Momyer, William W., Gen, USAF, Retired. *Airpower in Three Wars*. Edited by Lt Col A. J. C. Lavalle and Maj James C. Gaston. Washington, D.C.: Department of the Air Force, 1978.
Book call no.: 358.4 M733a
Index, 341-58.
Perret, Geoffrey. *Winged Victory: The Army Air Forces in World War II*. New York, Random House, 1993.
Report by the Supreme Allied Commander Mediterranean, Field-Marshal the Viscount Alexander of Tunis to the Combined Chiefs of Staff on the Italian Campaign, 12th December 1944 to 2nd May 1945. London: Her Majestys Stationery Office, 1951.
Book call no.: 940.542 A4361r
Tactical Dispositions and RoleAir Force (12 December 1944), 13-16.
A New Plan Adopted, 24-25.
Air Operations—January-March, 1945.
Planning the Spring Offensive--Ground Forces (with support from the air), 32-37.

Report by the Supreme Commander to the Combined Chiefs of Staff on the Operations in Europe of the Allied Expeditionary Force, 6 June 1944 to 8 May 1945. Washington, D.C.: Government Printing Office (GPO), July 1945.
Book call no.: 940.542 A436r
Planning and Preparation: The COSSAC Plan, 1-2.
Development of Plan OVERLORD, 3-11.
Plans for the 1945 Campaign, 81-86.

Tilford, Earl H., Jr., Maj, USAF, Retired. *Crosswinds: The Air Forcess Setup in Vietnam*. College Station: Texas A&M University Press, 1993.
Book call no.: 959.704348 T572c
Strategic Bombing and the Persian Gulf War, 199-201.

US Air Force. Office of Air Force History. *The Army Air Forces in World War II*. Edited by Wesley Frank Craven and James Lea Cate. Vols. 17. Chicago: University of Chicago Press, 19481958.
Book call no.: 940.544973 A741
Volume1.Plans and Early Operations, January 1939 to August 1942.
Volume2. Europe: TORCH to POINTBLANK, August 1942 to December 1943.
Volume3. Europe: Argument to V-E Day, January 1944 to May 1945.
Volume4. The Pacific: Guadalcanal to Saipan, August 1942 to July 1944.
Volume5. The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945.
Volume6. Men and Planes.
Volume7. Services Around the World.

US Military Academy, West Point, Department of Military Art and Engineering. *Summaries of Selected Military Campaigns*. West Point, N.Y.: The Academy, 1953.
Book call no.: 355.48 U58s
World War II, 109-69.
Operations in Korea, 19501951, 17375.

US Strategic Bombing Survey, Military Analysis Division. *Air Campaigns of the Pacific War*. Washington, D.C.: GPO, 1947.
Book call no.: 940.53 U58rp no. 71a

_____, Naval Analysis Division. *The Campaigns of the Pacific War*. Washington, D.C.: GPO, 1946.
Book call no.: 940.53 U58rp no. 73

_____, Naval Analysis Division. *The Offensive Mine Laying Campaign Against Japan*. Washington, D.C.: GPO, November 1946.
Book call no.: 940.53 U58rp no. 78
Part IV. War Lessons and Comments: I. Planning, 17-18.

_____, Office of the Chairman. *Over-All Report (European War)*. Washington, D.C.: GPO, September 1945.
Book call no.: 940.53 U58re no. 2

_____. Office of the Chairman. *Summary Report (Pacific War)*. Washington, D.C.: GPO, July 1946.
Book call no.: 940.53 U58rp no. l

Warden, John A., III, Col, USAF. *The Air Campaign: Planning for Combat*. Washington, D.C.: National Defense University Press, 1988.
Book call no.: 358.414 W265a
Bibliography, 183-86.
Index, 187-92.

Weigley, Russell F. *The American Way of War: A History of United States Military Strategy and Policy*. New York: Macmillan Publishing Co., 1973.
Book call no.: 355.0973 W418a
Part 3, Chapter 11. A Strategy of Air Power: Billy Mitchell, 223-41.
Part 4, Chapter 14. The Strategic Tradition of US Grant: Strategists of the European War, 31259 (AWPD-1, 337-38, 343, and 354).
Part 5, Chapters 1518. American Strategy in Perplexity, 1945, 363-552.
Notes, 479-552.
Select Bibliography on American Writings on Military Strategy, Theoretical and Historical, 553-61.

Documents

Davis, Charles N., Jr., Maj, USAF. "A Decision Support Process for Planning Air Operations." Paper. Newport, R.I.: Naval War College, February 1991.
Doc. call no.: M-U 41662 D2611d

Fabyanic, Thomas A., Col, USAF. "A Critique of United States Air War Planning, 1941-1944." PhD Dissertation. St. Louis, Mo.: St. Louis University, 1973.
Doc. call no.: M-U 43567-18
ChapterI. Background of High Altitude, Daylight, Precision Bombing.
ChapterII. Air War Plans Division-1.
ChapterIII. AWPD-4 and AWPD-42.
ChapterIV. The Plan for the Combined Bomber Offensive.
ChapterV. Conclusions.
Select Bibliography, 211-16.

Felker, Edward J., Maj, USAF. "Does the Air Force Practice Its Doctrine? A Limited and Focused Air Campaign Concept." Thesis. Fort Leavenworth, Kans.: US Army Command and General Staff College, June 1991.
Doc. call no.: M-U 42022 F316d
This study explores the US Army and Air Force doctrinal base for building a focused and limited air campaign. The concept presented focuses on operational art and directly achieving the joint force commander's objectives versus generating air sorties to service targets.

Harrell, William, Jr., Lt Col, USAF. "Air Campaign Central Europe: Comparative Analysis Between World War II and the Present." Defense Analytical Study. Maxwell AFB, Ala.: Air War College, Air University, May 1989.
Doc. call no.: M-U 43117 H296a
Bibliography, 58-60.

Jordan, Daniel W., Maj, USAF. "Tactical Airpower at the Operational Level of War." Thesis. Fort Leavenworth, Kans.: US Army Command and General Staff College, June 1990.
Doc. call no.: M-U 42022 J821t
Appendix IV. Air Operations, 179-96.
The Air Superiority Campaign:
Offensive Counter Air.
Defensive Counter Air.
Suppression of Enemy Air Defenses (SEAD).

McSwain, Donald L., Col, USAF. "Air Campaign Planning for Contingency Operations." Defense Analytical Study. Maxwell AFB, Ala.: Air War College, Air University, May 1989.
Doc. call no.: M-U 43117 M175a

RAND Corporation. "Allied Air Forces Central Europe Air Campaign Study (U)." Edited by R. J. Hillestad et al. R-3897-AF. Santa Monica, Calif.: RAND, January 1992.
Doc. call no.: M-S 30352-1 no. 3897

_____. "The Challenge of Future Nonstandard Contingencies: Implications for Strategy, Planning, Crisis Management, and Forces." Edited by James A. Winnefeld and David A. Shlapak. Two vols. (N-3098/ 1-DAG). Santa Monica, Calif.: RAND, October 1990.
Doc. call no.: M-U 30352-53 no. 3098
Volume 1, Section VI. Force Development Planning: Needed Mission Capabilities, 33-45.
Volume 1, Section VII. Force Employment Planning and Command Arrangements, 46-53.

RAND Corporation. "Lessons from an Aerial Mining Campaign (Operation Starvation]." Edited by Frederick M. Sallagar. R-1322-PR. Santa Monica, Calif.: RAND, April 1974.
Doc. call no.: M-U 30352-1 no. 1322
Section III. Genesis of the B-29 Mining Campaign, 15-30.
References, 79-80.

_____. "NATO Tactical Aircraft Capabilities for Supporting Land Warfare in Central Europe in the Early 1990s: Attacks Against Divisions and Brigades (U)." Edited by T. M. Parker. R-3743/6-AF. Santa Monica, Calif.: RAND, August 1989.
Doc. call no.: M-S 30352-1 no. 3743/6
Implications for Air Campaign Planning (U), 24-31.
Air Campaign Planning (U), 71-76.

_____. Operation Strangle (ItalySpring 1944): A Case Study of Tactical Air Interdiction. Edited by

Frederick M. Sallagar. R-851-PR. Santa Monica, Calif.: RAND, February 1972.
Doc. call no.: M-U 30352-1 no. 851
Section 3. The Planning, 1636.
Appendix B. Bibliography, 9395.

Royal Australian Air Force, Airpower Study Centre. "The Air Power Manual." RAAF Base, Fairbairn, Australia, August 1990.
Doc. call no.: M-U 36760-54 no. 1000
Air Power:
The Air Campaigns, 3234.
Campaign Priorities, 9798.
Air Bombardment Campaign, 129.

Skattum, Mark H., Maj, USAF. "Air Campaigns: Fact or Fantasy?" Fort Leavenworth, Kans.: US Army Command and General Staff College, May 1989. Monograph. School of Advanced Military Studies.
Doc. call no.: M-U 42022-2 S626a

US Air Force. Assistant Chief of Staff, Studies and Analysis. "The Uncertainty of Predicting Results of an Interdiction Campaign." Saber Measures (Alpha). Washington, D.C., December 1969.
Doc. call no.: M-U 42210-43
The purpose of this study is to gain a better understanding of how to evaluate the effectiveness of an air interdiction campaign by analyzing the historical records relating to Operation STRANGLE in Italy, which was conducted from 15 March 1944 to 11 May 1944.

_____. Office of Air Force History. "Air Campaign Planning." Washington, D.C., February 1990.
Doc. call no.: M-U 42229-76
A study of air campaign planning, consisting of ten air campaigns from World War I to the war in Southeast Asia and the several Israeli air campaigns.

US Defense Nuclear Agency. "Task 3: Nuclear Targeting Policy Issues for the 90s: Volume VI--Lessons of History: Strategic Air Warfare, World War II." Technical Report. DNA-TR-90-161-Vol. 6. Washington, D.C., April 1991.
Doc. call no.: M-U 37762-34 no. 90-161 Vol. 6

Periodicals

Bogardus, Anneke-Jans, Maj, USA. "Prelude to Operation Overlord: The Air Campaign." *Military Review* 74: 64-66, March 1994.

Canan, James W. "Back to the Future: As Senior Air Force Leaders Describe It, Global Reach, Global Power Is a Forward-Looking Mix of Tradition and Change." *Air Force Magazine* 73: 32-37, October 1990.

Cioletti, Craig, Capt, USAF, and Lee Smith, Capt, USAF. "Bright Star 82." *USAF Fighter Weapons Review*, 24, Summer 1982. "Preparation," 23.

Copp, DeWitt S. "The Pioneer Plan for Air War." *Air Force Magazine* 65: 74-78, October 1982.

George, Bob, Maj, USAF, and Lonnie Goodson, Maj, USAF. "Planning, Leading & Executing a Large Force Package: The Gorilla Lives." *USAF Fighter Weapons Review*, 58, Summer 1985.

Kirtland, Michael A., Lt Col, USAF. "Planning Air Operations: Lessons from Operation Strangle in the Korean War." *Airpower Journal* 6: 37-46, Summer 1992.

McPeak, Merrill A., Gen, USAF. "For the Composite Wing." *Airpower Journal* 4: 412, Fall 1990.
"Manufacturing a Gorilla," 58.

Meacham, James A., Cmdr, USN. "Four Mining Campaigns: An Historical Analysis of the Decisions of the Commanders." *Naval War College Review* 19: 75129, June 1967.

Ogan, Andrew J., Maj, USAF. "Thinking about Air Power." *Airpower Journal* 3: 4349, Spring 1989.
"Employment of Air Power: Mission Development; Example of Mission Development; Key Elements," 48-49.

Parker, Steven A., Cadet First Class, USAF Academy. "AWPD-1: Targeting for Victory--the Rationale Behind Strategic Bombing Objectives in Americas First Air War Plan." *Airpower Journal* 3: 5870, Summer 1989.

Swan, Guy C., III, Maj, USA. "Theater Campaign Planning for NATOs Northern Region." *Parameters* 20: 4863, March 1990.

Walker, John R., AVM, RAF. "Air Defence in the Central Region." *Hawk*, 69-84, May 1990.
Air Combat, 7577.
Attrition, 7779.
The Air Campaign, 7984.

Westenhoff, Charles M., Maj, USAF. "Aggressive Vision." *Airpower Journal* 3: 3439, Fall 1989.
More than most campaigns of World War II, New Guinea was won using current military concepts and organizations. From the start, operations were combined (multinational) and joint (multi-service).

Weyland, Otto P., Gen, USAF. "The Air Campaign in Korea." *Air University Quarterly Review* 6: 3-28, Fall 1953.

Gulf War-1991

Books

Atkinson, Rick. *Crusade: The Untold Story of the Persian Gulf War*. Boston, Mass.: Houghton Mifflin, 1993.
Washington D.C., 56-65.

Cohen, Elliot and Thomas F. Keaney, et al. *Gulf War Air Power Survey: Summary*. Washington, D.C., March 1993.
What Was Planned?, 2149.

Coyne, James P. *Airpower in the Gulf*. Arlington, Va.: Aerospace Education Foundation, 1992. Air Force Association book.
Book call no.: 956.70442 C881a
The Internal Look Rehearsal, 16.
Chapter 4. Plan of Attack, 4347.
Adjusting the War Plan, 6164.
Planning in the Wings, 6465.

Freedman, Lawrence, and Efraim Karsh. *The Gulf Conflict 1990-1991: Diplomacy and War in the New World Order*. Princeton, N.J.: Princeton University Press, 1993.
Book call no.: 956.70442 F853g
Chapter 23. The Strategic Air Campaign, 31230.

Friedman, Norman. *Desert Victory: The War for Kuwait*. Annapolis, Md.: Naval Institute Press, 1991.
Book call no.: 956.7043 F911d
Chapter 9. The Air Campaign, 169-96.

Gordon, Michael R. and Bernard E. Trainor, General USMC (Ret.) *The General's War. The Inside Story of the Conflict in the Gulf*. Boston MA, Little Brown & Co., 1995.
Book Call No. 956.7044'2-dc20.

Pimlott, John and Stephen Badsey, et al. *The Gulf War Assessed*. Department of War Studies, Royal Military Academy, Sandhurst. London: Arms and Armour Press, 1992.
Book call no.: 956.70442 G9711
Chapter 5. The Air War, by Ray Sibbald, 105-24.
Planning the Air War, 109-11.
Air Tasking, 111-13.

Hallion, Richard P. *Storm Over Iraq--Air Power and the Gulf War*. Washington, D.C.: Smithsonian Institution Press, 1992. (Smithsonian History of Aviation Series)
Invigorating Military Thought and Doctrine: Summers, Warden, Lehman, Rice, 115-20.
Orchestrating the Air War: Checkmate and Black Hole Write the Music, 141-46.
The Air Plan that Defeated Saddam Hussein, 150-56.

Head, William and Earl H. Tilford, Jr. (eds.) *The Eagle in the Desert: Looking Back on U.S. Involvement in the Persian Gulf War*. Westport CT: Praeger Publishers, 1996.

Kinzey, Bert. *The Fury of Desert Storm*. Blue Ridge Summit, Pa.: TAB Books, 1991.
Book call no.: 358.41830973 K56f
Concept of the Air Campaign, 12.

Mann, Edward C., III, Col, USAF. *Thunder and Lightning: Desert Storm and the Airpower Debates*. Maxwell AFB, Ala.: AU Press, 1995. Vol. 2 of a 2-Vol. Series. (See Reynolds, Heart of the Storm.)

Pagonis, William G. *Moving Mountains: Lessons in Leaderships and Logistics from the Gulf War*. Boston, Mass.: Harvard Business School Press, 1992.
Book call no.: 956.70442 P139m

RAND Corporation. *A League of Airmen: US Air Power in the Gulf War*. James A. Winnefeld, Preston Niblack and Dana J. Johnson, eds. Santa Monica, Calif.: RAND, 1994.
Book call no.: 956.7044248 W434L
Chapter 4. Planning the Air Campaign, 5587.

_____. *Operation Desert Storm Master Attack Plan (U)*. Donald E. Emerson, Fred L. Frostic, T. M. Parker, and Phillip Propper, eds. Santa Monica, Calif.: RAND, November 1993.

Reynolds, Richard T., Col, USAF. *Heart of the Storm: The Genesis of the Air Campaign Against Iraq*. Maxwell AFB, Ala.: AU Press, 1995. Vol. 1 of a 2-Vol. Series. (See Mann, Thunder and Lightning.)

Summers, Harry G., Jr., Col, USA, Retired. *On Strategy II: A Critical Analysis of the Gulf War*. New York: Dell Publishing, 1992.
Book call no.: 956.7043 S955o
The Strategic Offensive, 194-201.

United States Air Force. *Reaching Globally, Reaching Powerfully: The United States Air Force in the Gulf War: A Report*. Washington, D.C., September 1991.
Book call no.: 956.7043 R281
Crafting a Plan, 1114.

US Congress. Senate. Committee on Armed Services. *Operation Desert Shield/Desert Storm. Hearings, 102d Congress, 1st session*. Washington, D.C.: GPO, 1991.
Book call no.: 956.7043 U58oa
Original Theater Campaign, 234.
Air Campaign Plan & Targets, 237.

US Department of Defense. *Conduct of the Persian Gulf War. Final Report to Congress*. Three volumes. Washington, D.C., April 1992.
Book call no.: 956.70442 C746
Volume 1, Chapter VI. The Air Campaign, 117247.

_____. *Conduct of the Persian Gulf Conflict. An Interim Report to Congress*. One volume. Washington, D.C., July 1991.
Book call no.: 956.70442 C7461
Operation Desert Storm: Air Campaign Overview; Phase I - The Strategic Air Campaign; Phase II - Air Superiority in the KTO; Phase III - Battlefield Preparation; Phase IV - The Ground Campaign, 4-2/4-10.

US News & World Report. *Triumph Without Victory: The Unreported History of the Persian Gulf War*. New York: Times Books, 1992.
Book call no.: 956.7043 T839
Air campaign planning for the Gulf War, Chapter 12, 191; Chapter 14, 22223; Chapter 15, 259-60; Chapter 16, 26567.

Documents

Martin, Jerome V., Lt Col, USAF. "Victory from Above: Air Power Theory and the Conduct of Operations Desert Shield and Desert Storm." AU-ARI Command-Sponsored Research Report no. AU-ARI-92-8. Maxwell AFB, Ala.: Air University Press, June 1994.
Chapter 4. Planning the Storm, 45-61.
Notes, 58-61.

US Air Force. Tactical Air Command. Deputy Commander, Tactics and Test, 57th Fighter Weapons Wing. "Tactical Analysis Bulletin (U)." One volume. Nellis AFB, Nev., July 1991.
Doc. call no.: M-S 42339, July 1991
(U) During the period 2123 May 1991, fighter pilots from around the world gathered at Nellis AFB, Nevada, to attend the Tactical Air Forces Desert Storm Tactics Conference. The purpose of this conference was to capture those lessons learned during Operation DESERT STORM.

US Department of Defense. "Conduct of the Persian Gulf Conflict (U)." One volume. Washington, D.C., July 1991.
Doc. call no.: M-S 42214-112a
Theater Campaign Plan, 2-6.
Air Campaign Plan, 2-6/2-7.
Ground Campaign Plan, 2-7/2-8.
Operation Desert Storm: Air Campaign Overview, 4-2; The Strategic Air Campaign, 4-2/4-4; Phase II--Air Superiority in the KTO, 4-4/4-5; Phase III--Battlefield Preparation, 4-5/4-6.

Periodicals

Clodfelter, Mark, Maj, USAF. "Of Demons, Storms, and Thunder: A Preliminary Look at Vietnam's Impact on the Persian Gulf Air Campaign." *Airpower Journal* 5: 1732, Winter 1991.
Air campaign planning for the Persian Gulf, 28.

Cook, Nick. "Air War Doctrine Affirmed--How the RAF Now Measures Its Success." *Janes Defence Weekly* 15: 738+,

4 May 1991.
Coyne, James P. "Plan of Attack--Off-the-Shelf Plans Did Not Suffice for the Air Campaign that General Schwarzkopf Envisioned in the Gulf." *Air Force Magazine* 75: 40-46, April 1992.
Downer, Lee A., Brig Gen, USAF. "The Composite Wing in Combat." *Airpower Journal* 5: 415, Winter 1991.
Eshel, Tamir. "The Most Successful Air Campaign Ever?" *Military Technology* 15, no. 4: 3638+, April 1991.
Planning the Attack, 3738.
Fulghum, David A. "Allies Divide Air Strike Targets into Grid of Killing Boxes." *Aviation Week & Space Technology* 134: 62, 18 February 1991.
Glosson, Buster C., Maj Gen, USAF. "War Planner: Civilians Didn't Change Target List: Interview by Casey Anderson." *Air Force Times* 51: 27, 8 July 1991.
Grossman, Larry. "Col John A. Warden III: Air Force Veteran Battles for New World Order." *Government Executive* 24: 46, February 1992.
Over the six-month build up to Desert Storm, the details of the full air tasking order were painstakingly nailed down in Saudi Arabia by Lt Gen Charles Horner, the coalitions air component commander, and his chief targeteer, Brig Gen Buster Glosson. The particulars were Horners and Glossons work, says a senior Air Force planner, but the heart and soul of the air campaign was vintage John Warden.
Gunselman, John H., Jr., Lt Col, USAF. "Documentary on Desert Shield/Storm Supply Support." *Air Force Journal of Logistics*, 1116, Fall 1991.
Horner, Charles A., Lt Gen, USAF. "The Air Campaign." *Military Review* 71: 1627, September 1991.
Planning the Offensive, 2124.
_____. "A Conversation with Chuck Horner: Interview by Richard MacKenzle." *Air Force Magazine* 74: 5764, June 1991.
Lewis, Richard B. H., Col, USAF. "JFACC Problems Associated with Battlefield Preparation in Desert Storm." *Airpower Journal*, 421, Spring 1994.
Mason, R. A. "The Air War in the Gulf." *Survival* 33: 211-29, May-June 1991.
The Air Plan, 214.

Mathews, Tom, et al. "The Secret History of the War: Prodigious Planning and Unshakable Will Produced a Famous Victory." *Newsweek* 117: 2839, 18 March 1991.
Part 1. In the Black Hole, 29-30.
Morrocco, John D. "Allied Strategists Altered Battle Plans to Compensate for (Gen Michael J.) Dugan's Comments." *Aviation Week & Space Technology* 135: 60, 22 July 1991.
Palmer, Michael A. "The Storm in the Air: One Plan, Two Air Wars?" *Air Power History* 39: 24-31, Winter 1992.
Ground generals fear of a tough land war against Iraq lead to two air wars: a strategic air effort and a ground support campaign.
Putney, Diane T. "From Instant Thunder to Desert Storm: Developing the Gulf War Air Campaign's Phases." *Air Power History* 41: 3850, Fall 1994.
Record, Jeffrey. "Why the Air War Worked." *Armed Forces Journal International* 128: 4445, April 1991.
The Campaign Plan, 4445.
Schwarzkopf, H. Norman, Gen, USAF. "Schwarzkopf: I Got a Lot of Guff (On why the air campaign succeeded)." *Newsweek* 117: 34, 11 March 1991.
_____. "Success of Allied Air Campaign Validates U.S. Tactics, Training and Equipment." *Aviation Week & Space Technology* 134: 4647, 25 February 1991.
Waters, Gary, Wing Cmdr, RAAF. "The Gulf War and Logistics Doctrine." *Air Force Journal of Logistics*, 1822, Summer 1992.

General

Books

Boyne, Walter J. *Silver Wings--A History of the United States Air Force*. Foreword by Gen James H. Doolittle. Introductory Note by Lee Ewing. New York: Simon & Schuster, 1993.
The Air War Plans Divisions, AWPD, 134-37.

Hosmer, Stephen T. *Psychological Effects of U.S. Air Operations in Four Wars, 1941-1991: Lessons for U.S. Commanders*. Santa Monica CA, RAND, 1996.

Mason, Air Vice Marshall Tony. *Air Power: A Centennial Appraisal*. London, Brassey's, 1994.

Pape, Robert A. *Bombing to Win: Airpower and Coercion in War*. Ithaca, N.Y.: Cornell University Press. 1996.

Ross, Stephen T (ed.) *American War Plans, 1919-1941*. Five volumes. New York: Garland Publications, 1992.
Volume1. Peacetime War Plans, 19191935.
Volume2. Plans for War Against the British Empire and Japan: The Red, Orange, and Red-Orange Plans 19231938.
Volume3. Plans to Meet the Axis Threat, 19391940.

Strange, Joe, Dr., *Centers of Gravity & Critical Vulnerabilities: Building on the Clausewitzian Foundation So That We Can All Speak the Same Language*. Quantico, Va., Marine Corps War College (Perspectives on Warfighting, No. 4, 2nd ed.), 1996.

US Air Force Materiel Command. Armstrong Laboratory. Contingency Air War Planning System (CAPS): Program Concept. Brooks AFB, Tex., October 1993. (AL-TR-1992-0167)

Van Creveld, Martin L. *Supplying War: Logistics from Wallenstein to Patton*. New York, N.Y.: Cambridge University Press, 1977.
Book call no.: 355.41 V2223s

Watts, Barry D., Lt Col, USAF. *The Foundations of US Air Doctrine: The Problem of Friction in War*. Maxwell AFB, Ala.: Air University Press, 1984.

_____. *Gulf War Airpower Survey*. Washington D.C.: U.S. Government Printing Office, 1993.
Vol II Section 2: "Effects and Effectiveness."

Winnefeld, James A., and Dana J. Johnson. *Joint Air Operations: Pursuit of Unity in Command and Control, 1942-1991*. RAND Research Study. Annapolis, Md.: Naval Institute Press, 1993.
Book call no.: 355.422 W776j

Documents

Barlow, Jason B., Maj. USAF. "Strategic Paralysis: An Airpower Theory for the Present." Thesis. Maxwell AFB, Ala.: Air University, Air Command and Staff College, School of Advanced Airpower Studies. February 1994.

Carter, John R., Maj. USAF. "Airpower and the Cult of the Offensive." Thesis. Maxwell AFB, Ala.: Air University, Air Command and Staff College, School of Advanced Airpower Studies. June 1997.

Eggington, Jack B., Maj. USAF "Ground Maneuver and Air Interdiction: A Matter of Mutual Support at the Operational Level of War." Thesis. Maxwell AFB, Ala.: Air University, Air Command and Staff College, School of Advanced Airpower Studies. August 1994.

Fadok, David S., Maj. USAF. "John Boyd and John Warden: Airpower's Quest for Strategic Paralysis." Thesis. Maxwell AFB, Ala.: Air University, Air Command and Staff College, School of Advanced Airpower Studies. February 1995.

Fischer, Michael E., Maj USAF. "Mission-Type Orders in Joint Air Operations: The Empowerment of Air Leadership." Thesis. Maxwell AFB, Ala.: Air University, Air Command and Staff College, School of Advanced Airpower Studies. June 1994.

Ford, James M., Maj, USAF. "Air Force Culture and Conventional Strategic Airpower." Thesis. Maxwell AFB, Ala.: Air University, Air Command and Staff College, School of Advanced Airpower Studies. May 1992.
AWPD-1 and AWPD-42, 1416.

Griffith, Thomas E., Jr., Maj USAF. "Strategic Attack of National Electrical Systems." Thesis. Maxwell AFB, Ala.: Air University, Air Command and Staff College, School of Advanced Airpower Studies. October 1994.

Gruner, Glenn A., Maj, USAF. "Clausewitz at Mach II--Has Classical Military Theory Kept Pace with Technology?" Monograph. Fort Leavenworth, Kans.: US Army Command and General Staff College, School of Advanced Military

Studies. May 1993.
Section V. Implications for Campaign Planning, 3942.
Hust, Gerald R., Maj, USAF. "Taking Down Telecommunications." Thesis. Maxwell AFB, Ala.: Air University, School of Advanced Airpower Studies. September 1994.
Chapter 4. Guidance for Campaign Planning, 5762.
Livsey, Timothy D., Maj, USA. "Air Occupation: A Viable Concept for Campaign Planning?" Monograph. Fort Leavenworth, Kans.: US Army Command and General Staff College, School of Advanced Military Studies. May 1993.
Rinaldi, Steven M., Maj. USAF. "Beyond the Industrial Web: Economic Synergies and Targeting Methodologies." Thesis. Maxwell AFB, Ala.: Air University, Air Command and Staff College, School of Advanced Airpower Studies. April 1995
Saxman, John B., Lt Col, USAF. "The Concept of Center of Gravity: Does It Have Utility in Joint Doctrine and Campaign Planning?" Monograph. Fort Leavenworth, Kans.: US Army Command and General Staff College, School of Advanced Military Studies. May 1992.
Section III. The Use of the Concept of Center of Gravity in the Gulf War, 2529.
Sullivan, Mark P., Maj. USAF. "The Mechanism of Strategic Coercion: Denial or Second-Order Change?" Thesis. Maxwell AFB, Ala.: Air University, Air Command and Staff College, School of Advanced Airpower Studies. April 1995.
Treadway, C.G.C., Maj., USAF. "More Than Just A Nuisance: When Aerial Terror Bombing Works." Thesis. Maxwell AFB, Ala.: Air University, Air Command and Staff College, School of Advanced Airpower Studies. February 1998.
US Air Force. Deputy Chief of Staff, Plans and Operations. JFACC Primer. Second Edition. Washington, D.C., February 1994.
Section III. Air Campaign Planning, 31.
Watts, Barry D. "Clauswitzian Friction and Future War." Monograph. Ft McNair, Wahsington D.C. McNair Paper 52. October 1996.

Periodicals

Bartlow, Gene S., Col, USAF. "The Operator-Logistician Disconnect." *Airpower Journal*, Fall 1988, 2337.
Beyerchen, Alan, Dr. "Clausewitz, Nonlinearity, and the Unpredictability of War." *International Security*, Vol. 17 No. 3. Winter 1992-93. 59-90.
Carpenter, P. Mason, Maj, USAF, and George T. McClain, Maj, USAF. Air Command and Staff College Air Campaign Course: The Air Corps Tactical School Reborn? Airpower Journal 7: 7283, Fall 1993.
Clodfelter, Mark. Pinpointing Devastation: American Air Campaign Planning Before Pearl Harbor. Journal of Military History 58: 75101, January 1994.
Gehri, Suzanne B., Lt Col, USAF. The Air Force Mission (Singular). Airpower Journal 6: 1724, Winter 1992.
Hagel, Stephen J., Maj, USAF. Capturing Logistics Data (Part I). Air Force Journal of Logistics, 12, Fall 1991.
_____. Capturing Logistics Data (Part II). Air Force Journal of Logistics, 19, Winter 1992.
Pape, Robert A. "The Limits of Precision-Guided Air Power." *Security Studies*, Vol. 7, No. 2, Winter 97/98. 93-113.
Roche, James G. and Barry D. Watts. "Choosing Analytic Measures." *The Journal of Strategic Studies*, Spring 1988. 165-201.
Warden, John A. III. "Success in Modern War: A Response to Robert Pape's *Bombing to Win*." *Security Studies*, Vol. 7, No. 2, Winter 97/98. 170-188.
Watts, Barry D. "Ignoring Reality: Problems of Theory and Evidence in Security Studies." *Security Studies*, Vol. 7, No. 2, Winter 97/98. 114-169.