In 1982 I was asked by the Army War College to write a text for its 1983-84 curriculum, which the College Commandant then "widely distributed throughout the Army." Titled Organization and Operational Employment of Air/Land Forces, in its Foreword I wrote:

The charge to the author was to produce "the best available thought which can be defended by reason, regarding air/land operations... (at) brigade through unified and combined command."

This work had its origin in a desire by doctrinal authorities at the U.S. Army War College for something which would fill a perceived void in the literature at "echelons above corps." The product reflects the real-world situation: There is little uniformity in air/land field organizations, as they now exist, at echelons above (or even below) corps. Nor can there be, given the variety of conditions where U.S. air/land forces are, or may be, deployed.

Any search for principles, or for the best available thought, must take that lack of uniformity into account, and also the practical reality that U.S. Army forces will always be employed in a multiservice or multinational framework in which the multiservice/multinational commander's needs and perspectives should govern.

In March 1984 the College faculty member who monitored my effort received this letter:

Dear Colonel Stewart

I have recently had the occasion to review your reference text, Organization and Operational Employment of Air/Land Forces, written by Lt Gen Cushman. I am enormously impressed with this document. I wonder if it is possible to get 10 copies or so for distribution here at TAC Headquarters.

Thanks very much for publishing an outstanding text.

Sincerely

MERRILL A. McPEAK, Major General, USAF
Deputy Chief of Staff, Plans
Tactical Air Command

From October 1990 to October 1994 General McPeak was Chief of Staff, United States Air Force.

ORGANIZATION AND OPERATIONAL EMPLOYMENT

OF

AIR/LAND FORCES

JOHN H. CUSHMAN

A Reference Text

for the

Center for Land Warfare

1983-1984

Director.....Colonel John P. Stewart
Project Officer.....Colonel William D. Johnson

UNITED STATES ARMY WAR COLLEGE
Carlisle Barracks, PA 17013

DEPARTMENT OF THE ARMY
US ARMY WAR COLLEGE
CARLISLE BARRACKS, PENNSYLVANIA 17013

REPLY TO
ATTENTION OF

Office of the Commandant

16 January 1984

This reference text, *Organization and Operational Employment of Air/Land Forces*, has been prepared for use by the students and faculty of the US Army War College. But, in a larger sense, it has been designed for the entire Army and specifically for use by our mid-level and senior leadership. For this reason, the reference text is being widely distributed throughout the Army.

The text was prepared by Lieutenant General John H. Cushman, USA Retired, for the US Army War College. The newly established Center for Land Warfare will sponsor further effort in this area. I strongly encourage readers to participate in the dialogue on the art and science of military operations. Any recommendations for corrections or improvements should be forwarded to the Center for Land Warfare at the Army War College.

This reference text is not an official publication of the Department of the Army. The views expressed are intended to stimulate thought and discussion rather than to convey official Army policy.

Thomas F. Healy

THOMAS F. HEALY
Major General, USA
Commandant

Foreword

The charge to the author was to produce "the best available thought which can be defended by reason, regarding air/land operations... (at) brigade through unified and combined command."

This work had its origin in a desire by doctrinal authorities at the U.S. Army War College for something which would fill a perceived void in the literature at "echelons above corps." The product reflects the real-world situation: There is little uniformity in air/land field organizations, as they now exist, at echelons above (or even below) corps. Nor can there be, given the variety of conditions where U.S. air/land forces are, or may be, deployed.

Any search for principles, or for the best available thought, must take that lack of uniformity into account, and also the practical reality that U.S. Army forces will always be employed in a multiservice or multinational framework in which the multiservice/multinational commander's needs and perspectives should govern.

For experienced air/land commanders and staff officers this work contains much that is basic and possibly little that is new. For them the author hopes only to address familiar material in a different way, namely from the viewpoint of the multiservice/multinational commander. The purpose is to provide food for, and stimulate, their further thought and action.

This work began as a "handbook." It is not such; it contains more explanation and rationale than would be in a proper handbook.

Further, the work falls short with respect to "how to do it." There is a good reason: no one yet has figured out how to do much that is required. It remains primarily for the commands themselves, after practice (including air/land warfare simulation), to decide how to do the many things they must do.

A number of people have contributed directly and indirectly to this effort. Many of these made their contributions long ago, not knowing that what they believed and conveyed to the author would one day be part of a work such as this. Some will recognize their contributions. They are simply too many to list. To all of them, in the distant as well as recent past, many thanks.

What is written here is at best only a point of departure, a contribution, or perhaps a way station, in a search for the best available thought.

John H. Cushman

Bronxville, New York

PREFACE

Purpose

The purpose of this work is to set down in writing, for senior commanders of air/land forces and their staffs, useful thought on the subject of the organization and operational employment of air/land forces.

This work is addressed to formation commanders of two-star* rank and above, and their staffs -- of whatever Service or national formation, or multiservice/multinational combination of forces -- who are part of, or who may be part of, an air/land force to which United States forces contribute a capability.

This work seeks to set forth, for this subject, "principles and policies... which have been developed through experience or by theory, that represent the best available thought... that can be defended by reason."

Although the words quoted are from the definition of "doctrine" contained in the Dictionary of U.S. Army Terms, November 1953, this is of course not doctrine.

"AirLand" or "air/land"?

Since shortly after the airplane began to be used in war, "land warfare" has in reality been "air/land warfare."

About 1978, the U.S. Army began writing and briefing about what it called the "AirLand Battle" and "AirLand Battle 2000." These are "doctrinal/conceptual" terms. They connote a set of ideas first developed and espoused in

*The two-star command level is selected because it is here that, generally, commanders begin to deal with the operational art as well as with tactics. This dividing line is certainly not precise, however, and much of what is written applies to commanders and staffs at lower levels.

U.S. Army circles, then picked up in part in some U.S. Air Force quarters and within the armies of some U.S. allies. In 1982, the term "AirLand Battle" and the ideas the Army wanted that term to convey were embodied in a revision of the Army's Field Manual 100-5, Operations, thereby becoming official Army doctrine. "AirLand Battle 2000" remains a set of operational concepts oriented on the future upon which requirements for Army materiel can be based.

This work uses the term: "air/land."* This is not used as a "doctrinal" term (such would not be appropriate, since this work can have no standing as "doctrine") but rather as a "descriptive" term. It simply conveys a generally accepted proposition, namely that "land warfare has for some time been in reality air/land warfare." (See the discussion under Air/Land Warfare, beginning page 1-1, Chapter I.)

Background

Air/land forces are always multiservice** and will almost always be multinational.

The way the U.S. military establishment is organized makes difficult the writing of useful authoritative operational guidance for U.S. multiservice forces. Each U.S. Service writes its own doctrine, including how it believes multiservice operations should be conducted. But the Services are responsible for the preparation of forces, not for their operations. Operations are the responsibility of combatant commanders, through a multiservice, usually multinational, chain of command which does not include the individual Services

*Presumably, the term "air/land" could be written as "airland," "air-land," or "air land" and be equally correct gramatically. Only to be consistent with itself, this work sticks to "air/land."

**For want of a better term, the prefix "multi-" as used herein means "more than one" rather than "many" as most dictionaries would have it.

except that the four Service Chiefs are members of the Joint Chiefs of Staff (who, to be precise, are not in the "chain of command").

Doctrine for U.S. multiservice forces is so tied up in Service roles and missions that to date it has not been possible for the Joint Chiefs of Staff, who operate essentially as a committee, to write meaningful "how-to-fight" guidance for multiservice forces -- or even to set up a mechanism for the development of such doctrine as "the best available thought... that can be defended by reason."*

Indeed, what has been published to this time by the Joint Chiefs of Staff (e.g., JCS Publication 2, Unified Action Armed Forces, or UNAAF) restricts the development, either through experience or by theory, of the best available thought. Over the years, ways of thinking, and thus of operating, have been codified by Service proponents meeting in committee and then promulgated by the Joint Chiefs of Staffs in a series of definitive publications beginning with the "joint dictionary," (JCS Publication 1). Changes in these prescribed ways of thinking go through the same process.

This work by no means ignores what is written in JCS publications, but chooses not to be bound by such when it restricts the development of the best available thought.**

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*The JCS have recently established a "pilot program" under which various unified commanders develop doctrine in specific areas. The CINC, US European Command, will thus write doctrine for the "attack of follow-on forces." USEUCOM is, however, a U.S.-only command; the multinational command known as Allied Forces Central Europe (AFCENT) will have the operational responsibility for such attack in war. (USEUCOM intends to write its "doctrine" in that light.)

**For this reason, the term "multiservice" is used, rather than "joint." The latter term has become so burdened with meanings negotiated by Service proponents, then prescribed for use throughout the U.S. military establishment, that it restricts, rather than permits, the seeking of objective thought.

Reality

This work seeks to focus on reality. It seeks to see history as it has been and the world as it is. It takes note of certain basic principles which have been learned, often at great cost, over the years -- such as that teamwork produces better results than does its lack and that unity of effort is an essential requirement.

In that light it aims to describe, for the conduct of air/land operations, "what will usually work best."

This effort sees weapons capabilities and the laws of physics as very real; they are decisive determinants of events. Also quite real, and necessary to be taken into account, are the intangibles of men's minds and of man's behavior in battle. So also is what is often called "Service culture" -- that which is written in Service doctrine and has been over the years drilled into the officers and men of a Service. This too needs to be taken into account.

The laws of physics cannot be changed by man. The intangibles of man's behavior often can be changed, especially when man learns by experience that what he has been doing does not work very well and that there is probably a better way.

Stemming from a failure to take full note of the statutory basis of the organization and employment of U.S. military forces, there is a certain lack of reality in much of what is written as "doctrine" today: The Services tend to portray that they, the Services, are responsible for operations.

For example, the Preface of U.S. Army Field Manual 100-5, Operations, 20 August 1982, states that "The fundamental mission of the United States Army is to deter war..." and that the field manual "explains how the Army must conduct campaigns and battles..." (emphasis added).

A phrasing more in keeping with governing statutes might be that "the fundamental mission of the United States Army is to prepare land forces* which (do such and such)..." and that Field Manual 100-5 describes "how operational formations of the Army should be trained to fight."

Such a formulation would then be consistent with the realities of operational command.

The Political Context

In order to defend their territories and in other ways to serve the freedoms and well-being of their peoples, other nations of the world have joined, and can in the future be expected to join, with the United States in coalitions for a common cause. The multinational air/land or air/land/sea forces for the commanders and staffs of which this is written serve, or will serve, such a common cause.

The military forces with which this work deals are instruments of national, and in the case of multinational forces, coalition policy. Their makeup, missions, and strategic guidance are determined by the political authorities who establish them. They respond to the direction of such political authorities. At the same time, their senior commander's judgment should be taken carefully into account as that direction is being formed.

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*From the National Security Act of 1947, as amended:

> The United States Army, within the Department of the Army... Shall be responsible for the preparation of land forces (underlining added)... [From the National Security Act of 1947, Statutes at Large 61, sec. 205, p. 517.]

and,

> ...the President, through the Secretary of Defense, shall establish unified or specified combatant commands for the performance of military missions... to be composed of forces of the Department of the Army, the Department of the Navy, and the Department of the Air Force (underlining added).... [From the Department of Defense Reorganization Act of 1958, Statutes at Large 72, sec. 5, p. 518.]

This text does not address how the coalition's common cause, or the United States' national objectives in the case of a U.S.-only force, may be determined and defined; nor does it address the issues of political and strategic, or even operational, direction by higher authority of the multiservice/multinational force. It is aimed simply at seeing to it that the force, responsive at all times to the direction of political authority, acts with the greatest possible effectiveness within its means.

The Influence of Nuclear Weapons

Inasmuch as the United States is a nuclear superpower, any air/land force to which the United States contributes a capability will have within it, or in its support, nuclear weapons and the means of their employment.

Further, any foreseeable use of such an air/land force must take into account the possibility, however slight, that the enemy either will possess nuclear weapons and delivery means or will be supported by a power that does.

Thus, any contemplation of air/land action must consider the influence of the nuclear weapon on such action -- any air/land action will take place in a "nuclear environment."

Nuclear warfare is a great unknown. Excluding Hiroshima, Nagasaki, and some testing, there is no base of experience in the matter. Despite a variety of theories which have been offered, the idea of a "limited" or "tactical only" nuclear war is so conjectural that to embark on any such involves the most grave risks.

This is so because it is certain beyond doubt that an all-out nuclear war between superpowers would be a calamity of the most immense proportions. It follows, then, that statesmen and military men have the most profound obligation to see to it that no such catastrophe occurs. The very first use of nuclear weapons by either side, even in a "tactical" role, may well bring

about the other side's greater use. For one of two nuclear-capable sides to believe that the other is poised to start nuclear warfare may trigger his own, or hasten the other's, pre-emptive use.

All of this cannot help but raise in the minds of statesmen and their peoples the specter of the gravest dangers of a most unwanted escalation.

Yet, without a nuclear capability of a certain size and character in its hands or in the hands of a reliable ally, and faced by an enemy willing to threaten the use of nuclear weapons, any nation is susceptible to nuclear blackmail.

The paradox is that in order for the United States and its friends to avoid nuclear blackmail it is necessary to be able to wage nuclear war, regardless of how deeply one wishes to avoid doing so.

The nature of tactical, or theater only, nuclear war is itself an unknown. Certainly the widespread use of nuclear weapons against forces in contact and in the depth of the battlefield will create conditions of the most extraordinary destruction, which no responsible military man can rationally or logically seek.

The aim of each commander within an air/land battle force must be to so organize and employ the force and all its parts so that its dispositions will not invite the use of nuclear weapons by the other side, nor will they -- the commanders -- find it necessary on our side to recommend to political authorities the use of nuclear weapons to accomplish the mission of the force.

See Chapter IV, An Approach to Nuclear Warfare.

Chemical Warfare

Unlike nuclear weapons, chemical weapons, although they kill and maim in a different way from other munitions, do not introduce totally new orders of destruction and uncertainty to warfare.

ORGANIZATION AND OPERATIONAL EMPLOYMENT OF AIR/LAND FORCES

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Chapter I. AIR/LAND FORCES

Air/Land Warfare

Air/land warfare is warfare which takes place on the land, in the envelope of air above the land, and on or over the land's contained and adjacent waters. Its boundaries are not precise; air/land warfare may blend at its boundaries with air warfare and with sea warfare. Under conditions in which substantial sea areas are involved it may become air/land/sea warfare.

It is possible for opposing air forces to clash in an "air battle," or even in entirely "air warfare." It is also possible for opposing naval forces to clash in a sea battle or in entirely "sea warfare." But above the level of engagement between opposing battalions, or perhaps brigades, it is not possible to conceive of modern land forces clashing in other than an "air/land battle." This approach sees no such phenomenon as "land warfare."

On any particular land mass, "theater warfare" will usually be a combination of "air warfare" and "air/land warfare," and will in many cases include "sea warfare." Theater warfare is waged by "theater forces."*

Thus, in a large theater of operations the phenomena of "air battle" or even "air warfare" may well occur, such as in the deep attack of an enemy's air bases and other air resources, or in the defense of our own air resources against enemy attack, or in air-to-air engagements well above the land.

*The theater forces of the United States and its allies can be looked at as those multiservice, usually multinational, forces either deployed or in preparation for deployment to largely land mass areas of operation. They join strategic and maritime forces in a global fabric aimed at deterrence, crisis control, and, if necessary, the effective waging of war. Today these theater forces focus on Europe, Korea, and the Middle East/Southwest Asia.

When such air battle occurs in an air/land theater of operations, the air forces which wage it will in almost every instance be in large part also engaged in the air/land battle described below which the theater air battle overarches. The tactical air forces which so operate may well be, and in the case of U.S. forces and those of its allies will probably be, under a single air authority or command.

(History: Various theaters in World War II; various battles [e.g., Okinawa, Rhineland, Italy] in World War II; Korea in 1950-53; Vietnam War; AFNORTH, AFSOUTH, and AFCENT since 1953; Korea since 1953.)

Air/Land Battle

In a zone forward of, rearward of, and immediately above the places where opposing land forces actually clash -- a zone which may extend perhaps 200 miles or more forward and rearward from the places of land contact -- the phenomenon is that of an air/land battle.

Here the firepower of tactical air mixes intimately with that of land forces. Here the reconnaissance capabilities of tactical air and those of the land forces complement, even duplicate, one another and air and land intelligence gathering blends intimately with the sensings of high technology "national" means used by both land and air forces. Here land and air forces share logistical support means, including air delivery. Here land and tactical air forces can each lay mines and destroy roads and bridges. Here the enemy and our own air defense guns and missiles on the land interact with enemy and our own tactical air and helicopters, in a single battle, and the radars of both land and tactical air forces look at the same targets. Here the jammers and the communications means of land and tactical air forces use the same frequencies.

Air/land battle is always waged by a composite of land and tactical air forces. These can be called "air/land forces" or "air/land battle forces,"

or, in a given situation, "the air/land force" or "the air/land battle force."*

(History: 1973 October War; Falklands, 1982 (air/land/sea); Israeli Operations in Lebanon, 1982.)

Air/Land Forces

Air/land, or air/land battle, forces have over the years taken shape in various ways; no two nations have organized them identically.

In United States forces, for example, land based air defense gun and missile units are organized, trained, and equipped by the U.S. Army, while in the Federal Republic of Germany the army provides only air defense gun units and air defense missile units are the responsibility of the Luftwaffe.

The U.S. Marine Corps, because it has focused primarily on its mission of preparing forces for amphibious operations, has within its own Service the equivalent of tactical air forces. A separate Service, so organized for such a role, can be justified by the strategic requirements of the United States, and perhaps for other powers as well.

U.S. naval aviation, which by tradition and in practice includes that of the Marine Corps, may well engage in air/land warfare -- as for example would carrier-based aviation if war should occur again on the Korean peninsula.

Of course, the land and tactical air (and sea) forces of the Soviet Union and its satellites differ in their organization from all of the above mentioned.

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*It should be evident that the term "air/land" as used in this work is a descriptive rather than a doctrinal term. It is related to but does not carry the same meaning as the term "AirLand" used in U.S. Army studies, briefings, and doctrinal material on the "AirLand Battle." (See Preface, page P-2.)

Nonetheless, air/land forces, wherever they are found in a configuration prepared for an operational mission, are a composite of land and tactical air forces more or less intimately combined.

(History: World War II in Europe and Pacific; World War II, Eastern Front; Manchuria, 1945; Korea, 1950 to present; Vietnam; 1973 October War.)

Characteristics of Air/Land Forces

Although overlapping in many capabilities, the land and tactical air forces which make up an air/land battle force have quite different characteristics.

Land forces are organized hierarchically into a chain of command which typically goes from a level such as the corps, down through division, brigade (or regiment), to battalion and below.

The "land" of the corps commander is largely divided among his division commanders; they assign parts of the battle area to brigade commanders, and so on. Authority, responsibility, and direction descend from the corps commander through the commanders of divisions, brigades, battalions, companies, platoons, and even squads or sections.

These "maneuver unit" commanders -- from company, or even platoon, and up -- pull together the battle at their immediate levels. Orders go down through this chain of command, and battle information frequently comes up only through the same route.

There is a particular language for control and direction. Lines and ovals superimposed on a map represent such ideas as boundaries between units, the forward line of troops, fire support coordination lines, air corridors, no-fire zones, assembly areas, objectives, axes of advance, and battle positions.

The combat leader keeps a strong hand on the battle, but at the same time allows his subordinates freedom of action. He directs the battle by orders. Battle orders must be unambiguous. Time is usually of the essence. Sentences should be short. Commonly understood words, map symbols, control measures, and tactical concepts must be used.

The "air battle" system is of a different sort. Its forces are far more fast moving and flexible. The radars which track its aircraft "see" at long ranges and handle many machines at once.

Flights of aircraft and individual aircraft can be directed, even controlled, at a distance. Seconds are important, aircraft flash across great territory in minutes, and the map coverage is large. These characteristics both permit and require that special combination of centralized control and decentralized execution which is characteristic of tactical air.

The air and land battle systems always combine into a single, more or less well integrated, air/land battle system. A network of liaison officers and, often colocated, control centers is put into place to insure harmony and integration of effort.

Capabilities of Air/Land Forces

The capabilities of air/land forces derive from the intrinsic qualities of the air and land forces which make them up, and from what the two components can do together.

In peacetime, air/land forces can protect frontiers and defend the territorial integrity of nations and coalitions. By their presence and evident strength, air/land forces in place are silent evidence to any unfriendly nation or bloc that an attempt to seize territory would be met by force.

It is the land component of air/land forces that draws the line which should not be crossed. However, the air element and its evident complete

integration with the land element makes clear that serious to devastating consequences would be the result of intrusion or aggression.

(History: Central Europe; Korea)

When an aggressive threat becomes imminent or is under way, air/land forces can be moved into place toward the same effect.

(History: French presence in Chad in August-September 1983.)

The presence of friendly land forces can provide a stabilizing influence in a troubled area. Land forces on the scene can reinforce civil authority which has been weakened and is attempting to reestablish itself. Again, the evident power, in those land forces not committed but nearby and in the tactical air which is with it and ready for operations as part of an air/land (some would say air/ground) team, adds credibility and weight to the land presence.

(History: U.S. Marine Corps forces in Lebanon, 1983.)

However, these peacetime and crisis capabilities of air/land forces derive from, and would have little value without, the fighting capabilities of the air/land force -- that is, its capability for prompt and sustained combat. Air/land forces are designed and built for fighting.

Air/land forces can attack and destroy enemy forces; they can defend against an enemy attack; they can take control of land areas and the people who are there. They can protect the land's resources.

Air/land forces can operate virtually anywhere there is land -- in deserts, mountains, jungles, and arctic regions, as well as in more temperate places; on islands, in riverine areas, and on large land masses. Suitably trained and provided with landing craft and/or helicopters, they can conduct shore-to-shore and amphibious operations.

(History: World War II.)

Air/land forces can conduct operations of virtually any size -- from that of a battalion or brigade task force with appropriate air to those of a force of many corps and multiple army groups operating with thousands of tactical aircraft.

Situation Specificity

Each air/land force is different. Each is built for its own particular situation.

The parts which make up a multiservice/multinational air/land force are provided by the various nations and, in the case of forces of the United States and of some other nations, by the Services within those nations' defense establishments.

Making use of these air and land "building blocks," the appropriate responsible authority determines what will be the composition of the air/land battle force. To a greater or lesser extent, the force is "tailored" for its situation and mission.

Thus the compositions of the deployed air/land forces in Central Europe and Korea are quite different from each other, and they are both quite different from that of the U.S. Central Command, which is oriented on the Middle East and Southwest Asia. Each of these compositions reflects the contribution of the nations and Services involved, as determined by the relevant political and military authorities, based on the mission and on the situation in the region.

Likewise, an air/land or air/land/sea task force which may be put together for a specific mission and situation would be organized for that specific situation and mission, taking its force elements from those which are

available from, and are provided by, the various nations and Services which contribute force components.

Some components of air/land forces are readily suitable to a wide variety of situations and missions. This is especially so with tactical air forces; a fighter squadron or troop transport unit which can operate as part of an air/land force in Korea, for example, will be quite capable of the same kind of operations in Europe, or in the Middle East.

This is less so with land forces. Some units, such as armor and mechanized divisions, are, because of their particular characteristics and capabilities, more suited for service in one situation than in another.

Nonetheless, the composition of the force, whatever it turns out to be, is established for that particular situation, and will not be the same as, although it will resemble in many ways, what is in another force elsewhere.

This uniqueness, or situation specificity, of each air/land force makes it difficult to prescribe detailed ways of organizing and operating which apply to all such forces. None of the established air/land or air/land/sea commands to which U.S. forces are assigned -- Korea, Europe, and the forces of the U.S. Central Command -- has the same structure for command and control of its forces.

Thus no detailed statement of "doctrine" for organization and procedures can apply to all of these forces.

Command Arrangements

Command arrangements also vary.

It is possible to visualize a situation in which the air/land force command arrangements would be those of a U.S.-only force, with no forces of

other nations involved. Such was the case with the Iran rescue mission of April 1980.

However, in most cases the U.S. air/land force will be deployed on or into the territory of other nations, as part of a long- or hastily-established coalition; command arrangements must then accommodate the presence of other than U.S. forces.

This can be a complex multinational command arrangement which in its organization charts for operational command in war resemble familiar structures of air/land command. Such is the case in Allied Forces, Central Europe.

It can be a loosely organized command, in which the command structure of U.S. forces follows a recognizably traditional pattern, but there is no common command of forces of other nations on the scene. Such was the case during the Vietnam War, when the South Vietnamese chain of command was separate from that of the U.S., as were the chains of command of South Korean, Australian, and New Zealand combat forces -- yet operations were nonetheless conducted in a coordinated way. This could not have been so, however, without the dominating presence of the U.S. command in Vietnam and its control over many of the most important resources for prosecuting that war.

Tightly organized command of the forces of more than one nation will usually mean that there is "double hatting" -- that is, many commanders and staff officers will at the same time fill two or more command or staff positions.

The situation in Korea is an example of such today. There, the senior U.S. commander has as many as six "hats," and few of his key subordinate U.S. officers have only one.

Thus, in command arrangements, as in most aspects of air/land battle forces, each situation is unique -- and each solution is situation-specific.

Chapter II. THE RESPONSIBILITY OF COMMAND

This chapter is about the responsibility of senior multiservice/multinational commanders* of air/land forces, and about the responsibility to them of the single Service, or national, air/land commanders whose formations are part of the multiservice/ multinational command.**

The Senior Commander's Fundamental Task

A commander is responsible for everything his command does or fails to do. He is responsible that his command is as ready as humanly possible within the means provided to him. He is responsible that his command not be surprised. But the fundamental driving force for which he is responsible is his mission.

*This work does not use such terms as "the theater commander" or "the unified commander," or similar terms from JCS publications. The senior multiservice/multinational commander here discussed may well be "wearing the hat" of a JCS-publication-defined "theater commander" or a "unified commander" or both. However, the problem is that, once such language is used to introduce a discussion of his duties, one finds that the JCS-prescribed meanings are embedded in the discussion, to the detriment of an objective consideration of the actual multiservice/multinational organizational and operational situation which prevails on the scene.

For example, a discussion of the organization and way of operating of the CINC AFCENT in Central Europe is not helped by attempting to define his position as that of a "theater" or "unified" commander; he is in fact neither.

**While this material is written for the use of formation commanders of two-star rank and above and their staffs, it looks at all commanders at brigade and wing level and above (and perhaps even lower) in an air/land force as "air/land" commanders, notwithstanding that by far most of these will be commanders of single Service formations. By the nature of the objective situation, brigade/wing commanders, like those at division, corps, and tactical air force, are engaged in air/land operations.

The fundamental task of each senior commander* is simply this: To use whatever authority and resources are made available to him in the most effective possible way toward the accomplishment of his assigned mission.

The primary interest of each such commander is, and must be, his mission. Should either his subordinates, or those to whom he is responsible, or those alongside whose forces he must fight, begin to believe that the commander has another primary concern (such as a regard, first, to a particular Service or national position), the value of the commander immediately deteriorates, raising thereby the question as to whether he should be replaced in the interests of the effectiveness of the force.

The above proposition is of surpassing truth for the senior multiservice/multinational commander,** who, as will be addressed later, must use to its fullest the moral authority which stems from his complete mission orientation. The proposition however becomes difficult to assess when a multiservice or multinational commander is at the same time the commander of a single-Service or national command (known as "double hatting"). In peacetime, single-Service or national concerns may take up most of the commander's attention, to the detriment of his multiservice/multinational mission.

The overriding concern and primary focus of the senior multiservice/multinational commander must be his wartime mission and the readiness of his command for that mission.

*By "each senior commander" is meant each commander for whom this work is written, namely commanders of two-star rank, of whatever Service or nationality, whether commanding a single-Service or multiservice formation.

**By "senior multiservice/multinational commander" is meant such commanders as those commanding Northern and Central Army Groups and Two and Four Allied Tactical Air Forces (Europe); the U.S. Central Command; or the Combined Field Army, the Air Component Command, and the Combined Forces Command in Korea.

The reason for this is simply that to do otherwise, to think in terms of any other determining factor, can only make it less likely that the command mission -- the reason for the command's existence -- will be accomplished.

Further, the senior multiservice/multinational commander who bases his every consideration on his mission being his overriding concern gains an immense advantage in his moral authority.

(History: Command of forces, and "double hatting," in NATO; in Korea; in Vietnam; in the Warsaw Pact; in the Korean War.)

The Mission

In well-ordered military forces, all members are indoctrinated as to the overriding importance of the mission and as to each member's personal responsibility for mission accomplishment.

In the United States Services the idea of an inescapable personal responsibility for accomplishing the mission is drilled into military men since they first put on the uniform.

The governing Army Regulation says that:

> Every commander has two basic responsibilities in the following priority: Accomplishing the mission, and the care of personnel and property. [Army Regulation 600-20, Army Command Policy and Procedures, April 28, 1971.]

Note that accomplishing the mission comes first.

Here is what Lieutenant General George S. Patton, Jr., said in his letter of instructions to the corps and division commanders of Third Army in April 1944:

> Full duty. Each, in his appropriate sphere, will lead in person. Any commander who fails to obtain his objective, and who is not dead or

severely wounded, has not done his full duty. [George S. Patton, Jr., War as I knew It, annotated by Colonel Paul D. Harkins (Houghton Mifflin Co.: Boston, MA, 1947) Appendix D, p. 397.]

War is a hard line of work. Those who sign up for command in this line of work accept the fact that they will be responsible, and that they will be held personally accountable, for everything their unit does or fails to do and most especially for failure to accomplish their mission. That burden comes with the command position.

After Pearl Harbor, the Congressional Joint Committee which investigated that disaster arrived at 25 principles they wanted to pass on to the military. One of these was about command responsibility. It said:

> No consideration should be permitted as an excuse for failure to perform a fundamental task. [U.S. Congress, Investigation of the Pearl Harbor Attack, Report of the Joint Committee on the Investigation of the Pearl Harbor Attack, pursuant to S. Con. Res. 27, 79th Cong., 1946 (Washington, D.C.: Congressional Information Service, CIS J0285), p. 265.]

The 1949 revision of the U.S. Army's FM 100-5, Operations, transmitted the Congressional Pearl Harbor Committee findings to the Army. It said:

> ...[The commander's] fundamental responsibility is to carry out his mission. No excuse or explanation can justify or even temper his failure to discharge that responsibility. (Emphasis added.) [U.S. Army Field Manual 100-5, Field Service Regulations, Operations, 1949.]

Two Kinds of "Mission Responsibility"

The mission responsibility of a field commander can be looked at as two kinds of responsibility.

The first can be called "operational responsibility" -- the responsibility to accomplish his operational mission. For a field commander facing a

likely enemy in Central Europe or Korea, this might mean "defend my sector, should war come."

The second can be called "readiness responsibility" -- the responsibility to accomplish his readiness mission, namely to achieve the highest level of force readiness for his command within the resources provided.

The typically colorful, perhaps overstated, words of General Patton cited above were directed at the first of these. He was, in effect, saying: "Accomplish your fighting mission! Take that objective! Defend that position! Or die in the effort!" Motivating indeed, for a field commander.

However, the commander's "readiness responsibility," although perhaps less urgently motivated in peacetime than is his operational mission in battle, is nonetheless equally real.

The Congressional Committee which investigated the disaster at Pearl Harbor addressed both the "mission accomplishment" and the "readiness for mission acccomplishment" responsibilities of the commanders involved. Indeed, it was forced to do so. There was no way to separate what went on in Hawaii on the day of December 7, 1941, when the Japanese achieved devastating surprise, from what the authorities there and in Washington had done or failed to do in the days, weeks, and even months and years before that date.

Responsibility and Accountability

Among the characteristics which senior commanders must possess and which seem to be abundant in those who attain very high command is a highly developed sense of personal responsibility.

An adult lifetime of bearing increasing responsibility in one command position after another, in the stark environment in which the commander is responsible for all his unit does or fails to do, creates in the psyche of the typical most senior commander an unquestioning acceptance of the proposition that on his shoulders rests the full burden of achieving mission success.

Along with this burden of mission success goes the incumbent commander's certain accountability for mission failure.

In war, mission success and mission failure are readily apparent. Not so, in high command position, in peacetime. Too often, it takes a Pearl Harbor or other disaster in which the command fails for the inadequacies of a high commander's peacetime performance to be revealed.*

In the crucible of war, ineffective commanders do not often last long in command. Those who perform well and survive often rise to higher command, to be further tested. Perhaps because they have survived a fairly rigorous selection process, the most senior are not often relieved for cause, even in war.

This lack of vulnerability to relief for cause, especially in peacetime, places an obligation on the most senior commander of the multiservice/multinational air/land battle commander to be the harsh judge of his own effectiveness. No outside authority will audit rigorously his performance in peacetime. In war, the audit will come too late for him to do very much about the conditions it uncovers.

Thus, to the highly developed sense of personal responsibility which seems to be naturally present in those who achieve high command there needs to be added an equally lively acceptance of personal accountability -- even if only to himself and to an imaginary unforgiving jury of his peers.

This lively sense of personal responsibility and accountability is in peacetime addressed to improving the readiness of the command, never forgetting that an enemy's test of that readiness may come at any hour.

*In the less elevated command positions through which the battalion or brigade, or squadron or wing, commander has risen, the Service has ways of determining if the commander meets his readiness responsibilities in peacetime.

Authority and Capacity

The idea of authority is well understood. It is the right to act in a certain way, or to demand that others act in a certain way and to expect compliance. However, to possess the authority itself does not guarantee that events will take place as wished; for this, capacity is necessary.

For example, if, in battle, one has authority to direct the commitment of forces in a certain way but does not have the communications capacity to convey the necessary order, the authority alone is of little value. (Capacity includes considerably more than communications. Human talent is involved, as is an adequate structure of command and control, broadly defined. See Chapter IX.)

It it is in the nature of things that the senior multiservice/multinational commander's authority (especially his readiness authority) and his capacity (especially his command and control capacity) usually do not match the great responsibility and accountability for mission accomplishment and mission readiness which he bears.

This is because nations, and Services, retain authorities -- and, as providers, they tend to limit capacities.

Among the 25 principles which the Pearl Harbor Investigating Committee, cited on page 2-4 above, enunciated "in the earnest hope that something constructive may be accomplished that would... preclude a repetition of the disaster of December 7, 1941," several are particularly appropriate to a commander's "mission readiness" authority. The Committee said that:

> The... issuance of orders entails the duty of inspection to determine that the official mandate is properly exercised....
>
> The implementation of official orders must be followed with closest supervision....

> Procedures must be sufficiently flexible to meet the exigencies of unusual situations....
>
> Failure can be avoided in the long run only by preparation for any eventuality....
>
> No consideration should be permitted as excuse for failure to perform a fundamental task....
>
> Personal and official jealousy will wreck any organization.... [and]
>
> In a well balanced organization there is close correlation of responsibility and authority....
>
> [U.S. Congress, Investigation of the Pearl Harbor Attack, p. 254.]

Examination of the command and other authorities, as composed and placed into writing, which senior multiservice/multinational commanders actually possess reveals that what is written in their charters consists in very large part of limitations on their authority. The drafters of command charters, especially in peacetime when the consequences of failure do not come vividly to mind, seem to be motivated very substantially toward retaining authorities for those who are the providers of the forces, and toward denying authorities for the commander who must employ the forces.

In its discussion of the "close correlation of responsibility and authority," the U.S. Army field manual of 1949 which transmitted the above words of the Pearl Harbor Committee throughout the Army went on to say:

> To vest a commander... with responsibility and no corresponding authority is eminently unfair.

Yet this is the way it is, for the multiservice, and even more so for the multinational, commander -- especially in his mission readiness area of responsibility.

Stemming in part from this limited authority there exist also deficiences in capacity -- not so much in human talents as in the practical means of bringing about that which is desired, in peace or should there be war. (This

point is covered in more depth and detail in Chapter IX, The Command and Control System.)

The Commander's Use of Moral Authority

However, although the "legal" or "charter as written" authority of the senior multiservice/multinational commander is usually scant indeed, there rests with that commander by virtue of his command position an immense moral authority waiting to be put to use. This moral authority derives from the commander's undeniable personal responsibility for the mission, and from his ability to remind all who report to him of the consequences of failure -- and to point out his, and their, accountability to themselves and to history should the audit of war reveal that they have failed, whatever the reason, to meet their responsibilities.

This moral authority is not self-activating. It can reach its full effect only if the senior commander is able to present vividly to his subordinates, and to those outsiders who would place limits on him, the practical consequences of failure if he is not granted what he seeks.*

The commander who fails to take full advantage of this moral authority is, to that degree, remiss in meeting his personal responsibility and accountability.

*Battle simulation (see Chapter X) is one means of presenting vividly the practical situation of the command.

Chapter III. FUNDAMENTAL CONSIDERATIONS IN ORGANIZING AND OPERATING

The Basic Problem

Whether the always multiservice, usually multinational, air/land battle force is newly formed, has long been established, or is merely in a new situation, the basic problem of its appointed top commander is essentially this:

- Higher authority has given him a mission -- the purpose for which the force exists, will exist, or will be used.

- Higher authority, or Service or national authority, has provided him with an array of, often disparate, designated forces -- usually either with ambiguities or with well-defined constraints as to how these forces may be used.

- Higher authority, after a process of negotiation with those who have provided the forces, has given him a set of terms of reference -- namely, the authorities under which he is to operate.

- There exist certain understandings and arrangements, however ill- or well-defined, for the logistic and administrative support of his force.

- His task -- whether explicit or implied is immaterial; it is the task he must set for himself -- is to take those forces, and use those terms of reference, and so organize, train, and if necessary direct in

- erations his air/land battle force as to give the highest probability that the assigned mission will be accomplished.*

(History: MacArthur in Korea, 1950; Eisenhower in North Africa invasion, 1942; Sennewald and predecessors in Korea; Chalupa and predecessors in AFCENT; Vaught in Iran Rescue Mission, 1980; other....)

As the top multiservice/multinational commander approaches this task, he should bear in mind certain fundamental considerations.

The Need for Integrated Effort

The term "integrated effort" as used herein means essentially two things:

- o The highest order of teamwork and harmony in the operations of the air/land battle force as a whole, and within all its parts.

- o The use of each and every capability of the force to its fullest possible effect.

Modern air/land warfare is so complex from a technological viewpoint, its pace can be so rapid, and the consequences of its poor execution can be so far-reaching, that the need for teamwork and harmony and for the best possible use of all available means -- that is, for full integration of effort -- takes on surpassing importance.

*His task must also be, should he decide that the combination of mission, designated forces, and terms of references presents him with an intolerable situation, to make that judgment clearly known to higher, and to other relevant, authority -- and, if conditions remain intolerable, to decline to serve.

Consider the intelligence function, for example. A typical air/land force has within itself, and in its support, all sorts of ways of gaining information about the enemy and his activity. These range from the newest high technology sensors of various kinds to such long familiar sources as interrogation of captured enemy personnel and the examination of captured documents.

If the intelligence effort of the air/land force as a whole, and within the formations which make up the full force, lacks integration -- that is, if the tasking, the collection effort, the information processing and distribution, and the interpretation and timely sharing of relevant data are not characterized by harmony and teamwork, and if the full range of means available is not used to the optimum benefit of all -- that timely and reasonably complete knowledge of the enemy which is so essential to battle commanders at every level and which is so often decisive in war will be gravely diminished or may even be denied.

A fundamental objective of senior commanders of air/land battle forces must therefore be to achieve the fullest possible integration of effort, not only in intelligence but in each and every aspect of operations.

(History: Pearl Harbor, 1941.)

The Need for Looking at Systems as Systems

To achieve the most in integration of effort, all senior commanders of the force need to look at the full force and its parts in terms of objectively described and, desirably, harmoniously working functional systems.

At each hierarchical echelon of an air/land battle force, the air/land battle system at that level can be viewed as a mix of functional systems, or subsystems. One such view (some might call it the "land commander's view") is shown in the figure on the next page.

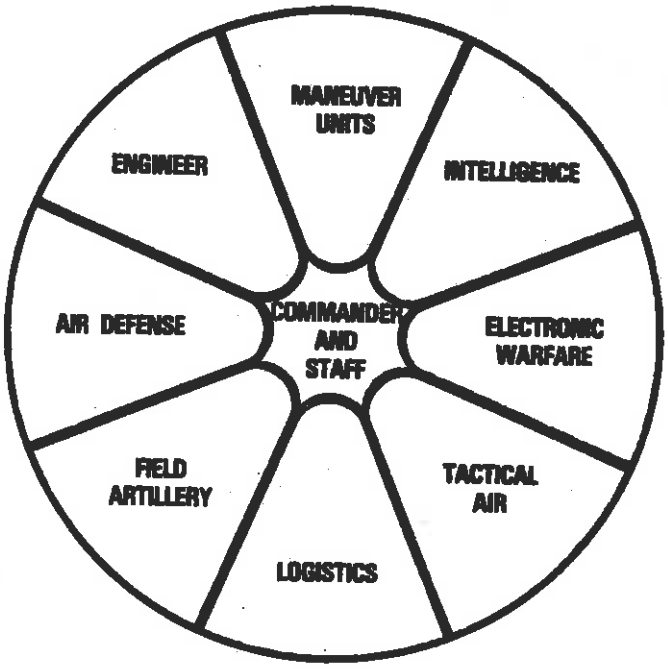

Figure 3-1. Subsystems of the Air/Land Battle

The figure shows eight such systems. It is possible to sort out the elements of the air/land battle force in other ways, into perhaps six sectors or even ten or so. But we can accept this division of systems for purposes of discussion.

Each subsystem extends upward and downward through the successive levels of command. A brigade, or even battalion, commander in combat has nearby a representative of each one of the "non-maneuver" subsystems, on the ground and doing his job, linked by connections that may extend to corps and beyond. The result is a sort of matrix organization to accomplish the immensely complex task of air/land combat.

When these forces are well designed and well trained, the result is a robust, decentralized system, with harmonious and largely self-executing parts, which can withstand the shocks and changes inherent to warfare on land.

However, the ways of operation of these subsystems (and especially of the complete system) cannot be reduced to detailed prescriptions in writing. For

one thing, their ways of operations are not always the same. Different situations make them change. Different commanders work in different ways. Troops who have been fighting a long time work out procedures for themselves and, if organizations do not change their people too much, good units get better.

Figure 3-1 above is misleading in at least one respect. It does not convey that the sector called "tactical air" actually includes functions shown in all of the other sectors.

Tactical air provides much of the electronic warfare and intelligence capabilities of the force; it complements the artillery and engineer effort; its anti-armor weapons complement those of armed helicopters which are carried under the maneuver function; its airlift and airdrop capacity contributes to logistics; and so on. (Tactical air alone can be seen as a composite of an array of functions of its own, some of which are shown in Figure 3-2.)

Figure 3-2. Tactical Air Functions

No one can prescribe for the senior commanders of any specific air/land force how they should break out the various functional systems which make up their forces as a whole. What is shown in Figures 3-1, if it is taken together with Figure 3-2, seems reasonable enough, but it is for each commander to make his own analysis.

What is essential, however, in the interests of integration of effort -- that is, teamwork, harmony, and the full use of all means -- is that the senior commanders and their subordinates, whether single-Service or not, look at the force as a whole as a system, and at its components as subsystems, which can be objectively described by function and which must operate harmoniously, efficiently, and to fullest effect without regard to who it is that provides the means for the function.

(History: There is no history which addresses this point. What is written seeks to represent "the best available thought... that can be defended by reason.")

Harmony is achieved through the "command and control" part of the air/land battle system, which overlays all these sectors. The lines come together in the center, and that makes "C^2" or "command, and control."*

*C^3, C^4, and C^3I may be inferred, when we use C^2.

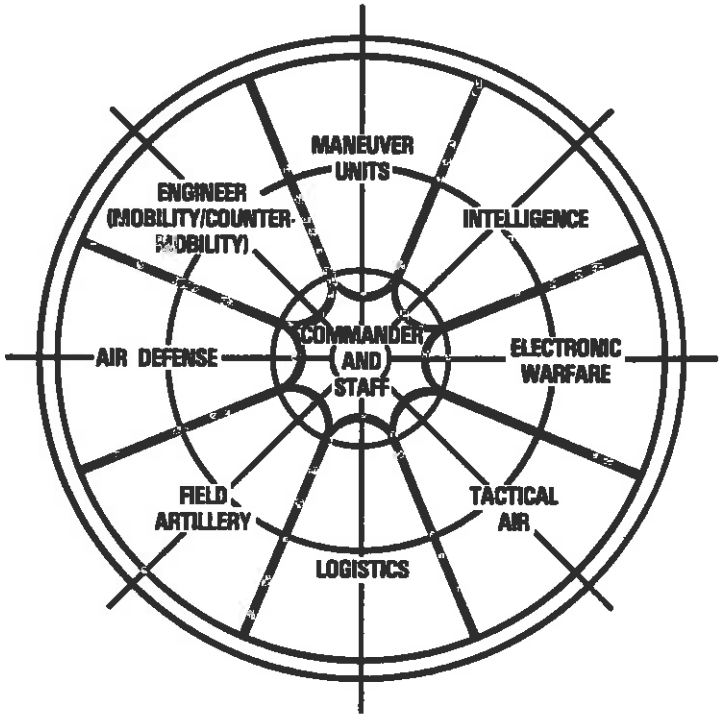

Figure 3-3. The Web of Command and Control

Command and control (C^2) systems, sometimes called C^3 systems (for command, control, and communications), or even C^4 systems (adding computers), or C^3I systems (for command, control, communications, and intelligence) are the countless sensors, and command facilities, and communications links, and data processing equipment, and personnel and procedures through which all the subsystems get information, sort it out, exchange it, think, decide, issue orders, and monitor performance. Elements of these C^2 systems, or subsystems, are often imbedded in the weapons themselves. C^2 systems are, however, not "weapons" or "materiel" systems, even though some weapons systems are partly C^2. (One problem has been that C^2 systems have been developed and acquired, using the same rules as have been used for weapons systems.)

Impediments to Integration of Effort

However useful it may be to look at "systems as systems," in the real world these are not merely abstractly defined technological systems. They are human as well, indeed predominately so, with the cussedness and frailties which humans bring to any problem.

The human characteristics of these systems thus generate many impediments to the achievement of integration of effort, objectively defined.

National interests very often collide with the interests of the coalition. It is in the nature of things that, when the most acute of national considerations arise, they will often prevail over the wishes or interests of the multinational commander and national interests will be stronger.

Even in the heat of battle this is so (Eisenhower vs. DeGaulle as the allies approached Paris in August 1944; MacArthur vs. Syngmann Rhee as the United Nations Command approached the 38th parallel in September 1950).

How much more so in peacetime (restraints on the day-to-day operational control of SACEUR; the bureaucratic processes for allocation of NATO infrastructure moneys).

Service interests often impede integration of effort.

Unlike national interests, Service interests will not often directly impede integration of effort, at least at the lowest level of command, in the heat of battle. Somehow, when the bullets are flying, patriotism and the national identity of U.S. fighting men close to the enemy usually override narrow Service interests.

In organizing, planning, and training for battle, however, senior multi-service/multinational commanders will find that the most trying impediments to that teamwork and harmony and that fullest possible use of all means which this work calls integration of effort are often certain narrow concerns of the U.S. Services and their local senior Service commanders.

This is because the continued health of a Service, as a Service alone, requires that its roles and missions be zealously fought for and protected. It was because of this that Services fought to have their roles and missions written into law upon "unification" in 1947. They remain in law and directive today. A web of Joint Chiefs of Staff publications, beginning with the Joint Dictionary and the UNAAF (Unified Action Armed Forces) has codified language which protects, at every juncture and to the maximum extent, the Services have been able to do so, Service roles and missions.

That the Services fight for their own interests is neither reprehensible nor unpatriotic. It is entirely natural considering the way the U.S. military establishment is by statute and deliberate Congressional intent organized.

It is thus in the nature of the Services that any plan, any organizational arrangement, any proposed way of operating of a multiservice commander which in the eyes of a Service proponent presents a threat to the integrity of a Service role and mission will be resisted.

Furthermore, the way in which multiservice forces are organized for operations sets up a channel through which the local senior Service commander can report such a threat quickly to his Service Chief who, as a member of the Joint Chiefs of Staff, can bring JCS influence to bear on the multiservice commander who proposed the idea.

Although not intended by its authors solely to do so, Service doctrine serves to reinforce Service roles and missions.

Details of the operational and tactical doctrine promulgated by a Service will derive in large part from, and will in turn reinforce, basic Service doctrine -- the latter being largely statements of basic policy and Service positions.

To the extent that Service doctrine provides a basis for a senior Service commander to take exception to his multiservice commander's proposals for

plans, organization, or methods of operating, it can be a serious impediment to integraton of effort.

There is often a language impediment to integration of effort. The practical effect of multitongued forces is to slow down communications and make mutual understanding more difficult.

In today's computer world, there is a "protocols" impediment to integration of effort. When computer-based aids to command and control cannot link with one another because their protocols are different, information flow is impeded. (See Chapter IX, The Command and Control System, pages 9-13 to 9-16.)

There is an SCI impediment to integration of effort. Security Compartmented Information (SCI) is handled through special channels, under special procedures, with limited access (especially among allies in the same coalition). this impedes information sharing essential to integration of effort.

There is, at root, a human impediment to integration of effort. This stems from a natural human desire for "turf," a natural human desire to have the full array of means under full local command and fully responsive, and, finally, a natural human tendency to resist the contemplation of unpleasant consequences which stem from one's own cussedness.

The Challenge to the Multiservice/Multinational Commander

The challenge to the multiservice/multinational commander is simply this: to overcome these and other impediments in the interests of the effectiveness of the force as a whole, its readiness for its assigned mission, and when called upon its success in battle.

At the same time the commander must recognize that underlying some of these "impediments" are attributes which provide real strength. For example, Service pride and a Service's indoctrination of its own people makes for high quality performance of the formations of that Service in battle.

Chapter IV. AN APPROACH TO NUCLEAR WARFARE*

(This chapter should be read after reading The Influence of Nuclear Weapons, pages P-5 through P-7 of the Preface.)

The overriding dilemma facing the United States and its friends and allies around the world today is this: How to conduct affairs in a way which avoids war, above all nuclear war, and at the same time permits freedoms to flourish and peoples to prosper, determining their own affairs.

Although the ability of the United States and its partners in coalitions to wage theater nuclear warfare is today essential to achieving a world without it, this work will, for now, leave to other writings the details of fighting and supporting nuclear warfare.

This chapter's purpose is only to describe how air/land field commanders can by their actions contribute to solving the basic dilemma which United States and coalition political authorities today share, namely how to preserve freedoms and permit peoples to prosper, without war, especially without nuclear war.

Nuclear Warfare Is Not Inevitable

When the possibility that a superweapon based on nuclear fission could be built was presented to the U.S. President after Nazi Germany had begun its war in 1939, it was perhaps inevitable that research and development would be undertaken. When in 1945 a usable weapon was produced and the United States

*Some might interpret this chapter as advocating a policy of "no first use" of nuclear weapons. For a number of good reasons, including inadeqate conventional forces at some places, the United States is in no position today to adopt or announce such a policy -- notwithstanding that in due course there is much to be gained by so doing.

and Japan were still at war, it was perhaps inevitable that it would be used. When in 1949, after the Soviet Union had produced a fission weapon of its own, the President faced a decision whether to go ahead with the development of a multi-megaton fusion weapon, it was perhaps inevitable that he would decide to do so.

But today, decades after these events, although tens of thousands of nuclear weapons have been built and several nations possess them, it is by no means inevitable that nuclear weapons will again be used in war. The possibility that any such use would not be containable presents a prospect so horrifying to so much of mankind as to affect deeply beyond doubt the viewpoint of any but the most reckless decision maker with authority and capacity to direct nuclear weapon use.

While nuclear weapons cannot be "disinvented," the experience of the ROK/US coalition in Korea demonstrates that it is within the capacity of United States and coalition political and military authority to act in ways which mean that nuclear weapons are neither continually threatened nor again used in war.

Stability on the Korean Peninsula

Stability of frontiers and regions is sought so that freedoms and well-being can flouish. But stability is not self-achieving; it has dynamics which in each particular situation need to be understood and taken into account.

To the North on the Korean peninsula lies a Stalinist dictatorship which tried once, and gives every indication of being ready and willing to try again if conditions should be right, to attack southward toward bringing the entire peninsula under its sway.

Toward this evident end, with only half the South's population and less than the South's economic strength, North Korea has created and maintains military forces considerably greater than the Republic of Korea (ROK) in every category. It evidences hostile intent in many ways -- propaganda loudspeakers

along the DMZ (a zone demilitarized in name only), the digging of tunnels under the DMZ, and infiltration of armed parties across the DMZ and over the South's coasts.

Toward stability in Northeast Asia and the defense of the territory of the Republic of Korea, the United States has for more than thirty years joined in a coalition with the Republic of Korea.

The ROK/US coalition which defends South Korea has a very simple objective -- to see to it without doubt that there will be no second Korean war. Achieving this contributes to peace and stability in Northeast Asia and at the same time makes possible the Republic of Korea government's progress toward a more stable, more prosperous, and ever more democratic society.

Deterrence (Dissuasion)

The ROK/US military command's essential part in this can be called "deterrence," or what the French would call "dissuasion."

Deterrence (dissuasion) in this case means to establish in the minds of the political-military authorities of the North the unmistakable conclusion that an attack on the South is not to the North's advantage, that the odds for success are all too poor no matter what the North does, and that the costs and risks are far too high.

Deterrence fails when an enemy's political-military authorities miscalculate (as in Korea in 1950, when it seems that neither the North Koreans nor their Soviet sponsors believed that the United States would come to the aid of the fledgling Republic of Korea, having only a year before pulled out all U.S. combat forces), or when for one reason or another they become reckless or desperate, or when they become the victims of their own grandiose ideas (as when Hitler invaded the Soviet Union in 1940), or from combinations of any of these (Argentina in the Falklands in 1982; Libya in Chad in 1983).

A complicating factor in the Korea situation is that the self-deified dictator of the North, Kim Il-Sung, has given not a few signs of recklessness, of unduly grandiose ideas, and of a tendency to miscalculate.

The Low Visibility of the Nuclear Deterrent in Korea

Although it was not always so, it has in recent years become possible to present to the North Korean decision makers a more than adequate deterrent to any idea they may have about attacking the South, without repeated reference to the nuclear component of that deterrent in the hands of the United States.

The nuclear component exists, for certain. But it has not been necessary to refer to it again and again. This is because, even with so unpredictable a political chief to the North as Kim Il Sung, the ROK/US ability to safeguard the territorial integrity of the South and to punish severely an attacker is assured without the nuclear weapon.

Such a situation is to be devoutly wished for and energetically sought wherever U.S. and allied forces are or may be in coalition.

There will always be differences in the factors in the equations of deterrence from case to case (e.g., Central Europe; Korea; the Middle East/ Southeast Asia). Between Korea and Europe there are major differences, some of them profound. Among these: Korea has no nuclear weapons of its own (although the Soviets or Chinese could support with such), and facing the allies in NATO is the Soviet Union, a nuclear superpower.

The Evolution of U.S. Nuclear Warfare Thought

The first U.S. nuclear weapons were built for "strategic" bombing; this was the purpose for which the early U.S. nuclear weapons stockpile was created.

Very early in the nuclear age, however, research and development began on "tactical" nuclear weapons for use in theater combat. By the mid-1950s such

weapons and their artillery and tactical air delivery means were in the U.S. arsenal.

During the Eisenhower administration, with its declared emphasis on "massive retaliation" and its implied assumption of long-range nuclear superiority over the Soviet Union, the United States made clear, both by action and by writings in doctrinal manuals and military journals, its military's acceptance, indeed embrace, of tactical nuclear warfare.

The U.S. Army's "pentomic" divisions with their maneuver units organized in "fives" and their organic nuclear rockets and cannon, and the U.S. Tactical Air Command's nuclear-equipped "composite air strike forces," which made TAC a kind of "mini-SAC," were mid- and late-1950's examples.

Then, about 1960, the U.S. Army embarked on a series of studies on tactical nuclear war, to become known as Project Oregon Trail.

Project Oregon Trail analyzed in detail the use of nuclear weapons by both sides the length and breadth of the battlefield, and the effects of nuclear weapons on troop units, logistics, command posts, communications and routes of movement. Clearly implicit in its conclusions was that full-scale, all-out, tactical nuclear war is not a feasible political or military option. The destruction is simply too great for military forces and the land and the people to bear.

When the United States was in Vietnam, counterinsurgency and non-nuclear war dominated its Army's thinking. In the latter 1960s and into the 1970s the special courses for training nuclear weapons employment officers disappeared from Army service schools, and whatever programs there had been for making the Army a dual-capable (i.e., fully nuclear and non-nuclear warfare capable) force were attenuated or dropped.

When in the 1970s the Army turned its attention again to readiness for a war in Europe, it resumed serious thinking about, and preparation for, nuclear war. But, while the Army accepts the obligation for its forces to be ready

for nuclear war, neither it nor its officers who serve in senior positions in air/land formations believe in nuclear war as a solution to political or military problems.

The Evolution of Soviet Tactical Nuclear Thought

Shaken in 1945 by U.S. possession of the nuclear weapon, the USSR undertook a massive program to build a nuclear capability of its own. Like that of the U.S., it concentrated first on strategic nuclear weapons. Observing U.S. actions, it soon began a sustained and heavily resourced effort to developing a capability for tactical nuclear warfare.

From 1945 to the death of Stalin in 1953, the Soviet emphasis was on the development of the nuclear weapon, rather than on the doctrine for its employment.

In August 1953, four months after Stalin died, the Soviets exploded a hydrogen bomb, dropped from an airplane. By mid-1955 the production of the Soviet Bison bomber, similar to the U.S. B-52, was rising to some twenty-five aircraft a month. By 1957, the Soviets had launched Sputnik, the world's first artificial satellite, and had tested the world's first intercontinental missile.

From Stalin's death through the rest of the decade the Soviet political and military leadership undertook a major and comprehensive examination of military doctrine. Secret seminars in which high ranking officers participated examined the nature of contemporary war.

The product of this period of doctrinal ferment, revealed in the late 1950s and early 1960s, was, in effect a profound conclusion that any war would be nuclear, indeed thermonuclear, from its outset. The Soviets began adapting their theater forces in earnest to nuclear war.

Thus, while in the 1960s and early 1970s the U.S. -- after writing about tactical nuclear war and making some tentative efforts at adapting to it as

the "norm" -- was not creating a nuclear capable army, the Soviets were doing exactly that.

The Soviets have put together the full machinery for tactical nuclear war, about as well as anyone could. Even so, as the realities of tactical nuclear war become ever more recognized and accepted by them, it can be foreseen that they, like their American counterparts, will come to see nuclear war as not a viable option for their side. They can then be expected to see a nuclear capability as, first and foremost, a way to dissuade their opponent from using his own.

Some would say that they are close to achieving the latter, if not already having achieved it.

The Soviet Concept of "Correlation of Forces"

The Soviet military have a considerable respect for what in Marxist-Leninist ideology is called the "correlation of forces."

To a degree which the typical Western mind finds difficult to comprehend, the Communist ruling class in the Soviet Union are wedded to a system of Marxist-Leninist theory which to them explains all human events. Indeed, even though they have been known to modify their theoretical constructs from time to time, they are in a very real sense prisoners of their own theories.

Warfare comes under such a dialectic.

Stemming from their intensive study of history, especially their own experiences in World War II, and with considerable help from Karl von Clausewitz, Soviet authorities have put together a comprehensive and coherent strategic and operational military doctrine.

In so doing, they have determined with certainty, among other things, that, as they say, "the outcome of a war is dependent on..." a series of factors -- such as the forces of the combatants at the start of the war, the

morale of the combatants, etc. -- and that among the decisive determinants, if not the decisive determinant, of a war's outcome is the "correlation of forces."

We cannot explore here all that is meant by the "correlation of forces." Suffice it to say that Marxist-Leninist logic as applied by the Soviet military is somewhat circular: One, the correlation of forces, properly defined, determines the war's outcome; and two, whatever the outcome, if it was not determined by the "correlation of forces" as theoretically defined, only the definition was faulty, not the principle of "correlation of forces."

One point is absolutely clear, however: Whatever else the "correlation of forces" may include, it includes lots of numbers -- numbers of divisions, of aircraft, of tanks, of artillery, of ammunition. In other words, quantity.

In the Soviet garrison-state where the military is rarely denied what it asks for, the result is an obsession with and commitment of resources to numbers which democratic countries are simply unable to match.

Making the Soviet Decision-Makers Doubt the Favorable Correlation of Forces

Deterrence (dissuasion) of the Soviet Union in any given instance therefore is in large measure a matter of causing its decision-makers to entertain substantial doubt as to whether they correctly understand and assess the "correlation of forces" in that particular instance.

In Central Europe, for example, this can be done in part by taking into account what the Soviets believe -- that the correlation of forces is more than simply numbers of divisions and the like (or numbers of nuclear weapons), but that it includes such factors as command and control, weapons and intelligence technology, and what we can call "skill in the operational art" or "air/land battle mastery."

The aim is, taking account of the Soviets' own beliefs, to instill doubt in their assessment of such intangibles, to heighten their risk perception in

a given situation, and thereby cause them to decide not to initiate a hostile action.

(By no means insignificant, the correlation of forces also includes the immense discontent and hatred the Soviets have earned in the populations of countries, like Poland, on which the Soviets have imposed their yoke and which could erupt in major resistance in war, affecting not only Soviet lines of communication to the front but indeed the reliability of the military forces of those countries.)

It is to the West's advantage that, unlike that of North Korea, the Soviet political and military leadership has been generally cautious rather than reckless, and conservative rather than radical, and that, as long as they are not driven to desperation in Europe (which our side must make every effort to prevent), the Soviet leadership would prefer not to have a war but to let history unfold in their direction, just as Marx and Lenin have assured them that in due time it will.

The Meaning for Deterrence of War, and Especially Nuclear War

What our side seeks in each instance, then, is something like this: The Soviet decision-makers, whoever and wherever they are, who may be contemplating an action which is likely to generate a U.S. or U.S.-allied coalition response, will ask each other and their "operations calculator," so to speak -- "what is the correlation of forces?" and will then receive the reply "the correlation of forces is... unfavorable."

They will then decide -- "Not today."

And our side will do what it needs to do to be sure that such is the answer in non-nuclear terms alone, as well as in nuclear terms, retaining our tactical nuclear capability to be sure, but not flaunting it or advertising our intention to use it -- simply letting it be known that it is there and will be there whatever the Soviets might do, as a certain "dissuader" of any Soviet notion to start a nuclear war.

For the Soviet's perception of an unfavorable correlation of forces it is of utmost importance that our side insure the survivability and effectiveness of nuclear weapons in adequate numbers, of their delivery means, and of the essential command and control for their effective employment, particularly should the Soviets be so reckless as to be first to make a nuclear attack.

Air/land commanders can do much, in addition, to change the Soviet perception of the non-nuclear correlation of forces. Commanders in place are more than capable of making their own lists. Here are some possibilities:

- Improve the effectiveness and survivability of command and control systems.

- Improve organizations and mechanisms for logistic support.

- Improve troop unit and air crew training.

- Improve airbase survivability.

- Improve warning; make sure not to be surprised.

- Understand Soviet vulnerabilities of all kinds, and make concrete plans to exploit them.

- Carefully justify to the providing nations and defense establishments the needs for increases, of the right kinds, in resources. It seems that such requirements are modest enough, in view of the benefits.

- Make clear beyond all doubt that, in any operations they may contemplate, the Soviets will find the U.S.-allied coalition better organized and more skilled in warfare -- superior to them in the exercise of the operational art.

- Practice, again and again, toward the achievement of air/land battle mastery (see Chapter X).

It is toward these latter two objectives that this work has been written.

Chapter V. ORGANIZATION AND EMPLOYMENT OF LAND FORCES -- BASIC CONSIDERATIONS

Doctrines

As they consider how to organize and employ the land forces under their command, senior commanders of and within air/land battle forces confront the established "doctrines" of those who organize, equip, and train the forces, who provide them to operational commands, and who sustain them in operations. These national and Service "providers" of the forces have their own ways of looking at their employment; such must be taken carefully into account.

However, the ideas of the "providers" may well not be consistent with what the senior operational commanders of such forces see as the forces' required employment, considering the objective situation and mission of the air/land battle command.

When these ideas differ, senior commanders must be prepared for the inevitable clash of opinion -- in which their judgment may well not prevail (especially when powerful national or Service influences are brought to bear).

In any case, the senior air/land battle commander seeks only that which is objectively required for the most effective use of all forces available toward the accomplishment of his mission. He insists on such.

As stated in Chapters II and III, the stark responsibility which the operational commander bears for ultimate mission accomplishment, if objectively used, carries with it very substantial, perhaps overriding, moral authority. With logic and the mutual mission-orientation and good will which can reasonably be expected, this should prevail.

The Essential Nature of Land Forces

The essential nature of land forces is their tie to the land and its people.

Whether it be a solitary sentinel, a two-man guard post, or a motorized patrol in a troubled area or whether it be troops fighting in the fiercest of combat, the contest is for control of the land and its people.

Whatever words are used to describe the action in which land forces engage -- "capture" or "destroy" an enemy, "protect," "secure," "defend," "assault," "seize," "occupy" -- the ultimate reason for the aggregate of all these actions is to gain, or keep, control of a land area and its people.

By their presence, or by their entry, land forces can secure the land and stabilize the land and its political institutions.

They can defend against others who would take over the land and its political institutions.

The resolution of armed conflict comes about, ultimately, through the actions of forces on the land.

The instrument of land forces is the land combat formation -- the troop unit -- trained, disciplined, weapons in its hands, capable of the utmost of violence those weapons can produce, and also capable of the utmost restraint when so ordered.

The Battalion

The order of land combat formations descends from corps and division all the way down to company, platoon, and squad or crew, and then to the individual fighting man.

Although it is on these smaller fighting units, and on the individual fighting man, that everything in land combat finally depends, those for whom this work is written, as they consider the organization of land forces and their employment in operations, should think of the units just above these -- the maneuver battalion, and the brigade -- as the basic building blocks.

These are, however, not inanimate "building blocks." They are humans equipped with weapons and provided with mobility, organized and trained as fighting teams, under the control of leaders, and engaging in the most dangerous and demanding of activities known to man -- close combat on the land.*

Essentially, the maneuver battalion is a maneuver-capable unit with largely direct-fire weapons in its hands. It can take a strong grip on the ground, and it can move over the ground. Its specialty is close combat, but it seeks such -- and senior commanders should strive to place it in position so that it realizes such -- always at the enemy's disadvantage.

Maneuver battalions are of many kinds -- light infantry, mechanized infantry, tank, tank-infantry, reconnaissance, to name a few. Each has an established composition; this varies with, and within, the battalion's national or service source.

Battalions may deploy at less (or more) than established composition, or unreplenished battle losses may bring them to less than established.

Although battalions usually carry mortars with them indirect fire for the battalion is primarily the task of units of field artillery, which arm takes as its clear duty the delivery of fires at the maneuver battalion's call.

*Those whose task is close combat in other environments can with some justification take exception to these last three lines (see page 6-2).

The obligation of senior air/land battle commanders is to understand the capabilities and limitations, as they actually are, of each and every battalion of the force, and always to take these capabilities carefully into account -- demanding everything that can rightfully be demanded but not more.

The Brigade

Above the maneuver battalion is the brigade (or its frequent equivalent, the regiment).

The brigade echelon combines the maneuvering and close combat arms of infantry, or tank, or infantry-tank, with the indirect fires of the arm of field artillery -- and usually with the actions of the arms of engineers and air defense artillery. Whether artillery and other supporting arms are under the brigade commander's direct command or not, the brigade pulls together and harmonizes the actions of all of the combined arms.

In many armies the brigade/regimental echelon is a flexible organization. The brigade is task-organized by a higher commander to suit its situation and assigned mission, and the brigade commander likewise task-organizes his subordinate units as he sees fit.

Because the success of the combined arms team at brigade depends so much on good communication -- not simply radio and wire communication but also mind-to-mind mutual understanding -- the entire brigade should normally be of a single nationality. To combine U.S. Army and U.S. Marine Corps units in a single brigade/regimental team has been done in the past with success.

In modern war, the battle at battalion, and especially at brigade, is by its nature an air/land battle. A tactical air control party (TACP) or its equivalent should always be with the battalion, and an air liaison officer (ALO) must be at the brigade. Through these agents and their communications into the tactical air control system is arranged and delivered the necessary and assigned-as-available tactical air support for the close-in battle.

The Division and Corps

Above the brigade (or its regimental equivalent) is the division. Above the division is the corps of two or more divisions and corps troops.

However, this is not necessarily so. In an established theater of operations, the above may well be the uniform case. But even in such, and often where an air/land or air/land/sea force is newly establishing itself in an area of operations, the brigade (or the division) may be part of a "task force" -- or may itself be the task force, as may be the corps.

Although a separate brigade or brigade task force is often established, and when established it may have the characteristics of a small division, the lowest level at which the combined arms and their supporting services are found within a single command is most often the division.

Armies of different nations organize their divisions differently. Almost all divisions are, however, formations which combine the arms and services under one command.

With its brigades (or regimental equivalents), its artillery, and its reconnaissance, engineer, and signal units and such air defense and aviation as may be organic -- and with the organic transportation, maintenance, supply, medical, military police, replacement and other units which sustain its operations -- the division is a force of ten to twenty thousand. It can be assigned a very substantial mission.

The nature of the mission depends on the type of the division and on its capabilities -- whether it be an armored or mechanized division, or an airborne division, or an essentially air mobile air assault division, or an essentially foot and truck mobile infantry division, or a Marine division especially trained and equipped for amphibious assault but capable also of extended operations ashore.

Pulling Together the Air/Land Battle

The battle at division and corps, and at task force organized at these levels, is always and entirely an air/land battle. Harmonizing and pulling together the activities of its participants is the responsibility, but not solely the responsibility, of the division and corps, or equivalent task force, commanders.

These commanders are provided with the means for meeting this responsibility. The means include air liaison officers (ALOs) and, always at U.S. corps and perhaps at division in task force operations, an air support operations center (ASOC) or its equivalent.

The means available also include the necessary communications and procedures for bringing tactical air into the battle area and for ensuring that its operations harmonize with and reinforce those of the battalions and brigades, and vice versa.

The air/land battle at division and corps is also a battle for information on our side -- and to deny information, including his own information, to the enemy. This involves the sustained and energetic direction of an intelligence effort; it involves the use of our own air- and land-based electronic warfare means to confuse and disrupt the enemy's command and control; it involves the direct and indirect attack on the enemy's command and control system; and it involves preventing his interference with our own C^2 system.

Pulling together the above operations are also the responsibility, but not the sole responsibility, of the commanders at division and corps.

Determining Land Force Composition

U.S. land forces are described in three categories -- combat, combat support, and combat service support. Each category is further divided -- combat forces including infantry and tank battalions, for example; combat support forces including artillery and engineer battalions, for example; and

combat service support including truck companies, port operating companies, and ammunition companies, for example.

The process of determining the composition of a given land force is a matter of developing a detailed troop list, unit by unit, against a ceiling which limits the total spaces available (the ceiling being established by political or higher military authority or, as common in contingency force operations, by shipping and airlift limitations).

In determining force composition, land commanders, and their higher air/land (or air/land/sea) force commanders, find themselves usually in one of two situations.

Either they come into command of a force the composition of which has already been determined and which may even be deployed, in which case their continuing obligation is to review that force's composition and modify it or recommend its modification.

Or they are tasked with the development of the troop list for a force to be newly created. This may be simply development of a contingency plan which is placed on the shelf for later use when required, or it may be the short notice new development or hasty modification of a contingency plan for actual execution.

Whatever the case, the land force composition is related to, may be affected by, and is often developed at the same time as the air element and the overall composition of the air/land (or air/land/sea) force of which the land element is a part.

The art and science of deciding force composition in the face of both shortages and a demanding mission is one which senior air/land battle commanders and their land subordinates, and their staffs, must master. Critical to its performance is the sound professional advice and judgments of the

various specialists -- the command engineer, the command signal officer, the artillery officer, and the like.

It is in the nature of these specialists' advice, however, that if it is all followed there will be few spaces left for the close combat fighting formations on which mission accomplishment ultimately depends.

Guiding the resolution of, and eventually deciding, these issues is the commander's task.

Organizing and Disposing for the Land Battle

Mission and resource assignment on the battlefield is the senior commander's most important and continuing exercise in tactical and operational judgment. It begins with his deciding how to place his available forces in their initial positions. It continues as he modifies these first decisions as events unfold and circumstances change.

We say that there is no separate "land battle," and this is so. However, when a senior air/land or land force commander considers how to organize and dispose his major subordinate land formations, he looks primarily at the way land forces fight and sustain themselves, without concerning himself at that juncture with how the air combines with these land formations (although tactical air is never far from his mind).

Organizing and disposing the major land formations is, in the planning phases, essentially a matter of deciding on the composition of these formations, their missions, and their areas of operations, or boundaries.

The usual method of assigning responsibility to a land echelon commander at brigade, division, corps and at the corresponding levels of task forces is, first, to determine both a mission and an area of operations, and then, as necessary, to modify or complete the task-organizing of the force.

Going through the familiar systematic thought process known as the estimate of the situation, with the help of his staff and when feasible involving his subordinates, the senior commander does this for his immediate land, or air/land, subordinates, and they do so for theirs in turn.

When initial dispositions are being planned, senior land, or air/land, commanders must, in addition and of necessity, and always, take into account political factors such as the nationality of the various land force formations in the forces. This, in reality, may determine which territory and mission is assigned to which force. Such considerations may well have a determining effect on organizing the force of operations.

Likewise, the Service composition of the air/land force may have a substantial influence. This will surely come to the fore should both U.S. Army and U.S. Marine Corps land formations be involved and will often be a factor as to the Services of other nations as well.

It is desirable to retain a single-nation composition at brigade, as a minimum, and perhaps higher. In formations of the same nationality, multiservice brigade formations are more acceptable.

A division, or division-level task force, can accommodate multinational and multiservice land forces of brigade-size reasonably well, provided time is available for the components of different nations and Services to learn and accommodate to each other's ways, modifying their own.

At corps, multinational/multiservice land forces are quite common and relatively less troublesome to put together and operate.

These forces at division and corps level, however, are more than the brigade level maneuver battalions and their artillery. They include supporting forces such as signal, engineers, air defense artillery, army aviation, transportation, and logistics as well.

The senior commander's most difficult task is to allocate means such as these. In virtually every case, this will be a matter of allocating shortages. There will never be enough for all subordinate commands or the senior commander himself to be satisfied.

Modifying the Plan

The commander never ceases to reflect on how his plan suits the situation as he now sees it. He does not lightly modify his plan, but neither does he hold to a plan which needs to be changed. He astutely, yet boldly, does what is called for.

Land formation commanders, especially those whose forces are deployed up against a potential enemy in peacetime such as is the case in Central Europe and Korea, after using the deliberate process just described to arrive at a plan, often tend to endow that set of dispositions with a totally undeserved permanance.

The fact is that, when the enemy has the ability to open the air/land battle with moves and dispositions of his own, the plan so laboriously arrived at becomes -- in the first hours of the war or even in the period of indications and warning which may lead the deployed defenders to increase their readiness -- like all plans, immediately open to question.

When that happens, the commanders of divisions, brigades, and battalions, and of units down to the tank crew and rifle squad, who have in the greatest detail laid out every position and calculated every field of fire may well find themselves hastily adapting to a totally different situation.

All concerned must foresee this possibility, and prepare themselves accordingly.

"Modifying the plan" is another way of saying "conduct of battle." All too often, instruction in the schools and staff colleges of the various

Services is -- and training at the levels of division and corps as well -- weighted more than it should be to "planning" and not nearly enough to "conduct of battle."

But "planning" is not the cause of this problem. What causes the problem is undue sanctification of the plan.

Planning is necessary at all levels, and is performed, perhaps often subconsciously, throughout all phases of an operation, including "conduct of battle."

Planning forces commanders, their staffs, and even unit personnel to think through and work through the types of problems and situations (as opposed to the exact problems and situations of a specific plan) they will face in combat. To expect the explicit assumptions, estimate of the situation and courses of action (friendly and enemy) upon which a detailed operations plan (prepared and written weeks, months and perhaps years prior to a crisis) is constructed to be valid at the time of plan execution is naive at best.

Important as the plan is and valuable as it is for pulling together all the participants in the force, it is actually only a point of departure.

Mission-Type Orders

Unfortunately, the development of plans in peacetime, in the great detail normally done, operates against the use in war of simple mission-type orders, along with describing an area of operations, which permit latitude to subordinate land formation commanders.

There is an art to using the mission-type order. The idea is easy to express; its execution in practice, however, is difficult to achieve. It is rarely possible other than in a command the commanders of which understand both one another and the command's, mutually understood, way of operating.

The mission-type order concept means essentially this: that the commander conveys to his subordinate both a mission, simply stated in few words, and the intent behind the mission. Conveying the intent may entail describing the concept of operations and the part that other subordinate commands play in that concept.

However, it is all too easy to allow a description of the "intent" to become a description of "how to do it."

The commander issuing a mission-type order avoids telling his subordinate "how to do it;" he simply tells him "what to do," and "why," leaving the "how" up to his subordinate.

In a command which can without exception use the mission-type order, the binding force is mutual confidence, based on certain knowledge that the commanders of that command understand its way of operating. This kind of understanding in the U.S. land forces comes most often from long experience working together, and from an enlightened approach by the senior commander -- an approach which tolerates a few, but not many, misapplications of the concept in order to achieve the quality of performance which is sought.

It can, not yet in the U.S. but in some other nation's forces, also come from the systematic training and education, over the years, in units and in service schools, of an officer corps which is imbued with the concept, understands it, is unafraid to practice it, and expects its seniors and juniors to do likewise.

The Idea of "Theater Army"

Should there be an echelon which commands all subordinate land formations? Some call this theater army.

This section (through page 5-17) is an historical/analytical survey:

As the U.S. Army was expanding before the United States entered World War II, it standardized the organizational structure of its field forces as follows:

- The basic organization of the combined arms and supporting services was to be the division. There were various types of divisions (infantry, armored, airborne, mountain).

- The next higher echelon would be the corps, which would have no administrative-logistical functions at all. It was a purely tactical unit.

- Above the corps was the field army, which had both operational and administrative-logistical functions. The logistical structure of the field army would link directly with that of the divisions of each corps, bypassing the corps commander -- who would, however, retain authority to establish priorities.

- Above the field army was the army group. It, like the corps, was a tactical unit only and had no administrative-logistical functions.

This remained the doctrinal concept of the U.S. Army until 1973, when, based on the Army's experience in Korea and Vietnam, the Army Chief of Staff eliminated the field army as an echelon and made the corps, in doctrine and in practice, an administrative-logistical as well as an operational headquarters.*

As used in the doctrinal and operational literature, the term "theater army" has had more than one meaning.

*In so doing without consulting the Air Force, General Abrams eliminated the echelon which had (in doctrine) operated alongside a numbered tactical air force. He created a doctrinal/procedural problem for Army and Air Force circles which exists to this day.

"Theater army" can convey the idea of an essentially administrative and logistic command. It can convey the idea of an operational command. Or it can convey the idea of both.

History in and since World War II sheds some light on this matter.

One of the great commander-type explosions in the European Theater during World War II took place when, in the late summer of 1944, British Field Marshal Bernard L. Montgomery, then commanding 12th Army Group, sent a proposal to the Supreme Commander, General Eisenhower, that he, Montgomery, be designated as the "land force commander" with command of the 12th, 1st (under General Omar Bradley) and the 6th (under General Jacob Devers) Army groups.

General Montgomery's idea of "theater army" was that of an "operational headquarters."

General Eisenhower said, emphatically, "No." He had no intention of taking his hands away from direct control of these three land force formations.

There was already, in the form of General Eisenhower's U.S.-only command in Europe known as ETOUSA (European Theater of Operations, U.S. Army), a "theater army" of another type -- not an operational headquarters but rather an administrative and logistical command.

During the Korean War, General MacArthur, as CINCFE (Far East Command), with his headquarters in Tokyo, used the idea of "theater army" for both operations and logistics functions. Eighth U.S. Army (EUSA), on occupation duty in Japan when the war erupted, moved its headquarters to the Korean peninsula and -- except for a period in late 1950 and early 1951, when the U.S. X Corps operated directly under General MacArthur -- EUSA ran the land war, as well as the logistics thereof.

In Vietnam, U.S. land forces were organized along the lines of World War II's European model. The "unified commander" was a U.S. Army general who was both operational commander, as Commander, U.S. Military Assistance Command, Vietnam (COMUSMACV), and commander of an essentially administrative/logistical command known as U.S. Army, Vietnam (USARV). As "unified commander" General Creighton W. Abrams, for example, commanded all corps-size U.S. formations directly.

One reason the idea of "theater army" continues to surface is that the U.S. Joint Chiefs of Staff have agreed, and promulgated in JCS Publication 2 (Unified Action Armed Forces, or UNAAF), that the Army, the Air Force, and the Navy (with the Marine Corps) will, in a unified command, each have a separately organized "component command."

One problem with the UNAAF, and with this sort of JCS agreement, is that it deals only with U.S.-only command organization, and that in virtually every case theater air/land battle forces will be multinational.

Today, where theater air/land forces are deployed in a command structure, uniformly multinational, in Europe and Korea, there is no operational headquarters known as "theater army."

The convention is followed in Korea's ROK/US Combined Forces Command with the designation of a subordinate Ground Component Command. But this is simply a convention. There is no separate headquarters for such.

General Robert W. Sennewald, U.S. Army, is both CINC, CFC, and commander of the "Ground Component Command;" his CFC staff serves him in both functions, and his subordinate land force formations along Korea's DMZ report in practice directly to CFC.

General Sennewald does command a U.S.-only "theater army" -- the Eighth U.S. Army of some 33,000 members including the U.S. 2nd Infantry Division. But Eighth Army performs only administrative and logistic functions; the 2nd

Infantry Division is responsible through another channel to General Sennewald for operations.

In Europe, U.S. Army Europe (USAREUR) is, and will be in war, an administrative and logistical headquarters -- responsible in peace for training and other readiness but with no responsibility for planning the operational defense of Europe.

The responsibility for Europe's defense rests with the allied chain of command. In Europe's Central Region, CINC AFCENT (Allied Forces Central Europe), a general of the German Army, who commands both land and air forces is responsible. One of CINCENT'S two army groups (Note: there is no operational "theater army" in AFCENT) is commanded (under another hat) in peace, and will be commanded likewise in war, by the CINC, USAREUR.

The most recent history of the "idea of theater army" has been as the U.S. Central Command (CENTCOM), at Army urging, took as its "Army component" an organization to be designated as Third U.S. Army. Whether this was to be an administrative/logistical headquarters only, or whether it was to have operational functions as well, was undetermined for a period of time.

This issue has been resolved by agreement between the Department of the Army and the Commander-in-Chief, CENTCOM: Third Army will be both an administrative-logistical and an operational headquarters.

However, what this will mean in a "one corps" expeditionary force operating in the field under the CINC CENTCOM is not immediately clear. Before Third Army was established, the "Army component" of the Rapid Deployment Joint Task Force, or RDJTF (the predecessor of CENTCOM), was the XVIII Airborne Corps which was made up of the 82nd and 101st Airborne Divisions and the 24th Mechanized Infantry Division, plus corps troops including a logistic support command. As of late 1983, no additional U.S. Army corps-sized organization had been announced as a part of CENTCOM.

Serious problems can be foreseen if there were to be a field army headquarters, with its full range of operational and intelligence functions and staffs, commanding only the XVIII Airborne Corps, which in turn would be commanding its divisions.

The CINC would be justified in believing that he had one too many operational headquarters in his multiservice force.

Experience and reason tell us that, unlike World War II, when there could be a standard description of what constituted a corps and a field army (and in Europe, an army group), there can, today, for the U.S. be no "standard description of echelons above corps."

Today, in Korea there is one situation (a ROK/US organization commanded by an American lieutenant general which is known as the Combined Field Army but which has an operational scope and function not unlike that of a U.S. corps). In Europe there is another situation (two U.S. corps and two German corps under an allied army group headquarters). In Central Command there is another, just described.

Indeed, because multiservice task forces can be quite small (the smallest recent example being that of the Iran rescue mission) there can be no standard description of "echelons above division" or perhaps even "echelons above battalion," for that matter.

Further, an expeditionary force will not arrive in the theater in its fully developed state. It starts as a small force, and grows. It may never grow beyond, say, division size -- in which there would be no function for a field army echelon. If it did grow to a multi-corps size force, there would be ample time to create the command superstructure. If Vietnam is a useful guide, an operational field army headquarters would never be created; the corps would report for operations directly to the CINC (regardless of what the CINC's Service might be.)

(End of the historical/analytical survey.)

Guidance on Echelons Above Corps

The full discussion in the section above comes under the subject known in Army parlance as "echelons above corps." The "best available thought" in this matter has yet to be arrived at. What follows is an effort at providing some useful thought, based on experience and reason....

o First, all air/land (and air/land/sea) forces are situation-specific. Historically, they have been tailored from the means available (using for the most part, but not always, logic and common sense) to meet as well as possible the needs of that situation.

o When considering "echelons above corps" (or "echelons above division" should there be no corps echelon in the force), the senior air/land force commander will encounter the "doctrines" which have been arrived at by various parties.

o Some thinking visualizes a "theater army," or a "field army," or both -- either or both of which might have an operational function as well as an administrative/logistic function. This meshes with JCS agreed doctrine for U.S.-only commands, which says that there will be "component commands" for all U.S. Services. It reflects some Army/Air Force agreed operational thinking which describes both a "land component" commander and an "air component" commander, co-equal and separate from the "joint force" commander, as the "doctrinal" solution.

o The senior commander will, however, also encounter an objective situation, to which these and other "doctrines" may well not readily apply.

o The senior air/land force commander, who will in virtually all cases command a multinational force, will of necessity take the doctrines and positions of the JCS and its Service Chief members into account. However, his primary interest is to find a practical and workable solution which meets both his operational and his administrative/logistic organizational problem, and which

streamlines and simplifies his command and control of the force and avoids headquarters proliferation and unnecessary echelons.

o Such a solution may not conform to any "doctrine" on the subject, or, conforming, may do so only superficially or partially.

o The senior air/land force commander, whether the force is multiservice/multinational (as is usually the case) or is multiservice but U.S.-only, will usually be able to (and in the interest of insuring his effective command and control of the integrated air/land force will usually choose to) command his major subordinate land formations directly, rather than establish a separate "land force command" headquarters. While this is especially suitable if the senior commander is an Army general who can be "dual-hatted," it is also entirely feasible if the senior commander is of another Service.*

o Tactical air command -- also under his direct command -- will however be centralized under a single operational headquarters (see Chapter VI).

o Because administration and logistics are functions normally performed through national and single-Service commands, rather than through multiservice/multinational operational commands, the U.S. Army (and other Services and nations) may well establish a single specific headquarters for this purpose.

o It may be that, in the interests of efficient use of manpower and toward effective coordination of effort, one or more commanders of the force (including the senior commander) will have two or more command-designations -- e.g., he may be both the multiservice/multinational air/land force commander (or his

*The October 1983 entry of U.S. forces onto the island of Grenada evidently saw the U.S. Navy admiral, task force commander in the initial lodgement, commanding directly both the Army ranger airborne assault unit and the Marine landing force, with no intervening "land force commander." That seems to have made good sense -- so why not?

deputy) and at the same time command (with the same or a different staff) another designated single-service or other command. This "double-hatting" is a tried and true method of reducing the number of headquarters and optimizing a multiservice/multinational command structure.

o In determining the organization with which to go to war, both operational and administrative/logistical considerations must be kept in mind, with effective mission accomplishment by the composite air/land force as the overriding consideration. (See Chapter VIII, Administration and Logistics.)

* * * * * *

The senior air/land (or air/land/sea) operational commander, a multiservice as well as multinational commander, could, in a given specific case and after considering all the above, arrive at the following organizational/operational thinking, as justified by experience and logic but not necessarily by JCS or Service doctrines...

"My main concern is the most effective command and control in this particular situation... I do not want to slow down my operation with too many headquarters or undue echelonment...

"Land formations differ in nature from those of tactical air, and from those of the sea. Once they are set up and in place, and are engaged in their missions, I (whatever my Service, as long as I understand air/land, or air/land/sea, warfare) -- like Eisenhower in 1944-45 in Europe, Abrams twelve years ago in Vietnam, and Chalupa in Central Europe and Sennewald in Korea today -- can command two or more land formations directly. I need no

intervening "land force headquarters." Indeed, such would only get in my way...*

"Tactical air is, however, a different matter. Its nature and reach call for a single control authority, responsible to me...

"Logistics, too, needs separate consideration...

"And my most difficult problems may well be with the maritime forces...."

Chapters which follow deal with these issues further.

*However, he might also say... "But it is not all that clear. During the Korean War, MacArthur, with his air and naval commanders near him in Japan, had (except for a short time when X Corps was directly under him) in Eighth Army a single land formation commanding the several corps on the Korean peninsula. And in the Mediterranean toward World War II's end, the multi-service/multinational CINC, General Sir Henry Maitland Wilson, had a single land forces commander, General Sir Harold R. L. G. Alexander (CINC, Allied Armies Italy), commanding both the Eighth (British) Army and the Fifth (U.S.) Army on <u>that</u> peninsula."

Chapter VI. ORGANIZATION AND EMPLOYMENT OF TACTICAL AIR--BASIC CONSIDERATIONS

Defining Tactical Air

The purpose of this work is to state usefully for its readers those ways of organizing and operating which history and experience, along with reason, would indicate will usually make for the most effective use of all available means.

Anyone who enters this field, however, immediately encounters strongly held opinions and doctrines, usually with a fully developed supporting rationale.

For example, there is no agreed set of principles which can be generally applied to define what is meant by "tactical air." The air arms of various nations, and of the various U.S. Services, have taken shape over the years in different ways. Evolution has placed us where we are.

Because some sort of definition is needed, this work takes the processes of evolution as having produced, between the U.S. Army and U.S. Air Force, an acceptable distinction between what is "tactical air" and what is not. This distinction generally prevails as well in the air forces and armies of other nations with which the U.S. is associated in coalitions.

Thus, the aviation capability, almost entirely helicopters, such as that with which the U.S. Army and other modern armies equip their forces are not, by this definition, "tactical air," although, as will be seen, distinctions are sometimes difficult to make.*

*Is a U.S. Army Nike Hercules air defense missile in the surface-to-surface mode, through which it can attack a target deep behind enemy lines, "tactical air"? The tactical air commander controls it in its air defense role; and in at least one theater controls it in its surface-to-surface mission.

The Nature of Tactical Air

The characteristics of tactical air which come first to mind are its speed and flexibility.

While land fighting formations are tied to the essentially two-dimensional land -- including the land's low air envelope through which helicopters can move -- tactical air, which joins land forces in one undivided air/land battle, springs free of that land returning only for basing and sustenance.

This fundamental quality of tactical air -- speed and flexibilty -- stems uniquely from the three dimensional, homogeneous air medium and from the ability of aircraft to traverse that medium readily and to mass their capabilities flexibly.

There is also the power of tactical air -- its multidimensional and wide-ranging ability to attack surface targets of all kinds with highly destructive effect, to engage enemy aircraft in air-to-air combat, to gather and process intelligence information, to conduct electronic warfare, to impede enemy movement, to move troops and supplies to and about the battlefield, to evacuate personnel and equipment, and to protect itself from enemy air and surface interference as it performs these and other functions.

A particular characteristic of tactical air lies in the nature of its command and control. Radars on the ground and airborne can track flight movements and those of the enemy and can permit control centers to give minute-by-minute, even second-by-second, instructions across great expanses of territory. (This type of detailed control is best provided before the battle is joined, execution then being carried out autonomously.)

Tactical air is also trained people. It is logistics. It is maintenance. It is bases. It is a chain of both operating and administrative/logistic command, often separated one from the other yet of necessity linked for integrated mission performance. The "front end" of tactical air described

in preceding paragraphs cannot exist without these ingredients also being present.

The Combat Aviator

Tactical air especially depends for its application on the aviator.

Few fields of endeavor demand anything like what war demands of the fighter/attack pilot in combat.

When the modern fighter/attack pilot straps into his aircraft, he takes personal charge of a machine which produces almost as much thrust as its own weight, which carries a munitions load greater than that of a World War II B-17, and which can deliver those munitions with an accuracy far superior to World War II's. He controls an array of sensors and electronic gear which extends his "vision" for nearly a hundred miles.

Loaded and fueled at his base; single ship, wingman at his side or in a formation; guided to a forward area control point and receiving instructions there, or acting on assigned mission orders -- he takes his aircraft and its munitions at high speed and sometimes very low altitude into a place where enemy fighters and air defenses may be. Avoiding or evading the enemy's defenses, minimizing his exposure as best he can, he locates his target (often concealed or otherwise hard to find) and delivers.

The whole system of generating tactical air -- the training, the building of aircraft, the maintenance of bases, the transportation of munitions, the command and control -- all comes for naught if at the end this fighter/attack pilot and his munitions are misapplied.

Special Features of Navy and Marine Corps Tactical Air

Naval aviation, although an integral part of naval forces and possessing particular characteristics, requirements and capabilities of its own, once it

is in the air has in large measure the capabilities of tactical air as described above. When aviation crosses the shoreline to join the air/land battle, it becomes for most practical purposes identical to the tactical air generated from land bases.

However, carrier-based naval aviation, because its launching and recovery must take into account the sea and its winds as well as a different sort of enemy interference with its operations, has developed methods for generating and recovering its capabilities which are quite different from those of land-based tactical air.

Commanders within air/land battle forces must be aware of how these special features of naval aviation affect its availability to, and operations as part of, the air/land battle.

U.S. Marine Corps aviation has many of the capabilities of U.S. Air Force tactical air as described above. There is little in its fighter aircraft and their pilots, for example, that makes land-based USMC air very different from its Air Force counterparts when operating with other than Marine Corps formations.

On the other hand, helicopters of USMC aviation, when based ashore, serve Marine Corps ground formations in ways quite similar to the ways in which helicopters of the U.S. and other armies work with their ground formations.

Attack helicopters of the U.S. Army and USMC have armor destroying capabilities which are not unlike those which certain aircraft of the U.S. and other air forces possess. Similarly, their utility helicopters can dispense mines from the air with an effect not unlike that of USAF, and perhaps other, tactical air. And so on.

But, as stated earlier, this work does not look at these U.S. Army and U.S. Marine Corps helicopters as "tactical air," but rather defines tactical

air for its purposes to mean that which is roughly similar to what the U.S. and other national air forces provide to the air/land battle.

Tactical Capabilities

Some of the means of tactical air are quite special purpose; others permit considerable flexibility in their use; others lie between these two extremes.

F-15s of the U.S. Air Force today are essentially special-purpose, primarily air-to-air fighters.

The A-10s of the U.S. Air Force, on the other hand, are built mainly for close air support and armor killing in the close-in battle, but not to go deep into the enemy rear where air defense missiles can reach them easily. On the other hand, the F-4 can do the close-in battle mission (although not with tank-killing prowess of the A-10) and, more often than can the A-10, can engage also in the deep battle.

The F-4 configured as a "Wild Weasel" is truly special purpose. It is built to find and destroy enemy air defenses, especially in protecting a deep attack by other aircraft on a specific target.

Some pilots are trained primarily for air-to-air, or air defense, combat (this situation is more frequent in allied air forces). While their air defense aircraft can in principle be "re-roled" to a ground attack mission, they may not have the internal wiring or the wing "hard points" for the required munitions, nor might their pilots be as proficient as desired.

Less modern aircraft of some allied air forces may be equipped to carry only "iron bombs" -- high explosive gravity munitions.

Even within the same aircraft types, configurations may differ. Some aircraft of a certain type may be configured to carry the Maverick anti-armor

missile; others may be equipped to deliver laser-directed precision munitions; others, both.

All too many tactical aircraft today do not have the ability to attack ground targets with precision at night or in bad weather. Various means are used to provide a degree of night/all-weather capability, such as radar-directed bombing, or beacons. These means are vulnerable to jamming, and aircraft using them are vulnerable to enemy air defenses except in a low-threat environment. Not all aircrews or air forces are equally proficient in these techniques.

Experienced tactical airmen understand very well all these, and the many other, differences in capabilities very well. They also understand, and are usually highly skilled in, how to work out ways to compensate for aircraft limitations when this is in any way possible.

The commander and staff officer who enters into air/land command through experience primarily in its land formations has an obligation to become as knowledgeable as he can in such differences in capabilities and in what tactical air can and cannot do. This is part of the essential equipment of the well-versed air/land professional.

Generating the Force

Bringing tactical air to bear on and over the air/land battlefield involves two basic processes:

- Generating the force
- Using the force

These processes are linked. Generating the force must be responsive to decisions on how the force is to be used. Timely and foresightful decisions on how the force is to be used will permit generation of tactical air without wasting time and effort.

Generating the force is a matter of maintaining air bases in working condition, of protecting these bases, of having in place the fuel, munitions, and repair parts to sustain the uninterrupted and responsive flow of aircraft to the battle areas, of organizing effectively the work of ground crews, and of conserving and using efficiently the air crews.

Extracting from all these resources the maximum in force generation, and sustaining this maximum performance, requires energy, drive, and management prowess of the very highest order.

The nature of the force generation process permits execution of surges in capabilities to meet particular needs. However, to sustain a surge for an extended period, or to generate repeated surges one soon after another, wears down the underlying resources of tactical air -- air crews and ground crews, in particular.

Those who use tactical air, and those who place requirements on its use (including commanders of land force formations who must have tactical air for the close-in and deep battles), must keep in mind that timely and accurate forecasts will improve the efficiency with which these always scarce resources can be managed.

Using the Force

Tactical air must be used well. It must be used where it will do the most for the command.

Wielding the power of tactical air in such a way as to achieve its maximum effect calls for air/land commanders at every level to understand this form of military power and what makes it most effective in war.

Certain principles apply to the use of tactical air. (Some of these are the well known "principles of war.")

- o Mass. When you decide what to do, do it right. Put in what you need. Put it in quickly. Don't go in "short" and don't string out the effort.

- o Unity of effort. Not only make the "air package" a team effort (e.g., combat air patrol, Wild Weasels, fighters) but closely tie in the air effort with the action of maneuver units, with the artillery, with the electronic warfare effort, with the attack on the enemy's command and control. The war is synergistic; think of it that way.

- o Precision. With a superior, air/land-oriented, intelligence effort and with superior coordinated decision making, select that precise effort, that specific target, that particular attack, which will do the most damage -- then deliver the tailored munitions there, maximizing their effect. Not only will many fighters about the air/land battlefield be grateful, but the logisticians who at great effort brought the munitions forward will also.

- o Surprise. Conceal your intentions, mask your activities, deceive the enemy whenever possible, and hit him when, where, and in a manner he does not expect.

- o Innovation. Be flexible. Use the speed, flexibility, and range of options of tactical air with imagination.

The art and science of directing and using tactical air means that there will be times, because the force priorities are elsewhere, when many land formation commanders will receive little or no tactical air.

There will be other times when some land formation commanders will have so much tactical air as to risk overwhelming their processes for placing tactical air in the right places on the battlefield.

The Cycle of Air Planning and Execution

The direction of the tactical air effort calls for planning of future effort to be taking place while the current effort is being executed. Normally this is done through a daily cycle of planning and execution.

In the tactical air control center, or TACC, where this is done, one normally finds two separate sections -- one for "planning" and one for "operations." The "planners" do the work of developing the "air tasking order" or ATO for the next day, and then turn the ATO over to "operations" to execute.

The daily cycle is not sacrosanct. The events or flow of the air/land battle will often make it necessary to make major shifts in priorities and plans on short notice, well before the next day's cycle. The speed and flexibility of response of tactical air permits such, provided the air command is well tied together with communications and has developed and practiced its methods for responsive force generation and control.

The Fundamental Element: The Mission

The fundamental element for applying the capabilities of tactical air is the mission.

A mission can consist of one aircraft (e.g., a reconnaissance mission). It can consist of, say, two to four aircraft (e.g., an attack of an enemy tank formation called for by a battalion in contact). It can consist of a substantial number of aircraft of more than one type (e.g., an attack on a deep target in which the attacking fighters are protected en route and in the target area by other aircraft). It can consist of the application of part of one aircraft's capabilities for a limited time (e.g., a jamming mission by an airborne jammer of a particular target at a particular time).

A mission is placed into effect by the issuance of an order or other tasking in the detail necessary, as a minimum, to get the job started, and by the follow-up control necessary to get the job done right.

The totality of all the missions executed over a period of time (say 24 hours) comprises the tactical air effort for that period.

The commander of the composite air/land battle force relies on one senior subordinate to direct the tactical air effort of the force and of all tactical air (as defined on pages 6-1 and 6-2 above) in its support. He holds that subordinate responsible for the fully effective performance of all that tactical air effort in the interest of the force and of the force's successful mission accomplishment.

The commander responsible for directing the tactical air effort for the senior air/land battle commander does so by directing what missions will be performed -- when, where, by whom, (if necessary) how, and for what purposes.

Battle Control of Tactical Air

The mission is decided on at the tactical air control center (TACC), or at the wing operations center (WOC) based on TACC instructions. The wing or squadron organizes the mission and the mission is launched.

After the mission is launched and en route, it can come under one of three separate and distinct forms of battle area control.

The first two of these provide a form of positive and direct control up to the time the mission commander identifies the specific object (target) of his mission.

- Air intercept control, for air defense fighters, is provided by a system of linked radars and control centers which track enemy aircraft and our own and which direct (commit) our flights to the appropriate place in the sky, at which point the enemy formations can be acquired

either visually or electronically from the cockpit. The flight commander then takes over control for the engagement.

- Close air support control, for ground attack missions in close support of ground units, is provided by a system of ground-based (or in some cases airborne) air controllers, who closely coordinate with the ground commanders, and (for ground-based air controllers) are located with them. The forward air controller, in voice radio communication with the mission commander, describes or otherwise (e.g., through its marking by artillery smoke or air rocket) identifies the target, at which time the mission commander takes over. (Under emergency conditions, when no air controller is present, field artillery forward observers or infantry platoon leaders or company commanders who have voice radio contact with the fighters have filled this function.)

The third condition is that of air-to-surface attack beyond the observation of a forward air controller. Such attack may range in distance from a point just beyond the line of ground contact but out of sight to a forward air controller or other ground observer, to targets one or two hundred miles distant in the deep battle zone.

Today's technology permits only "autonomous" control by the mission commander for such missions. Usually, the deep attack mission commander is briefed on the target before takeoff; he then proceeds to the target, identifies it himself, and carries out the mission.

Here the potential for misapplication of costly tactical air effort is high.

First, the intelligence upon which the target selection is based may well be incorrect -- this is especially true of moving targets such as enemy combat formations. Second, the criteria for target selection may not have been appropriate to begin with -- was this the right ground combat formation to be attacking at this time? Third, by the time the mission arrives in the target area, the original target may no longer be the most important one. Fourth,

the mission commander may for one reason or another identify and attack the wrong target in any event.

Research and development programs such as JSTARS (Joint Surveillance and Target Attack Radar System), PLSS (Precision Location and Strike System), and GACC (Ground Attack Control Center) are under way to overcome this serious gap in tactical air control, but none of these are scheduled to appear soon in the field forces.

In the meantime, air/land battle commanders, especially tactical airmen, must seek ways to acquire up-to-date and accurate target intelligence, to make timely and sound decisions on what targets should be attacked, and to insure that the mission commander is updated and fully informed about the target he is to attack.

Who Defines the Target in Deep Attack?

The land formation commander may well, and usually should, define the specific effect to be achieved. This definition may involve a give-and-take process, soldier and airman. But there can be only one answer as to who defines the target -- the tactical airman. No one else has the combination of technical and operational expertise required to decide the details of what to do and how to do it.

For his own confidence in mission success, the mission commander must have a target briefing by airmen, in airmen's terms. Defining the target and its surroundings in these terms and conveying that description to the mission commander is the task of the tactical air chain of command.

But it is absolutely essential that the tactical air chain of command make the target selection with full understanding of, and responsive to, to the effect desired by the land, or senior air/land, command and why.

This is a matter of wide-band communication between the appropriate land, air, and air/land authorities with an interest in the target. The land, or senior air/land, commander (or his staff) has the responsibility to make clear

to the tactical airman the effect desired. "Specific effect" might be in words like these: "You (the airman) and I agree that there seems to be a major enemy armored formation at (location), moving toward (location). With the resources allocated to me, destroy it to the maximum degree possible."

It is not possible in an all-command treatment to describe the details of how this understanding is achieved. Suffice it to say that it is a matter of experience in working together, of an acquired understanding of one another's ways, of competent and well informed Ground Liaison Officers (GLOs) at each Wing Operations Center (WOC), of Air Liaison Officers (ALOs) at land formation headquarters who have the confidence of and can articulate the concerns of the commanders there, perhaps of a Battle Coordination Element (BCE) at the TACC which can convey the battle situation faithfully for the commanders they represent, and, most important of all, of a tactical air commander and staff who identify with and understand the nature of the land part of the air/land battle and its dynamics. (See also "But Who Decides... and Controls?" at pages 7-15 and 7-16, Chapter VII.)

The only way this kind of mutual understanding and teamwork can be achieved in peacetime is through regular practice, especially in realistic and authentic air/land battle simulation. (See Chapter X, Air/Land Battle Mastery through Air/Land Battle Simulation.)

The Tactical Air Estimate and Decision

The senior air/land battle commander, linking his thought processes with those of his senior responsible tactical airman, never ceases to think about how best to use his single most flexible, and often his decisive, fighting capability -- tactical air.

From time to time, along with his chief tactical air authority, he may conclude that the situation has changed sufficiently that he must change the present weight of effort he is giving to one or more of the uses of tactical air, or to the distribution he is making of the effort along the front.

When this time, in his judgment, has come, he makes -- in conjunction with the subordinate he holds responsible for the direction of the tactical air effort -- an Air Estimate of the Situation. The following is one possible sequence:

- o Situation....
  - Land situation
    - Enemy
    - Own
  - Air situation
    - Enemy
    - Own
  - Other....
- o Mission....
- o Factors to be considered....
  - What is likely to be the case if present trends continue?
  - What are the command and control factors?... the electronic warfare factors?... the logistic support factors?... the air defense factors?...
  - What are the alternatives for refocusing the air effort?...
  - What will be the probable outcome of each?...

- What are the advantages/disadvantages of each?...

- What are the key (one or two) critical factors in this situation?...

- Etc...

o What is my decision?

o What orders do I now issue?

This may be a hasty estimate in which the thought processes, although complete, are abbreviated. Or when time is available it may be a more deliberate estimate with a more comprehensive gathering and assessment of information.

No less often than daily, he makes a deliberate estimate.

Chapter VII. OPERATIONS

The Essence of the Operational Art

Rules are of little help in the operational art. It is better for the responsible commander to be able to understand one objective situation and grasp its essentials than to memorize all the rules ever written about warfare.

The essence of the operational art is, first of all, a grasp of warfare as a duel between opposing forces each of which is governed by the minds of men; second, a thorough understanding of what goes on in the dynamics of the air/land battlefield; third, the ability of the responsible commander to think in terms of the harmonious orchestration of time, space, force, and logistics toward his ends; then gathering information and deciding what to do; and, finally, getting it done.

To the seasoned and skilled operational commander with his hands on reasonably good information, deciding what to do is the easiest part. The difficult part is to get it done -- especially to get done that "supereffort" which, if made to take place in the way visualized, will bring the enemy to his knees right there on the battlefield.

The operational art is, thus, more than just thinking. It is fighting for information. It is doing. Its most skilled practitioners are men of thought and at the same time men of action.

The target of the operational commander is not simply the forces of his enemy, but the minds which control those forces. The aim is, through what we do with our forces, to create in those enemy minds uncertainty and doubt in the first instance, and then apprehension, fear, and panic leading to their practical inability to respond to battle events.

The combination, therefore, of what we do with our forces, plus its psychological effect, ties the enemy into knots and lays his forces open to systematic destruction.

This is done by correctly calculating the enemy's vulnerabilities versus our advantages and exploiting these vulnerabilities in the way we handle our forces -- and by denying the enemy the use of his own advantages, likewise.

The key to this is the way we handle our forces. This is the operational art of the superior commander -- skilled, confident of his means, dominating the enemy by his intellect and by his use of these means, cautious yet bold, watching his flanks and his rear, but protecting those by the way in which he takes the fight to the enemy and causes that enemy even more anxiety as to his own flanks and rear.

Skill in Warfare

There has been, in recent years, a considerable discussion of what has become known as "differing styles of warfare." Some use the shorthand terms "maneuver" and "attrition" for "what should be" and "what should not be" a style of warfare.

Although this kind of language has some relevance, it often causes those who engage in the discussions to miss the most important point -- that warfare is the domain of relative human skill, of a relative human ability to use the available means to thwart, destroy, neutralize, or otherwise defeat the enemy at minimum cost, and that what we seek in commanders is technique of skill.

The simple tactic of the well-executed ambush (an air as well as ground tactic) is an example of such tactical skill -- definable neither as "maneuver" nor "attrition," indeed a composite perhaps of both.

Skill in warfare is possessed by that commander, whatever his level, who, possessing the combative instincts and urge to dominate the enemy which can be called "the fighting heart"...

- o Understands his mission and his commander's intent.
- o Understands the situation...
  - His own means, where they are and "how" (in what condition) they are.
  - The enemy, where he is and how he is.
  - The terrain and the air battle scene, and the visibility and the weather -- and how to make all these work for him and against the enemy.
- o Can then visualize "what will happen, if (such and such)..."
- o Grasps the risks, and the opportunities, in their true perspectives.
- o Has a tactical insight which leads him unerringly to "what to do..."
- o Has in his hands the means of control to "make the right thing happen"...
- o Drives on to make that happen, motivating his force, keeping track of the situation as it moves, adapting to change, and keeping at the minimum the action's cost.
- o Always keeping in mind his assigned mission and his commander's intent.

This kind of skill comes naturally to some, less so to others. Like all skills, it can be further developed in most. At the higher or "operational" level of war, it can perhaps be called "operational skill."

Its acquisition stems in large part from study of and practice in the art and science of war. Its development in the professional officer corps which may need it in war should be a matter of the utmost priority.

The "Battles" of Theater Warfare

Leaving aside for now the sea, or naval, battle (without the success of which no theater warfare could be carried out for long), theater warfare can be looked at as a composite of four battles -- closely linked, but separable for purpose of thought and discussion.* These are:

- The air battle...
- The deep battle...
- The close-in battle...
- And the rear area battle.

Tactical air runs throughout the first three, and in many cases will be deeply involved in the last. Land forces (other than air defense missile units and air defense jammers), although greatly affected by the air battle, do not join in it.

*It is dangerous to set up these four "battles" as separable. Treating them so may lead some to think that they are independent entities. They are far from that. They comprise a single fabric, itself a seamless continuum of battle. This text takes the risk of treating them separately only toward reaching a better understanding of their essential natures, at the same time urging readers not to lose sight of their essential unity.

In the simplest terms, the art and science of senior air/land, or theater warfare command means this: Effectively and successfully to fight concurrently these four battles, and to harmonize* their conduct toward the quickest and least costly accomplishment of the command mission.

The Air Battle

The objective of the air battle is to destroy or greatly degrade the enemy air force and to keep intact our own, all of this toward denying enemy air the ability to do us harm and insuring that a strong and continuing tactical air component is available to our deep and close-in battles.

Using for the most part high explosive munitions delivered on target**, the offensive air battle goes directly after those factors which are essential to the opposing air force -- its bases; its command and control centers and their communications; its fuel, munitions, and transportation; its aircraft and the quality and endurance of the enemy pilots.

Using for the most part air superiority aircraft and air defense missiles, the defensive air battle aims to protect the same on our side.

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*Because the word "harmony" seems better to convey what the operational level commander seeks, this work uses that term rather than "synchronization," as in the Army's Field Manual 100-5, Operations (which speaks also of "initiative," "depth," and "agility").

Tactics can and usually should be synchronized, as when artillery, close air support, and attack and lift helicopters are brought together in a heliborne assault. But "synchronization" (as in synchronizing the sound to the picture in a film production) connotes an order of precision in timing and teamwork not usually necessary at the operational level.

**Not only with "explosive munitions delivered on target" (which will include area munitions and precision guided weapons), however. For example, partisan/guerrilla/special purpose forces operating in the enemy rear can, by attack of these same targets, contribute to the success of the "air battle." The senior tactical air command authority may not control such forces, but he should have a key part in determining their missions and operational objectives.

The primary means for waging the air battle is tactical air. When such are available, long range surface-to-surface missiles, targeted by the senior tactical air command authority, also join in the air battle.

Winning the air battle entails a skilled and shifting combination of defensive counter-air (air superiority fighters), offensive counter-air (attack of bases and command and control), surface-to-air missile defense, and offensive fighter sweeps. Air battle skill lies first in judging rightly when and where to use available means with the greatest effect to thwart and destroy, and then in so using them.

Air defense, other than forward area air defense, is part of the air battle. Air defense missiles of high reach and large coverage are therefore placed under the control of the senior tactical air command authority. The senior tactical air authority also establishes rules of engagement for forward area air defense weapons not under his operational control.

The senior multiservice/multinational commander is vitally interested in the air battle. He keeps track of its conduct; he guides its conduct through the assignment of objectives and priorities. He decides, and re-decides as necessary, the relative proportion of his tactical air which will be devoted to it. But the conduct of the air battle is the responsibility of the senior tactical air command authority.

The Deep Battle

(Note: We have become prisoners of our own terminology. It is in the nature of the new air/land battle thinking that its practitioners must shake off, or at least reexamine, many of the terms, and their meanings, that derive from an earlier time. Examples of such terms are those which stem from tactical air doctrines of World War II and Korea -- such as the "three stages of air warfare": "air superiority," "isolation of the battlefield" or "interdiction," and "close air support." Many ideas behind these terms, especially that these are the priorities of the use of tactical air, are in large part no longer with us. But the terms remain -- especially the term "interdiction,"

which has become inaccurate -- confusing the application of logical thought to the objective problem at hand.)

(With this approach in mind, let us examine the "deep battle.")

Linked to the air battle and in reality inseparable from it is the deep air/land battle.

The zone of this deep battle extends perhaps some 200 miles or so out in front of where close combat between the two sides is taking place. Its depth varies, largely depending on how the enemy's land forces not yet committed are deployed and how his logistics and lines of communications are laid out.

The objective of the deep battle is to attack the enemy's resources which are in this deep battle zone -- his uncommitted formations, his command centers, his logistics, his lines of communications, his fighting potential of all kinds -- in such a way that these resources are either denied the enemy or cannot be brought to bear effectively on the close-in battle.

(To the tactical airman, this deep battle has long been known as "interdiction." Air/land thinking in many quarters has come to call this "air interdiction," for the deep part, and sometimes "battlefield air interdiction," or BAI, which in turn may be termed "shallow" and "deep" BAI. These terms and their meaning are not standard, from command to command.)

An important focus, but not the sole or even the most important focus always, of the deep battle is to prevent enemy reinforcements from moving to the close-in battle area.

The idea of this focus is that, if the enemy which our own air/land forces are fighting in the close-in battle (to be described) can be substantially deprived of the reinforcing formations en route from in the deep battle zone, our forces can defeat the enemy in that close-in battle with essentially the means in hand.

From the viewpoint of the land forces, the corps commander "fights the deep battle" so described.* This is so because at the corps level there will usually exist both the intelligence means, or access thereto, with which to assess this deep battle and the deep attack means, or access thereto, with which to wage this deep battle. The corps commander has the most critical interest in cutting the reinforcing enemy down to size, so that his divisions can deal with what remains; he must look at the fabric of close-in and deep battles as a single fabric.

However, from the viewpoint of the tactical air forces, the deep battle so focused is the business of the senior, or operational-level, tactical airman. This is so not only because most of the means for waging it are tactical air, which they are, but also because the air battle is linked with both the deep and close-in battles and competes with them for tactical air resources.

The senior air/land commander's aim is to bring together and harmonize the means and the interests of both authorities, land and air. This is the art and science of waging the deep battle.

Maneuver in the Deep Battle

Is there a place for the maneuver of large formations in the deep battle zone -- that is, in the zone of action beyond what is later (page 7-16) described as that of the close-in battle?

*The U.S. Army's AirLand Battle Doctrine has been making this point so strongly and consistently, that it has become part of conventional wisdom today. The "logic and experience" behind the Army's version of the "best available thought" is not clear. It may be much more accurate to write that "the major land formations" of the air/land battle command -- which would make it "army group" in Central Europe, "field army" in Korea, and "to be determined" in an RDJTF -- "fight the deep battle." It will take valid experience (which can be gained in large part through authentic and realistic air/land battle simulation), before anyone can say authoritatively what is right in this regard.

Experience and reason would lead to an answer, "Yes" -- especially in conditions of open warfare, where front lines are irregular, large gaps exist between units, and flanks are exposed.

(History: The closing days of the October 1973 Arab-Israeli War -- in which Israeli formations crossed the Suez Canal, attacked air defense and other units in Egyptian rear areas, and gained an operational advantage very influential toward ending that war.)

The availability of helicopter-mobile formations, and airlift and air logistics, adds to the possibilities of decisive maneuver in the zone of the deep battle.

The idea of "maneuver in the deep battle" is, however, not simply the maneuvering of our forces into the enemy's deep battle zone. It is to look at the full air/land fight as one of maneuver -- of the enemy's capability for maneuver, whether reinforcing or not, and our capability, using all means, for thwarting or denying his maneuver and seizing the operational advantage for ourselves.

Because bringing off such calls for a sure hand on the many means of battle, this formulation adds weight to the corps, or other land formation, commander's claim that the deep battle is his battle.

Problems of Harmonizing

The land formation (say, the corps) commander and the tactical air (say, the numbered air force, although these two are not parallel command positions) commander share a problem: how each is to harmonize (and even "synchronize," see footnote page 7-5) and reconcile his own interests and operations with the other's in a common effort.

Within the airman's own domain there are problems of harmonizing (synchronizing)...

- o Shallow battlefield air interdiction (BAI) with close air support (CAS).

- o Deeper BAI with shallow BAI.

- o Any BAI/CAS with suppression of enemy air defense (SEAD).

- o SEAD and BAI with what is called C^3CM (destructive as well as electronic countermeasures against the enemys C^3).

...all of which may use the same aircraft, but in different ways and against different types of targets.

The land formation commander has an interest not only in seeing that these air efforts are harmonized within themselves, and that they are in turn harmonized (synchronized) with his own artillery, air defense, obstacle creation, scheme of maneuver, and so on -- but also that their very priorities harmonize with his needs at every monent of the battle.

Also to be harmonized (synchronized) are:

- o Common use of the same airspace by tactical air and land formation helicopters, insuring that neither forward area nor more rearward air defenses of the land formations shoot down our own aircraft.

- o Common use of the electromagnetic spectrum, so that, for example, both land and air jammers jam enemy frequencies they should jam, but no friendly force frequencies they should not jam.

- o Sharing of intelligence -- its collection and its product.

Harmonizing and reconciling these activities is an art and science yet to be mastered in air/land battle commands today. Achieving it is not only a matter of good will and common understanding; it is a matter of agreeing on procedures.

Details of procedures will necessarily differ, command by command. Working them out is the task of each command, taking advantage of the best available thought offered by those who have studied in detail these and other problems of harmonizing.*

Intelligence, Assessment, and Decision-Making in the Deep Battle

The fundamental problem of an air/land commander (by which is meant a corps and division or tactical air force commander, as well as higher multi-service/multinational commander) is to capture at all times accurately in his mind's eye the dynamics of the deep battle.

What is going on in that deep battle zone? What enemy formations are there? Where are they? What are they doing? What are the time and space factors for their commitment forward? What are the potential obstacles to their forward commitment? What formations pose the greatest danger?

What are the enemy's logistics vulnerabilities? His command and control vulnerabilities? What effect will an attack on these vulnerabilities have on the enemy's ability to fight the close-in battle?

Further, what are the options available to our side? What are the possibilities for direct air attack? For creating obstacles? For partisan/guerrilla activity? For attacking the enemy's command and control? For deception? For putting these and other means together in an integrated fashion for maximum effect?

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*The efforts of the U.S. Readiness Command, the Air Force's Tactical Air Command, and the Army's Training and Doctrine Command have produced a useful series of TAC/TRADOC/REDCOM publications including: Joint Suppression of Enemy Air Defenses, Joint C^3 Countermeasures, and Joint Attack of Second Echelon. These publications have been widely distributed. A list of them is available through Headquarters U.S. REDCOM, MacDill AFB, Florida 33608, Attn: J5.

What are we to do? And who decides? What do we do with our air? ...with our maneuver units? ...with our artillery? ...with our jammers? And who makes the plans for these?

Finally, how do we get it done?

It may be in large part because these questions are "too hard to answer" that so much of the literature and briefings on the deep battle have treated it as an "industrial" operation -- an "attrition process" in which we simply "find and attack deep targets" -- after which we can calculate "presentation rates" or "rates of enemy arrival" of enemy units for "target servicing" at the front.

This is a particular characteristic of weapon and system developers with an admiration for "technology" and what it can do.

But this is not war. It is mindless destruction. It leaves out purpose, and skill in the operational art.

Dilemmas of Deep Battle Operational Command

As the corps or other land formation commander looks at the deep battle and at the part that tactical air plays in his waging of it, he is often confronted with this dilemma:

- He sees that tactical air is critical to operational success.
- He is told what tactical air will be available, and when -- so that he can arrive at an integrated operational scheme.
- But he also realizes that, on short notice, higher authority might well take part, or all of that tactical air from him.
- Does he plan that he will have the air, or not?

Insisting that he not lose his tactical air on short notice simply creates for his next higher commander another dilemma -- namely, does the senior leave his subordinate's allocation undisturbed, or does he in the conduct of battle use tactical air's flexibility for his own purposes, which he might judge as overriding?

The senior commander, i.e., he (whatever his level) who has jurisdiction over tactical air's allocation must realize that he cannot move tactical air around willy-nilly. His aim is to decide so astutely as to the main effort (call it the "schwerpunkt;" see page 7-18) for the period in question that he can stick with that decision until the battle unfolds toward a new situation and a changed "schwerpunkt." The higher his level of command, the longer must be his look into the future and the greater is the order of operational insight and battle generalship required.

Another dilemma of the corps, or other land formation, commander:

- He wants a certain effect to be accomplished by the tactical air made available to him -- and he makes known to the tactical airman that effect.

- Because he does not want to tell the tactical airman how to do his job, and because of uncertainties in any event (weather, air base damage, enemy action en route), he cannot be sure as to what will actually be the effect achieved.

- How does he plan?

There are ways to ameliorate, but never to remove, such dilemmas. It is small comfort to the commander to be told that to cope with dilemmas like this is why he was placed in command. But such is the case.

"Targeting" in the Air/Land Battle

In the deep battle it is characteristic of air intelligence to look primarily at "targets." This follows from the nature of the tactical airman's way of influencing the battle, namely with air-delivered munitions on selected targets.

To an airman, "targeting" connotes not only the full air intelligence process of selecting and defining the target in detail, but also implies the selection of aircraft (which aircraft and how many) the munitions load, accompanying penetration assets, and determining technical data on the packaging and the delivery -- all of these determined by the nature of the "target" and its "environment" as gathered by intelligence.

However, land commanders see intelligence as more than simply targeting information. They see it also as a way to grasp the enemy's capabilities as they lie out there on the battlefield, and his intentions as well -- and from this a way to defeat him using all means, not only air.

To the land formation commander, "targeting" means a statement of what he wants hit, what he wants done to it, and when.

For example, to the airman "targeting" a bridge for destruction, the timing of its destruction may not be so very important. To the land formation commander, who has in mind destroying that bridge just when it will cause the moving enemy the greatest difficulty, timing is all-important.

If the two authorities, air and land, are ever to harmonize and reconcile their approaches to the deep battle, the airman must adopt the land commander's way of looking at the dynamics of the deep battle -- and the land commander must understand how the airman must operate in his own medium, the air.

But Who Decides?... and Controls?

The problem is that there is on any battlefield a distributed array of command centers -- air, land, and air/land -- at all of which the deep battle situation is tracked and judgments are made, and each of which has a stake in decisions on the use of tactical air in the deep battle.

Further, each battlefield -- in Europe, in Korea, and in the contingency plan areas of operation of the U.S. Central Command -- is different in its command structures, in the layout of its various command centers, and in their functions.

Central Europe, with two Allied Tactical Air Forces -- each operating alongside and responsive to, but not responsible to, an allied Army Group of several corps -- is too large a theater to have the deep battle application of tactical air decided, attack-by-attack, at the senior air/land echelon, Allied Forces Central Europe.

AFCENT, therefore, allocates offensive air support -- which includes battlefield air interdiction -- all the way down to the corps commander. Further, there is no single Tactical Air Control Center, but rather there are four Allied Tactical Operations Centers across the front, two in each ATAF, which issue air tasking orders to the wings and squadrons.

Korea, on the other hand, allocates to its field army commanders only close air support, using a group of ROK/US Army personnel known as the Battle Coordination Element at the Tactical Air Control Center to process, prioritize, and coordinate the field armies' requests for air for the deep battle.

This work makes no judgment on "who decides." It states only that the land formation commander (probably corps level, perhaps higher) has a right to expect that (1) higher authority will assign him a given tactical air capability from time-to-time, or over a period of time, for the deep battle, (2) that he will be able to tell that tactical air what to do (that is, what

effect he wants to achieve), and when to do it -- and (3) that, in so doing, he will have available to him in his command center the advice of a qualified airman who represents the air commander who will have to do it and who can let him know if what he wants makes airman's sense.

And it states that the tactical air commander has a right to expect (1) that what he is told to do with that allocated air, and when, will be consistent with its capabilities, and (2) that he will be told not only what to do, and when, but (3) that in the battle's course he will be kept so well informed by the land formation commander as to the battle situation and the commander's continuing assessment that he will not need to be told "why." He will understand why without being told, and will therefore do what is wanted just as it is wanted.

And it also states that the ordinary citizen, the taxpayer of the countries which have provided these forces and deployed them for battle, has a right to expect that the land formation commanders and those of the tactical air will, under a senior commander who has jurisdiction over them both, work out the mechanisms and the methods by which not only will there be teamwork between the two kinds of commanders and their forces but also that the teamwork will be responsive to the operational thinking of a single directing mind, responsible for pulling together the two efforts, air and land.

How the air, land, and air/land commanders of theater forces work out the application of the above -- provided they agree with it at all -- is for them to decide, based, one hopes, on valid experience gained in large part through air/land battle simulation.

The Close-In Battle

The close-in battle is essentially the clash of maneuver battalions and their supporting arms, along with the play of tactical air.

The brigade, with its battalions, specializes in the "close-in battle."* Its commander usually looks several thousand meters into the enemy side. He takes into account the enemy units there and within early reinforcement, and outsmarts and outfights the enemy there on that ground, at the same time never failing to look beyond that battle in time and space for what might come in the next hours or days.

The function of the division commander with his brigades is to fight that close-in and near-deep battle -- to draw his brigades' boundaries, to give them their missions, their means, and his concept of operations, to see to it that they gain and keep the initiative, engaging the enemy always at the enemy's disadvantage, to assist them with combat support, to sustain them with logistic and administrative support, and to motivate and encourage them.

It would be worthwhile for division commanders and their battle staffs, and for brigade and battalion commanders as well, as they think about how they might fight this close-in and near-deep battle, to reflect on some useful terms which have long been part of German operational doctrine and which represent some of "the best available thought."

Full appreciation of the terms can come, of course, only from realizing more deeply the common way of thinking about warfare that lie behind the bare terms and their short definitions which follow. That too is worthy of some study.

One of the terms is <u>auftragstaktik</u>, which means essentially "mission-type orders." In its full context this term seems to convey a kind of mutual

*Regiments (and brigades) in some armies are organized to be less powerful than in others, and may not be capable of doing all that these paragraphs describe. In such a case, it may be the division commander who fills the function described. The corps might then take the place of the division as described in the next paragraph, and a field army echelon the place of the corps.

understanding between commanders, up and down and sideways, of the mission, the situation, and the governing concept of operations, and a mutually understood and accepted way of acting in situations, that permits orders to be short and to contain only the mission and the commander's intent, and to allow operational room for the commander executing the mission to then do his task as he sees fit.

Another term is schwerpunkt, which conveys the idea of "the decisive point," or the one (sometimes shifting as the battle unfolds) point where the command's attention or effort is to be focused because all understand that this is where the outcome of the battle will be determined. Each commander directs his attention toward being dominant there, accepting risks elsewhere.

Finally, there is fingerspitzengefuehl, which translates as "fingertip touch," and which means that masterful sensing of the terrain and the moving tactical situation with its risks and opportunities that leads the superior commander almost by instinct to just the right battle action. This is an uncommon quality, which when recognized should see its possessor retained in a command position so he can teach it to his subordinates and, if necessary, use it to his country's advantage in battle.

Even though the division commander may be focusing his primary attention on the close-in battle, he never fails to watch the zone of the deep battle -- especially that part of it which lies just beyond where his brigades are fighting.

He shares with the corps commander his estimate of how enemy resources in the deep battle zone can be most effectively attacked so as to improve his own, division, situation.

And he looks for opportunities to wrest the initiative from the enemy. He seeks to see the enemy's vulnerabilities and to take advantage of them. He seeks always to place his brigades and battalions in a position in which they have the upper hand and the enemy is at the disadvantage.

The division commander cannot expect always to have tactical air. Priorities will often -- indeed, because air will usually be limited, will usually -- go to another division or corps. But he must be ready to use it with maximum effect throughout the close-in, or near deep, battle zone when it is provided to him.

Area of Influence/Area of Interest

The discussion of air/land operations and their control and coordination has been complicated by the injection into that discussion of the terms "area of influence" and "area of interest."

"Area of influence" is defined by the JCS and NATO as that "geographical area wherein a commander is directly capable of influencing operations, by maneuver or fire support systems normally under his command or control." This may be a useful and reasonable notion, but when it is extended to mean in effect that "in his area of influence, each commander must command, or control, all the means of influence (e.g., tactical air)," the discussion of "who decides" and "who controls" then revolves around definitions.

Constraints on a land formation commander's lateral freedom of action have long existed in the form of boundaries between units.

The senior air/land commander (for example, CINCAFCENT in Europe), and the commander of each land formation in contact (for example, army group, field army, or corps) draws boundaries extending forward and rearward from the line of contact for each of his committed subordinate land formations (in the case of corps, for division or separate brigade/regiment). These boundaries -- for whatever level of formation -- define the area in which the higher commander, after considering the relevant factors, expects his subordinate to fight the battle with both his own means and those in support.

There has long been a clear mutual understanding -- superior to subordinate, and airman to soldier -- as to just what those lateral boundaries mean and what authorities they convey.

However, whether a forward constraint is needed, such as defining (limiting) the "area of influence" of a particular formation by connecting the forward limits of that formation's boundaries, is debatable. To establish such may unduly inhibit the thinking of both land formation and tactical air commanders in the conduct of battle.

The related idea of "area of interest" stemmed in part from a perceived need to coordinate the collection and distribution of intelligence information.

Extending fan-shaped forward (or even rearward) from his line of contact, and into the zones of adjacent units, there is defined a territory which contains, or may contain, enemy forces which can affect the future operations of the formation. This is called the "area of interest" of that particular formation commander; it necessarily overlaps both the "areas of influence" and "areas of interest" of adjacent commanders.

However, a commander can be rightfully interested in anything that might affect his operations, taking such into account or discounting it as he will. Factors of time and space, of whether the formation mission is defense or offense, of terrain and road nets, of the enemy, and so on will have a bearing on what each commander considers to be his area of interest. There can be no time-based recipe for its size.

Because each commander is responsible for making his own tactical estimate and decision, it is in principle not a good idea to limit a commander's "area of interest." Other devices can be found for managing the collection and distribution of intelligence.

The Rear Area Battle

The enemy will strive to disrupt our rear areas with a combination of direct airmobile/airborne attack, operations of his specially trained and equipped special purpose forces, penetrations by sapper/commando units, and the like -- as well as with this own tactical air.

The enemy's purposes will be to draw our attention away from the forward area, to cause diversion of resources to the rear area battle, to interfere with our logistic support activities and with the movement of our reserves, to degrade our ability to generate tactical air, and to reduce our ability to command and control

Defending against such attack requires that the senior land or air/land commander have a rear area command structure in place which is separate from the command structures responsible for other rear area activities such as logistics, air defense, and air base operations, but which takes into account and coordinates the defensive operations of these other command structures.

This rear area defense command structure should be tied into the local police and civil defense organizations, and should establish liaison with, control over, or communications with whatever militia, home guard, or other paramilitary forces exist in the area, so as to coordinate all rear area defense activities.

Each rear area activity or installation is held responsible for its own local defense. Lightly armed local forces are disposed to move quickly to assist threatened locations. Mobile reserves, more heavily equipped, are positioned for rapid reinforcement. A command and control network of communications, command centers, and reporting posts, is organized to give early warning of attack and a quick and accurate picture of events, so that immediate and responsive action can be directed by the local rear area defense authority.

Wielding the Air Effort -- Some Considerations

The senior air/land battle commander never ceases to think about how best to use his single most flexible, and often his decisive, fighting capability -- tactical air.

It is his task to decide, and to re-decide as required, the proportion of tactical air which goes to:

- o Fighting the close-in battle...
- o Fighting in the deep battle...
- o Fighting the air battle...

... and how the first two, at least, are to be distributed along the front.

The first two of these -- the close-in and deep battles -- are clearly "air/land." The last, the "air battle," is less "air/land" than "air" alone. The nature of tactical air is such that the same combat aircraft, reconfigured with different ordnance, can be used to perform missions in all three battles.

From time to time, the senior air/land commander concludes that the situation has changed sufficiently that he must change the present weight of effort he is giving to one or more of the uses of tactical air or to the distribution he is making of the effort along the front.

This is a continuous process which we can call "wielding the air effort."

The process of arriving at this decision (generally looked at as a daily event, the culmination of the tactical air decision cycle) has at times, in "doctrine," been described as two separate and distinct steps:

- o First, to decide the distribution of the air effort "front to rear," so to speak -- between (in the formerly usual terms) "air superiority," "interdiction," and "close air support."
- o And then, second, to decide how "close air support" is distributed to the major subordinate land formation commanders along the front.

  (Note: In Central Europe, because "air defense" is controlled by what are known as Sector Operations Centers (SOCs) and "offensive air" is

controlled by Allied Tactical Operations Centers (ATOCs), "air superiority" is divided into "offensive counter-air" (OCA) which strikes deep at the enemy's airfields and the like, and "defensive counter-air" (DCA), which engages enemy air in the skies overhead. "Interdiction," in Central Europe, is divided into "battlefield air interdiction" (BAI), which is then combined with "close air support" (CAS) and "tactical air reconnaissance" (TAR) into "offensive air support" (OSA) and is allocated right down to the corps commanders, and a deeper "interdiction," which is not much different in its targeting and mission control and performance from "offensive counter-air.")

This two step process stems in part from World War II's tactical air experience in Europe, as modified postwar when the U.S. Air Force became a separate Service with its own "component command" in each "theater."

The idea was essentially that the "air component commander" would recommend, and the "theater commander" would decide as to the first, and that the "army component commander" would, in a separate step, then decide as to the distribution of close air support to his subordinate land formations.

These notions survived through the Korean War and in Vietnam and some vestiges of them remain in tactical thought today.

In the real world, however, the two separate steps become one.

In Korea, for example, there is no separate "ground component" commander; the CINC, ROK/US Combined Forces Command, wears both the "theater commander's" hat and that of the "ground component." In such a case, the process must be a single thought process. (See pages 5-12 to 5-20 for discussion of the idea of a separate "ground component commander.")

Close Air Support vs. Interdiction

Another problem with the decision process as often found in "doctrine" is that "interdiction" and "close air support" are in separate categories not because that is the line along which functions or activities of tactical air logically divide, but because that is the line along which control of tactical air divides. (See pages 6-10 to 6-11).

According to the Joint Dictionary...

- Close air support is "air action directed 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 these forces," and

- Air interdiction is "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 distances that detailed integration of each air mission with the fire and movement of friendly forces is not required."*

But, as we have seen, the close-in battle must be looked at as one operational air/land activity, closely linked to be sure with the deep battle, which can be seen as another operational air/land activity.

Using these doctrinal terms, a tactical air mission attacking an enemy combat formation just over the hill and therefore out of sight of a TACP would be "interdiction."

*This definition of "interdiction" is especially inapt in thinking about the use of deep air attack in the "C^2 battle." See pages 7-31 to 7-32.

This makes little sense in practical terms. To the brigade or division commander and to the tactical airman as well, that "interdiction" target is part of the close-in battle.

Solutions to Wielding the Air Effort

Field commanders have coped with these doctrinal deviations from operational logic in various ways.

In Central Europe, they have established the category "offensive air support," which is allocated all the way down to corps commanders. This takes care of the situation in part.

In Korea, in 1977-78, based in part on thinking which came from TAC-TRADOC discussions, an arrangement was worked out between the then I Corps (ROK/US) Group, a field army-size command responsible for defending the Western Sector of the front, and Air Forces Korea which in effect said that the I Corps Group commander could, if he chose, use the "close air support" allocated to him by CINC, United Nations Command (there was then no Combined Forces Command), to attack close-in targets (which were then called "battlefield interdiction" as differentiated from "interdiction") which were of overriding concern to the Corps Group commander.

These sorties would come from the Corps Group's allocated "close air support;" they would go after enemy formations or other targets which the Corps Group commander requested, but their execution, and especially their coordination with other "interdiction" missions, would be under the control of Air Forces Korea.

Another arrangement worked out during the same period in Korea was the "close air support" would be allocated, not in terms of "sorties" but rather in terms of "aircraft." This was called the "new frag." In the "new frag" the Commander, Air Forces Korea, ordered a certain number of aircraft (by wing and squadron) to fly "close air support."

Until ordered otherwise, these aircraft flew only close air support, cycling through mission after mission as long as required and as quickly as they could when conditions required (which conditions always required in the air/land battle simulations of operations plans under which I Corps Group and Air Forces Korea exercised these arrangements).

This not only oriented the entire wing/squadron effort toward getting the maximum out of their wing and base resources; it also provided better mission continuity and mission understanding to the airmen who flew these CAS missions.

Another arrangement placed into effect, with the approval of the CINC, United Nations Command, in those days in Korea was that -- instead of the "doctrinal" division of close air support missions into "immediate" and "preplanned" (with the "preplanned" missions required to be submitted in great detail some 30 or more hours in advance, impossible to do in an initially defensive war of considerable movement) -- a Corps Group "forecast" of CAS requirements was submitted, based upon which the CINC's allocation decisions were made and the "frag" was written. Then, in effect, the next days missions all became "immediate."

Because the flexibility of tactical air is limited when an aircraft is armed for one type of target (e.g., armor) and is then used on another type of target (e.g., troops in the open), it is of the utmost importance for tactical air's efficient use that such CAS forecasts correctly describe in advance the types of targets visualized, by periods if feasible, the following day.

In Central Europe, much the same sort of processes as described above for Korea in 1977-78 have been developed for requesting and providing what Europe calls "offensive air support."

Wielding the Air Effort -- Suggestions on the Decision Process

In light of the above, it seems reasonable to make some suggestions to senior air/land commanders, in an effort to present "the best available thought" on how to decide the wielding of the air effort.

First, look at the process of deciding as a single integrated thought process, rather than a fixed two-step process. Go through this process using whatever sequence of thought makes good sense under the conditions.

Do this for two reasons. First, because in essentially every practical case the commander who makes the decision as to how air is to be divided by function (air superiority, "interdiction," etc.) is the same commander who makes the decision of its lateral distribution along the front. And, second, because in many cases the particular thought process for that situation may well have the responsible commander considering at first where to place the air effort across his front, rather than forward to rearward.

Second, always assess the full picture, the "gestalt," of the operational and strategic situation of the next day and more. What is happening? What is likely to happen? How can you, the senior air/land commander, best control events?... best thwart the enemy? What are your means? ...your tactical air means? What are your options?... your tactical air options? How best use your means? And so on.

Third, let the sequence of tactical air decision making be roughly as follows:

- Consider first what is needed for the deep and close-in battles for the period, e.g., for the following day. You, the senior commander, already have a grasp on this. But ask the major land commanders what they believe they must have. Have them justify what they ask for in operational terms. Have them describe the nature of expected targets; where, in general, they expect the tactical air effort to be made; and what they expect to achieve with it. (They, and you, will of course

realize that at least one of them will be disappointed what they receive, upon your decision.)

- o Then, look at the state of the air battle today, and its expected state tomorrow and beyond.

- o Then look at the availability of all tactical air, now and as forecast by the tactical air commander, for all three battles -- air, deep, and close-in -- and indeed for the rear area battle, if that is a factor.

- o Then look for the decisive points, at the decisive situation which seems to be looming, at the decisive effect which tactical air must achieve.

- o Then (the senior air/land commander, assisted by his senior tactical air commander) consider what should be the priorities and the weight to each -- the air battle, the deep battle, the close-in battle (or, alternatively, the air battle and the critical sectors of the close-in and deep battles), basing this consideration on:

  - First, the needs of the air battle. In most cases your first priority will be to give this effort what it needs -- not necessarily to win the air battle right then, or even in next few days, but simply in order to assure that there will be a sustained flow of tactical air in future days for the deep and close-in battle, which must have it.

    However, it may, in an emergency, mean that the commander must "risk the (tactical air) force" to maintain that absolutely necessary flow of tactical air to the deep and close-in battles.

  - Then, consider the needs of the front line commanders, taking into account these commanders' own statements of their needs and their justifications, and then making your (the senior air/land commander's) own assessment and judgment of these needs. Address the

issue of that degree of tactical air without which one or more of your subordinates cannot be expected to achieve operational success, and what it would mean to be denied that air.

- Then, consider (if there be one, and there should normally be) that decisive effect which is desired from tactical air in the short term.

Then make a tentative decision based on the best judgment of the senior air/land commander, with his senior airman's advice. State who gets what air, and how much by relative proportion, and why.

Fifth, review the decision -- is it the "just right" decision? "Wargame" it; visualize "what will happpen if..." Consider alternatives, or adjustments.

Finally, make the decision, in something like these terms:

- o The relative weight which will go to the air battle (expressed as a percentage of the air effort).

- o The relative weight which will go to the deep and close-in battles (essentially the remainder).

- o The distribution of the latter, by front line formations, or in some other way. Or, alternatively, specific instructions along with that distribution, as to the concept behind it -- e.g, that decisive effect which the commander wants to achieve with his tactical air in the deep and close-in battles.

And, above all, articulate the "commander's concept" for how tactical air is to be used -- to be sure that the senior tactical airman understands fully the intent behind his mission.

(Another way of looking at this matter is described in Chapter VI, The Tactical Air Estimate and Decision, at pages 6-13 to 6-15.)

Tactical Air "Auftragstaktik"

Current understandings as to the process by which tactical air is wielded are ready-made for the use by air/land and tactical air commanders of the land formation commanders' concept of "mission-type orders," as described in pages 5-12 and 5-13, and as referred to as "auftragstaktik" in combination with the ideas of the "schwerpunkt" and of "fingerspitzengefeuhl," in pages 7-14 and 7-15 above.

This is because "apportionment" -- which the Joint Dictionary defines as "the determination and assignment of the total expected (air) 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," and which is the task of the senior air/land commander -- is essentially the "mission," or "what to do" part of the tactical air commander's "mission-type" order.

And "allocation" -- which the Joint Dictionary defines as "the translation of the apportionment into total numbers of sorties by aircraft type available for each operation/task" and which is the responsibility of the senior tactical airman -- is the "how to do it" part.

All that is needed to install the full "mission-type order" or "aufstragtaktik" concept is (1) for both the senior air/land commander and the tactical air commander to be on exactly the same wavelength as to the senior commander's intent, not simply for the use of air but for the battle as a whole, and (2) for the tactical air commander to be in complete harmony with all the other subordinate commanders of the air/land force exactly as to the shared concept of operations and the common way of operating -- as well as understanding the senior air/land commander's statement of his (the tactical airman's) mission and the intent behind the mission.

Achieving this sort of harmony and mutual understanding in wartime operations must be the constant objective of the senior air/land battle commander.

The only way it can be achieved in peacetime is, not by simply talking about it and writing about it, but by the actual practice of air/land operations, especially through authentic and realistic air/land battle simulation. (See Chapter X, Air/Land Battle Mastery through Air/Land Battle Simulation.)

The C^2 Battle

Although not until recently labelled as such, there has throughout the history of warfare been a "command and control battle" in which each side sought to affect the other's mental/psychological ability to "command and control."

In former times skilled commanders used ruse, strategem, deception, surprise, dominating the pace and direction of events, and the like to create in their opponents the disorientation, fear, or panic which gave these commanders first, the psychological and, then, the material upper hand.

This work has emphasized throughout its pages this timeless feature of war. High technology has not changed it.

In the electronic age, however, the dimensions of the "C^2 battle" are considerably enlarged. The C^2 battle now very much includes not only the minds of opponents, but the attack, and the defense, and the preservation, of the very means of command and control -- command posts, communication links, radars, command nodes, and so on -- as well.

This is a highly technological battle which includes in abundance the electronic means of warfare -- frequency jamming, high-tech intelligence gathering, pinpointing enemy command nodes and their linkages, minute-to-minute decisions on what message traffic to jam and what to listen to, and insuring that what we attempt to do to the enemy does not disrupt our own side's ability to command and control even more.

Direct attack on command centers and nodes, and on communications links and nodes -- by artillery and tactical air, by specially trained special purpose forces operating in the enemy rear, by partisans and guerrillas -- is also part of the "C^2 battle."

In the U.S. lexicon, this has come to be known as C^3CM, for "command, control and communications countermeasures." In the Soviet forces, the term for the electronic part of the C^2 battle is REC, for "radio-electronic combat."

The Soviets take this subject very seriously. In any combat with Soviet, or Soviet-influenced, forces, our side can expect to encounter an enemy who can not only defend against "C^3CM" but who will use it highly effectively against out own battlefield information system.

The typical situation in U.S. and U.S.-coalition air/land force commands is that the ability to orchestrate the technical components of the offensive side of the C^2 battle is rudimentary at best. New equipment of all kinds is moving into the hands of the forces, both air and land. But the ability to coordinate and control its use is far from developed.

Defensively, one finds serious physical as well as electronic vulnerability in the communications links and nodes themselves, as well as in the often all too exposed and too easily identified command centers.

One of the most serious responsibilities of senior air/land commanders is to improve this situation in their commands.

Countering the Enemy's Blitzkrieg

We can conclude this chapter with a description of one application, out of many, in which the ideas expressed in all the above can be illustrated -- namely, countering a Soviet-style blitzkrieg.

The Soviet Union and its satellite countries have created and deployed ready for war along the borders of the Soviet Bloc powerful formations of combined arms-armored forces and combat aviation.

These forces have practiced a style of warfare like that of the German blitzkrieg of World War II but with special qualities of its own, including forces in numbers which the Germans rarely had.*

If executed against our side, this kind of warfare will probably be characterized by powerful leading armored formations attacking on narrow fronts with massive artillery and air support, with following armored forces echeloned behind (their employment either planned or to-be-decided in conduct of battle), in a distribution along the front of coordinated "pile driver" attacks each seeking to strike at objectives deep in our rear. "Operational maneuver groups," from battalion/regiment to division and higher in size, will seek in raid-like action to reach and roam in our rear areas.

Although some Soviet doctrinal writers have stated that any modern war will be a nuclear and chemical war from the outset, there is evidence that an initial Soviet attack may well not involve nuclear weapons, but will rely on overwhelming conventional, possibly non-chemical, forces.

There will also be a coordinated air and long range missile campaign to knock out our defending air; and there will be airmobile/airborne attacks in our rear areas, joining or supporting deep penetrations.

Because the purpose of coalition forces defending the borders of the Soviet bloc are defensive-protective, our side will of necessity be reacting

*Although the image created by the following words leads one to think of a Soviet/Warsaw Pact attack in Central Europe, the description applies to a large degree to a Soviet invasion in the Middle East/Southwest Asia, or (to a lesser degree because the forces are less mechanized) to a North Korean attack (whether Soviet-supported or not) to bring the Korean peninsula under its control.

at first to the enemy's moves, and will also be considerably outnumbered. The enemy will likely seek operational, if not strategic, surprise.

Coping with this kind of blitzkrieg attack, stopping it under conditions of being outnumbered, and seizing the operational initiative calls for tactical and operational skill of the highest order.

Although it may be useful in part elsewhere, in Central Europe the operational method of choice might include this (speaking here of the conduct of the close-in and near-deep battles):

- Cause the enemy to think our defensive plan is one thing, and then confront him with another -- disorienting him from the outset.

- Read his movements with high-performance sensors and intelligence fusion, look into those movements for his intentions, then redispose accordingly -- thinning some sectors, thickening others -- to shape the battle for our counteractions at critical times and places.

- Set him up in a series of pockets or ambushes (battalion to corps size), then hit him from the blind side with power and surprise.

- Use tactical air in mass at the schwerpunkts, as well as in the deeper battle.

- Use tactical air in an offensive-style defense, keeping pressure on the enemy's air and deep battle means even while the force as a whole is at first defending.

- Attack his means of command and control -- not only pinpointing his command centers and communications links with artillery, air, and special purpose forces strikes and with jamming, but disorienting and confusing his mental processes with deception and with an operations tempo which leaves the enemy always one or two steps behind in his thinking.

CHAPTER VIII. ADMINISTRATION AND LOGISTICS

Scope

This chapter deals with all those supporting and sustaining activities through which air/land operating forces are supplied, maintained, moved, based, sheltered, and serviced, and through which their personnel strengths and fitness are maintained and the personal needs of their people are taken care of. The history of war is clear: There can be no effective operations unless these activities are done well.

JCS Publication 1 calls this "combat service support," which it defines as the "assistance provided operating forces primarily in the fields of administrative services, chaplain services, civil affairs, finance, legal service, health services, military police, supply, maintenance, transportation, construction, troop construction, acquisition and disposal of real property, facilities engineering, topographic and geodetic engineering functions, food service, graves registration, laundry, dry cleaning, bath, property disposal, and other logistic services."

A roughly equivalent term is "administration," defined by JCS Publication 1 as "all military matters not included in tactics and strategy." NATO agrees with that definition, but adds the phrase "primarily in the fields of logistics and personnel management."

Because the term "combat service support" is cumbersome, and because to many the word "administration" is unfamiliar as its synonym, this chapter will (albeit inaccurately) often use the term "logistics" and "logistician" to convey most, if not all, of the above subject matter.

A short chapter such as this cannot do justice to the full art and science of combat service support in air/land commands (or, even more complex, air/land/sea commands). The chapter's only purpose is to provide some food for thought for senior air/land commanders and their staffs, most of whom are

not logisticians but all of whom depend on and must understand the logistician's work.

The Reality of Logistics

The embryonic American Army's example under Washington at Valley Forge and then Princeton tells us that a force, even when in poor health and under-supplied, can with great leadership do great things.

But, no matter what may be the esprit of a force and the quality of its leaders, a tank without a crew cannot move, an artillery battalion without ammunition cannot shoot, a radio without batteries cannot communicate, an aircraft without an engine cannot fly, a truck without fuel cannot resupply anyone -- and forces which are for long in this condition will lose.

The intangibles of morale and dedication do affect these realities, however. Logistic support troops who are willing to work twelve to sixteen hours a day, commanders who are skilled, smart, and efficient managers, and logisticians who are innovative, practical, and knowledgeable can produce and sustain for the time required that extraordinary effort which is embodied in the saying, "The difficult we do immediately; the impossible takes a little longer."

But pedestrian, routine, workaday performances are not enough.

The Commander's Task

The multiservice, multinational field commander can usually have little influence toward determining the quality of the logistic support performance which sustains his command. By and large, those who provide his logistic support are his neither to select nor to command.

Toward his fundamental obligation, mission accomplishment, the commander's logistics task is to understand logistics reality, through his

actions to influence logistics reality toward his ends, and to be an astute judge of the logistics risks.

It takes not only astute judgment of the logistics risk (itself no small accomplishment) but a certain strength of character for a commander to make an estimate which overrides that of his own logistician. But, otherwise, the commander becomes the prisoner of his logistician.*

*Rommel has written some interesting words about the commander and his logistician. In one passage in his diaries he describes how, in North Africa in late 1941, one of his adversary British commanders failed to pursue following a decisive victory and thereby lost that victory's full benefits. One need not accept the disdain which Rommel shows toward his own logistician, or to look at the commander and his logistician as an adversary relationship, to recognize a large degree of truth in what he said:

> "The reason for giving up the pursuit is almost always the quartermaster's growing difficulty in spanning the lengthened supply routes with his available transport. As a commander usually pays great attention to his quartermaster and allows the latter's estimate of the supply possibilities to determine his strategic plan, it has become the habit for quartermaster staffs to complain at every difficulty, instead of getting on with the job and using their powers of improvisation, which indeed are frequently nil. But generally the commander meekly accepts the situation and shapes his actions accordingly.
>
> "When, after a great victory which has brought the destruction of the enemy, the pursuit is abandoned on the quartermaster's advice, history almost invariably finds the decision to be wrong and points to the tremendous chances which have been missed. In face of such a judgment there are, of course, always academic soldiers quick to produce statistics and precedents by people of little importance to prove it wrong. But events judge otherwise, for it has frequently happened in the past that a general of high intellectual powers has been defeated by a less intelligent but stronger willed adversary.
>
> "The best thing is for the commander himself to have a clear picture of the real potentialities of his supply organization and to base all his demands on his own estimate. This will force the supply staffs to develop their initiative, and though they may grumble, they will as a result produce many times what they would have done left to themselves." [The Rommel Papers, New York, Harcourt, Brace and Company, 1953, pp. 96 and 97.] [Emphasis added.]

The Mutual Obligation

There is a mutual obligation between the troops and the logistician.

The troops have an obligation to the logistician. It is to use wisely and well what the logistician brings forward.

This means: to plan intelligently, to ask for no more than they need (within a reasonable margin), to use what they get efficiently, to conserve, to preserve, and not to waste. Battle being what it is, this can become very difficult.

The logistician has an obligation to the troops -- to deliver to them what they need, anticipating the troops' needs so that what they need is there when needed.

The existence and importance of this informal contract may have become obscured -- or may now be less than adequately perceived -- because American forces in the 20th century have for the most part gone to war with more than ample logistic support. This has not always been so at the start of a war, but almost always after American industry and logistics managers have geared up for the sustained effort.

Senior commanders are responsible for enforcing both parties' adherence to their obligations*.

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*Much more could be said on this subject. Speaking, for the moment, only of the troops' obligation, it should be said that if, in Washington's words, "discipline is the soul of an army" there can be no real discipline without supply discipline -- which means a unit and troop state of mind, fostered and enforced by company officers and NCOs, that what is in the hands of the troops was put there at considerable cost, is not easy to replace, and for their own benefit should be conserved.

Troops who clean their rifles will have more rifles that work and need fewer rifle parts; commanders who do not call for artillery unnecessarily will not only save shipping and overland transport and the taxpayers' dollars -- they will have a better chance of having fire support when they really need it.

Movement, Information, and Stock Control

The things which operational forces need to sustain their operations are described in large part in terms of items, and of tonnage.

For example, fuel and ammunition are of relatively few items, but of large tonnage. Repair parts are of relatively small tonnage, but many items.

At its root, logistics is a matter of movement, information, and stock control of both items and tonnage.

Movement is a matter of directing and coordinating the means of loading, transport, and unloading. Information is a matter of knowing where movement means are and what they carry, and where the stocks not in movement but in position are -- in detail and in real time.

If the movement of stocks is rapid and efficient, and if the information of stock levels and item location is accurate, then the size of stocks, both in items and in tonnage, can be minimized at the intermediate locations between the producing establishment and the consumers. Great effort at stacking and storing can thereby be saved.

However, if items are in a forward area but their locations are not known, scarce movement and special effort must then be spent to bring such items from far in the rear to where they already are. Once stock accounting and locations are lost, only a comprehensive inventory will recover the situation. Combat operations permit no such inventory and precious work and treasure -- not to speak of the mission effectiveness of the troops -- is then lost.

The most recent striking example of when this proved to be the case was in the mid-1960s buildup of U.S. Army logistics in Vietnam. Great tonnages and great numbers of items were on hand in "conex" shipping containers in Vietnam storage. Because their locations were not known, emergency measures

were used to find and ship by air the same stocks -- often one item at a time -- from the United States.

Such equations -- of movement and stock levels, of items and tonnages, of information and management -- are the basic stuff of the art and science of logistics.

Mastery of such equations is to be sought by logisticians. And logisticians who have mastered not only the equations but how to make them work superlatively in practice are to be sought by commanders.

Coalition Logistics

Combat service support for coalition forces starts with the nations which provide the forces for the coalitions. It goes all the way back to those nations' farms and forests, to their mines and factories, to their offices for recruiting and conscripting, to their transportation systems, their depots, their medical establishments, and to their governments.

National governments are the ultimate providers, both of the forces and of the resources to support and sustain the forces. In the U.S. defense establishment, this national responsibility further devolves into the principle that "logistic support is a Service responsibility."

The problem is that the field commander of multiservice/multinational forces cannot live with the unalterable dictum that "logistic support is a national/Service responsibility." Logistics, which is essential to mission accomplishment, must in major ways be not only the senior commander's personal responsibility but also that of his major subordinates.

This is so because, in battle, and in the planning for expected battle, somewhere toward the forward end where the forces are deployed and where they will fight, many of the operating forces' supporting and sustaining resources must of necessity lose their national and Service identities. They must be pooled. This cannot be otherwise, given the requirement on one hand for the

operational integration of national- and Service-provided forces and, on the other hand, the fact that logistics and operations mingle ever more closely, and eventually cannot be separated, toward the front.

Some resources (e.g., fuel and ammunition) lose their identities forward more readily than do others (e.g., repair parts). Some resources (e.g., personnel replacements) never lose their national or Service identities.

Because the parliaments and taxpayers of coalition governments do not like to give away or share resources their governments have bought and paid for, it is not simple in any case to place resources into a common pool, especially in peacetime, and especially far behind the front lines.

The fundamental challenge of coalition logistics is to resolve the contradiction between national/Service responsibility for logistic support on one hand, and the senior commanders' responsibility (to coalition political authority) for mission accomplishment on the other.

Theater-Level Logisitcs

Administration and logistics operates at essentially three levels. There is the producer level, essentially in the national homelands. There is the comsumer level, essentially with the operating forces themselves. And there is an intermediate level that links the two, which goes by such terms as "theater-level logistics" or "lines of communications," or "the communications zone."

The structures and processes of each of the various aspects of administation and logistics run rearward to forward, and back, through these three levels.

There is a detailed system linkage, for example, that connects the medical aid station of a battalion in contact back to military hospitals in the United States. This system is separate from that which links the ammunition in that battalion's combat trains all the way to an ammunition plant in

Illinois. And both of these are separate from the system which links the aviation fuel supply at a forward operating air base through a tanker route to a refinery in Venezuela.

It is too much to expect that the theater-level air/land force commander will manage systems like these even in his own territory. He simply cannot do so. He depends on other authorities to see that they function.

At the producer level, there are many arrangements for integration and coordination. NATO, for example, has among other mechanisms its NATO Maintenance and Supply Agency (NAMSA), and its Military Agency for Standardization (MSA). The United States has its host of Department of Defense/Joint Chiefs of Staff agencies and activities.

For coalition warfare, some of these mechanisms may leave much to be desired. But they are improving with time. Senior commanders need to urge continued improvement.

At the consumer level, where by and large the forces are either single-Service or of one nation, effective mechanisms generally exist for integration and coordination of the logistics effort. Senior commanders need to foster their improvement, as well.

However, at the intermediate level -- at the level of the three- and four-star operational commander, with his responsibilities -- adequate mechanisms for coalition and multiservice logistics are hard to come by, even rare.

This is the place where the national and Service responsibilities and the commander's interests come together and must be reconciled. It is here that senior air/land commanders need to devote extraordinary attention, recognizing that operational responsibiity demands logistics authority.

The Essential Logistics Functions of Senior Command

Coalition warfare or not, multiservice operations or not, there are certain functions which senior commanders must have if they are to achieve that integration of logistics effort which is essential for mission performance.

One function is the establishing of requirements. What is needed? How much is needed? Where is it to be positioned? What is the operational and conceptual basis for these needs? What consumption rate factors are to be used in its calculations? What are the risks if these needs are not provided? All this, and more, must be placed into the consciousness of the national and multinational providers.

This function involves the commander's setting of standards, and his police of these standards. In base development, for example, what is the standard for troop housing? (In a bare base situation with little host nation support, lumber and plumbing supplies take up shipping space which ammunition should perhaps have.) In food service, for example, what is the standard for refrigeration? (Frozen meat and fresh vegetables take up transportation which spare parts should perhaps have.)

Another function is the control of priorities.

Assets will be short. The responsible operational commander must make those tough decisions which may well determine whether or not operations succeed.

Control of priorities means more than simply establishing those priorities. It means having a system so that, once established, priorities are adjusted as the tactical situation dictates. It means authority to direct "cross leveling" of assets (i.e., taking from one element and giving to another as the situation requires.) It means establishing controls on ammunition expenditures, and making them stick.

Responsiveness of national and Service logistics systems to multiservice/multinational needs is essential. But more than willingness is required in such a system. Command and control and the ability to audit, in place at the start of operations, is also required.

Another function is the control of movement resources.

The basic tool of the theater-level logistician is movement. Movement means will always be short. They must be shared; they must be allocated to where the most urgent needs exist. They must be responsive.

Another is the ability to audit and correct logistics performance.

This means monitoring logistics performance, in real time and with accurate data, and giving guidance -- with the assurance that the guidance will be followed.

A Mechanism to Meet these Functions

The most powerful mechanism which a commander can have to meet these functions is command authority over the full logistics system. This was essentially what General Dwight D. Eisenhower had in 1944-45 in allied operations in France, the Low Countries, and Germany.

Eisenhower's case was unusual -- the United States was the allies's main logistics source, the United States Army command in Europe (ETOUSA, or European Theater of Operations, United States Army) was commanded by General Eisenhower himself, with an immediate subordinate in command of his Communications Zone. Wearing his operational hat, as Supreme Commander, Allied Expeditionary Forces, General Eisenhower had himself in effect as his own logistician.

Even so, making logistics decisions, and making them stick in times of strain, was not an easy matter.

The least powerful mechanism which a responsible commander can use is no command authority whatever, not much of a system, and very little influence. In such a situation, where the commander has a purported authority to direct operations but not to control logistics performance, he becomes powerless to do the former.

Unfortunately, the national influences on coalition logistics foster such a situation. Even today in Allied Forces, Central Europe, where a multinational "logistics coordination center" has been established and where other progress has been made, much more is needed if that command is to achieve a proper match between operational responsibility and logistics authority.

Each theater forces situation will be different. National and Service composition of forces will differ. The geography will differ, as will the distances and nature of the lines of communications. It is for each commander, in his situation, to decide what he must have as a coordinating and integrating mechanism, for that situation, and to fight to get it.

The Logistics Command and Control System

If the senior air/land, or theater-level, commander is to exercise influence on theater level logistics performance, he and his logistics operator must have information that is timely, accurate, complete, and germane to the problem, and which permits the issuing of instructions quickly to the right places.

This means a command and control system that exists in peacetime, with a data base that is current, with procedures that are practiced, and which is able to make the transition to and survive and function in time of war.

Unlike command and control systems for operations and intelligence, the widely spread agencies and activities of various Services and nations which provide this system with data will for the most part not be related to the logistics system operator through command channels.

Design and installation of such a distributed, cooperative system should be a matter of the highest priority to the senior air/land force.

Logistics in a Primarily U.S. Contingency Force

Extraordinarily difficult and complex logistics support operations will occur in a contingency force operation, where the logistics situation is "bare base" or nearly so.

Typical characteristics of such a situation:

- The U.S. dominates the logistics picture; the U.S. logistic structure largely supports whatever other national forces there are or may be.

- Careful and coordinated planning is an absolute must.

- There is little or no base structure or logistics infrastructure already on the ground; real estate acquisition starts from essentially zero.

- An intermediate staging area may or may not be available.

- Such ports, airfields, and highways and railroads as exist in the area are limited; their early and rapid improvement is required.

- The buildup of logistics stocks begins with the entry of the first operational forces. Typically, these are both U.S. Army and U.S. Marine Corps, the latter being deployed from a naval amphibious task force which carries a logistics train, and the former being air-dropped or air-landed with its own follow-on air-landed and seaborne logistics stream.

- Follow-on stocks and service facilities immediately begin coming ashore.

- o The fighting forces immediately begin moving out, stretching and soon outrunning their self-supported lines of communication.

- o It quickly becomes necessary to share stocks (e.g., fuel and ammunition) services (e.g., evacuation and hispitalization), and trnasportation, and to coordinate access to the local labor supply.

- o Fighter and transport aircraft, if and when based in the lodgement area, begin to consume large quantities of fuel and munitions.

- o Part, or all, of the initial lodgement has been made under naval (albeit "joint") task force command, and in due time there ensues a transfer of command ashore which does not include command of fleet units offshore nor of offshore logistics.

- o The local government and populace, which may vary in attitude from somewhat hostile to very cooperative, is overwhelmed by all that is happening, as are local resources of all kinds. Civil affairs, and civil military operations, take on increasing importance.

With faulty coordination and control, this is a situation ready-made for confusion. If it is compounded by enemy air or long range missile attack and by hostile guerrilla or other operations in the developing base area, the logistic and base situation can quickly get out of control and operations will soon begin to suffer.

Here the urgent requirement is that, from the outset of the planning, the commander who is responsible for the success of the multiservice (which may be to a limited extent multinational) operation must have available to him a central logistic support authority who can influence the planning of the logistic support and who can from the operation's inception coordinate, control, and when required direct that logistic support.

The functions of this central logistic support authority would be to achieve full harmony and efficiency in the following:

- o Real estate.
- o Common fuel.
- o Common ammunition.
- o Transportation and movements control.
- o Civil affairs.
- o Construction.
- o Port operations.
- o Airfield operations and air movement flow.
- o Hospitalization and evacuation.
- o Military police.
- o Civil affairs.

The senior multiservice/multinational commander who does not insist on there being such an authority responsible to him from the planning phases of an operation through its execution will regret it when his logistic support operations quickly become unmanageable, inefficient, even chaotic -- and his operations suffer accordingly.

When he attempts to insist on such, however, the multiservice/multinational commander encounters the doctrines of the U.S. Services and, all too frequently, the ingrained cussedness of the Service commanders reporting to him. (What follows may be unfair characterizations of Service positions...)

- The Army will claim that, if such a central logistics authority is required (with which proposition it is inclined to agree), it is already largely provided for in the Army concept of a "theater army," with its headquarters and commander. According to Army thinking, "theater army's" scope and authorities would need only to be expanded to fit the role.

  But the Army will also claim that this "theater army" should be an operational headquarters as well, commanding directly the Army divisions (or corps, one or more). This -- another operational headquarters -- is not what the multiservice/multinational commander needs. The top air/land, or air/land/sea, commander on the scene will in most cases be fully capable of directly commanding more than one land formation (whether it be corps or division size, or smaller), without an intervening "land force" or "Army component" commander. (See pages 5-13 to 5-21, Chapter V, for a discussion of "theater army" and "echelons above corps."

- The Navy will be most reluctant to relinquish its Service control over what is on its ships or what it provides ashore (i.e., "just about everything that floats or is painted grey") to include its construction battalions and port operations on the beach.

- The Marine Corps, because of its amphibious-related logistical linkage with the fleet, will be inclined to agree with the Navy at first. But it will soon find out that it has outrun its own amphibious force service support group and cannot get most of the tonnage it needs without using the Army's logistic structure.

- The Air Force, like the Army both a provider (e.g., air transport) and a consumer (e.g., fuel) of logistic support, and whose forces will operate from off-shore at first in any event, will be amenable to any system that works -- providing it can retain under Service control such things as air movement of repair parts.

- The Joint Chiefs of Staff will have difficulty agreeing to the responsible senior commander's insistence on a high order of control over forward area Service logistics machinery. This is because they operate as a committee, in which the Service chief members' natural bent is toward not relinquishing Service control. However, the JCS Chairman and the logisticians in the Joint Staff will tend to support the field commander.

This work offers to the senior multiservice/multinational commander the following thought in this situation:

- Think about your responsibility to your mission.

- Visualize as vividly as you can the inevitable confusion, wasted motion, and inefficiency -- and its effect on mission accomplishment -- if you do not have authoritative influence over your logistics, from planning through execution.

- Do not put up with Service cussedness and parochialism.

- Find the best logistician you can find, of senior rank and high reputation, and get him to work for you.

- Don't aim to do everything yourself. There is an immense establishment supporting you, with its roots in the United States and its linkages all the way to your fighting battalions and squadrons. Your aim is not ownership of this establishment, or even of its forward end. Your aim is rather meaningful influence over its operations, and especially over what it does in your territory, toward your mission accomplishment.

- Determine the authorities and organization you need, tell your masters what you need, and insist on getting it.

- Get someone to build you a battle simulation which will give both your operations and your logistics an honest workout; use it and learn from it. (See Chapter X, Air/Land Battle Mastery through Air/Land Battle Simulation.)

Chapter IX. THE COMMAND AND CONTROL SYSTEM

The Command and Control Cycle

Command and control of air/land battle forces can be described as the distributed, repetitive performance throughout the force of an essentially simple cycle in which countless individuals and command entities will:

- o Sense the situation and understand it.

They "sense" from what they see and what they hear, from what their subordinates report and how they report -- indeed with a "sixth sense" both innate and developed.

They "understand" -- integrating the reports they receive, discounting some as they will, putting it all together in their heads, and perceiving the situation close to the way it really lies there on the battlefield, with all its dangers and opportunitites.

- o Consider the situation and decide what to do about it.

They think, and arrive at the core of the problem. And they decide to do that which will damage the enemy most, and then they set events in motion.

- o Execute the decision (or issue instructions for its execution).

- o Continue to sense the situation, thereby starting the cycle again.

Over the centuries, much has changed about war, but one thing has not changed: this cycle of sensing, understanding, deciding, and execution, and the reality that that side whose commanders perform the cycle faster and with better result has a decisive tactical advantage.

What is changing dramatically today is the ability of technology to reinforce the individual as he goes through the cycle.

The Fight for Information

The fight, the duel of commanders and their forces that is battle, is also a fight for information and accurate perception.

Whether we use command and control technology or not, we seek information. And the enemy seeks to deny us information, to block or jam our sensings.

We seek an accurate perception of the reality of the battlefield. The enemy seeks to disorient us, to confuse us with deception, to distort what we perceive, to confront us with alarming events not foreseen, to keep us behind the situation, so that what we decide is already wrong even as it is decided.

When we have decided what to do, the enemy seeks to jam, or intercept, the communications through which we put events in motion. He seeks to collapse both our will and our ability to work our will.

And we must seek to do all these things, and more, to him.

What the Commander Needs

The air/land commander needs to know the real situation, as it lies out there right now.

He needs to know what is, as it is.

He needs to know who and where and in what strength the enemy is, and what he is doing -- right now.

He needs to know where his own forces are and what shape they are in -- right now.

He needs all information germane to his mission -- taking not a narrow view of his mission, nor seeking information in all-encompassing scope and detail.

He needs this without guesswork, without uncertainties, and without delays.

He knows that if he has such, he can defeat the enemy decisively. So he will fight for that kind of information.

To the mission-oriented commander -- faced with a real enemy who he knows will use every possible trick to deceive him, to deny him information, to get inside his decision cycle, to confront him with the unexpected -- this fight for information is not an academic question. At a minimum he is fighting for survival. In the ultimate, he is fighting for mastery of the enemy and the battlefield.

The commander needs all this information at the command center, or the command and control facility -- ATOC, CTOC, TFC, FDC, DTOC, or SOC -- where each particular piece of information is germane to that particular center's mission.

The task of data collection, data processing, data transmisison, data sharing -- in real time, with the internal consistency of the data maintained, with the data aggregated and interpreted as called for by each of the many parties who receive it -- is a data processing and management task of immense proportions.

So the best "decision aid" we can provide the commander and his staff is good information -- accurate, complete, timely, and germane -- and to solve, in place, the problems of distributed information processing -- the meshing of collectors, correlators, fusers, communications, and so on -- so that the right information, in the right forms, gets to the right places, at the right times.

Defining the Command and Control System

The Joint Chiefs of Staff define the command and control system as:

> The facilities, equipment, communications, procedures, and personnel essential to a commander for planning, directing, and controlling operations of assigned forces pursuant to the missions assigned. (JCS Pub 1)

This work takes no exception, but interprets the JCS definition quite broadly, to include the full command structures, all the command arrangements and control nodes, the interoperability of and interconnection between all the parts, the doctrines and mutual understandings, and the many ways of operating of the force as a whole.

The command and control system is thus the full war-fighting and force-sustaining command support system through which information is gathered and its meaning is assessed, and decisions are made and action is taken, the length and breath of the battlefield.

The C^2 system of an air/land force is an air/land battle command and control system -- not simply one for a land battle, and not merely one for a tactical air battle, but an intricately combined mixture of the two.

More than this, it is usually a multinational air/land command and control system. Where forces are now deployed they are deployed in an allied context. Forces not deployed will most likely operate in multinational context.

At any level the air/land field commander's command and control system is actually a web of systems, extending from the top to the bottom of his command, with some parts of the web not under his command.

The command and control system of one commander is a subsystem of the system of the next higher commander. Any force, other than the very smallest, has more than one command and control system, or subsystem. Large forces have

innumerable such systems, linked and cross-linked, horizontally and vertically.

Because no two forces are exactly alike, no two "webs" that make up the command and control systems of forces will be exactly alike.

Echelon Differences

Theater forces' command and control systems might be classified by echelon as follows:

- Higher echelon (e.g., corps or numbered tactical air force and higher);
- Middle echelon (e.g., division and brigade and equivalent air force and army levels);
- Lower echelon (e.g., battalion and below, including the tactical air control party and the ground attack mission commander).

These would not be precise subdivisions of echelons; boundaries between them are often difficult to determine. Further, there are webs of linkages between these echelons, and skipping of echelons as well (as when, for example, a TACP might talk directly to an Air Force tactical air control center, or TACC, or the readout of an individual sensor might go directly to a higher echelon fusion center).

Systems for a higher echelon will always be tailored to that command's specific situation (e.g., the linkages between the corps and the tactical air forces in Europe will differ substantially from those in Korea, or within a Rapid Deployment Task Force), while at lower levels there will be more uniformity (one battalion's system will probably look much like that of a like battalion in the same force, or even in a different major command).

Although the senior air/land force commander's interest in the details of the C^2 systems in his command will likely vary with the level or echelon of the system, the top commander is deeply concerned with the full web. His degree of concern is, or should be, complete, top to bottom. He will want to be sure that all of it works, because his mission performance depends on it.

To the operational commander, then, a "command and control system" means the full mechanism, with all its information gathering means, operations facilities, communications, people, procedures, and so on, through which the commander and his staff and subordinates direct and control the force toward mission accomplishment.

The "system" is a vibrant, living "web of systems" for perceiving and understanding challenge and for fashioning and producing response. Because it is made up of so many parts, linked and combined into a single (desirably coherent) system, and because the various parts are themselves being improved, replaced, added, or taken out from time to time, this web of systems is always in a process of evolution.

A Mix of Man and the Man-Made

Command and control systems are, singly or collectively, a mix of man-made systems and man himself.

The man-made component is the mix of hardware and software technology that provides communications, sensings, data base, speed, precision, automation, information transfer, and so on.

The human component provides for intelligence, adaptiveness, loyalty, motivation, discipline, moral strength -- improvisation, decision, and action in a common framework.

The two components are inextricably linked and combined. This characteristic distinguishes command and control systems from the other things defense

establishments buy to equip military forces; it makes command and control systems fundamentally different in kind.

But once we include the human mind as part of a C^2 system we must include every mind, from that of the force commander, to that of the radar operator, to that of the artillery battery executive officer, or pilot, or forward air controller.

Then, of course, we unavoidably introduce the factor of the quality of these minds -- commanders, staff, subsystem authorities, radar operators, and so on.

We also introduce the matter of doctrine, or way of fighting -- the thread of common outlook and method (sometimes complicated by culture and upbringing) that is needed if these minds are to function in reasonable harmony -- so that this extraordinarily complex system can operate toward its purposes. And we introduce the training and development of the people in the system.

These matters also cannot be disassociated from C^2.

C^2 Systems Exist Now

These command and control systems are out there in the forces right now. Their radios and microwave links, their command posts, their control centers, their nodes, their people and procedures, all exist today. Some of the gear is old, very old. Some of it is brand new. But, for better or for worse, the webs through which these equipments link and function now exist. As new equipment is provided, it fits into what is there along with the old. Agencies and activities among those who provide this gear and those who use it, must take it as their task to see that the pieces fit together.

With their people and their ways of operating, these webs out there are living things. And like all living things, these many webs of command and control systems (and some individual components of the webs as well) adapt to

conditions through an evolutionary process. They respond to stimuli and adapt, much as do biological systems. Those which adapt well will survive and even flourish. Those which adapt poorly will often confront others which have done better, and will suffer disastrous consequences. Thus evolution -- survival of the fittest.

The Commander's Responsibility for C^2 System Readiness

The multiservice/multinational commander normally has little direct control over the peacetime readiness of the forces under his operational command. These forces are provided to him by the U.S. Services and by the defense establishments of the nations of the coalition. The senior multiservice/multinational commander can influence the composition of these forces, and can influence the priorities for their resource support, but in his capacity as multiservice/multinational commander, he does not directly control their adequacy.

Such is not the case for the command and control system "web" or "web of webs" for his command. Because of their human dimension, the nature of command and control systems is such that the senior commander can almost always do a quite a lot to improve their readiness within whatever level of resources has been provided.

This is so (1) because he can directly influence, even control, the procedures, command relationships, and ways of operating which are part and parcel of the command and control system "web" or "web of webs," (2) because change in factors such as these often brings about substantial improvement in the effectiveness of the command and control system, and (3) because it usually takes little in the way of resources to modify these ingredients.

Also, the command, with fairly modest additional resources, can often bring about considerable further improvement. Simple subsystem interconnects, or modest improvement at one to several communications nodes, or fairly relatively low-cost improvements in linkage survivability, can often yield substantial improvements in capability.

Because there is so direct a relationship between ability to accomplish the force mission on one hand and the quality of the force command and control system, broadly defined, on the other, it follows that the commander not only has an overriding interest in his full command and control system web, but he has the gravest of responsibilities to make that system as ready as possible within the resources provided, and to make known in the clearest and most emphatic terms what he needs to make the system adequate for his responsibilities.

The senior air/land battle commander must, then, accept that his command and control system is a living web of components, that each component web in that web of systems is at all times in its own continuing process of evolution, as is the full web, and that he can and must take responsibility for guiding its timely evolution.

Information Flow

It has long been established that effective operations depend on natural, unimpeded, information flow -- flow between all parties that is limited by no artificial constraints, but is oriented entirely toward mutual information exchange toward mission accomplishment.

The essential problem in air/land operations command and control is to achieve such an order of information flow.

This means flow, in the first instance, to those command and control entities who need it, of information (of the enemy, of our own forces, and of the area of operations) that is:

- Timely
- Accurate
- Complete
- Germane to the functions of that entity, and
- Presented in a usable form

Within this, a particular problem is the determination of what information is germane to a particular command entity (e.g., to the G2 Section of a corps command post, or to the corps commander himself, or to the tactical air control center, or to the wing operations center) and, then, to arrange an information distribution system which provides such germane information -- timely, accurate, complete, and in usable form.

The idea of information flow also means flow, from those command entities who must provide it, in the interests of directing and coordinating operations, of information to other entities which they in turn require if responsive teamwork is to be achieved.

Unnecessary information overtaxes the system; too much direction inhibits initiative; too little information limits the effectiveness of operations.

It is for commanders, working together and under senior command guidance, to decide what they and their command entities realistically need, in light of what their sustainable communications can support -- and then to see that the system of information flow on the air/land battlefield meets these needs.

The Organization as a Distributed Information Processing System

Thess ideas of "living webs of systems" and "information flow" can be related to a concept of "the air/land battle organization as a 'distributed information processing system'."

The notion is this: That tactical (air/land battle) organizations as they exist in the field today are already "distributed information processing systems."

Computer scientists say that there are three components to a distributed information processing system. These are:

- Distributed processing (i.e., computers and programs),

- Data communications, and

- A distributed data base (i.e., information) management...

...all of these operating under distributed control.

Today, a visitor to an air/land battle organization (even without computers) operating in the field would find each of these components present:

- The "computers and programs" are the minds, in a brigade for example, of the commander and his staff, and of his battalion commanders and others, and their ways of thinking and operating.

- The "data communications" are whatever means these people use to convey information to one another -- face-to-face, hard copy, radio and telephone, body language. Data communications are also the language of sensors, whatever these may be -- from an observer's eyes to a sophisticated radar or other sensor platform.

- The "distributed data base" is whatever data each of these people have with them -- in their notebooks, on their maps, on their wall charts, in their journal files and message logs, on 3x5 cards, in their heads, in the understandings they have with one another (one could call this "doctrine" or "SOP").

And all of this operates under a system of "distributed control" -- not at the direction of some single central brain which controls each action, but rather in a mysterious complex web of interaction frequently changing, almost impossible to diagram in its entirety -- through which each does his part in teamwork with the others, responsive to the will and concept of the senior commander, who is himself within the team of his next higher commander in the chain of command.

Visualize all the distributed data processing systems that make up an air/land battle force. This force can operate without computers. It has done so. Indeed, such computers as there are in the force today are minimal.

Consider all the many places worldwide where this air/land battle force "distributed information processing system" now exists -- in Europe, in Korea, in the joint task forces of CENTCOM. Note that each organization is different -- in its makeup, in its situation.

We can, then adopt an outlook that says essentially as follows:

- Look at each (air/land battle) organization where it is -- at some level of aggregation -- as a distributed information processing mechanism. (Individuals, teams, communication links, nets, cells, subsystems, systems, vertically organized, horizontally organized, matrices, and so on -- that sense, exchange information, filter, correlate, evaluate, judge, decide, act, order, monitor -- each one, and all collectively working together to a common purpose under a common concept.)

- Seek the regular realistic exercise of the mechanism, <u>where it is</u>.

- Give the components access to microprocessor and other high technology. Provide them a technical interface with software and hardware specialists.

- Seek incremental improvement at all points of decision. Let the system determine for itself, realistically, what is good for it. Exchange experiences openly with other systems.

- Seek enlightened decentralized evolutionary adaptation responsive to requirements correctly understood.

- Set up the necessary controls to permit interoperability and interchangeability as needed.

Guiding the Evolution of the Force Command and Control System

Each air/land command's basic problem is:

- How to harmonize the full web of C^2 systems and bring its parts along together in an orderly evolutionary way so that the full system grows as quickly as possible to implement the organizational and operational concept.

- How to capture all the opportunities of technology and funding.

Too often air/land commands have suffered from an inability to guide the often costly efforts by the various parties who provide sections of its full command and control system web so that these efforts serve the best interests of the web as a whole.

To correct this situation, each command needs, first, a way to make its influence felt to the U.S. and multinational political authorities, and to the Services and defense establishments which provide C^2 means to its component commands. Ways are available for commanders to make their influence felt, especially in the present Pentagon climate in which the views of operational commanders are sought as funding and other resource decisions are being made.

But, second, today each command needs a stronger capability for determining what its position should be, especially in technical matters. This serious deficiency has been recognized for some time. Very little, however, has yet been provided. Commands have thus been forced to rely largely on pick-up or ad hoc, resources for technical analysis and support.

No matter that each command's small staff may be doing an excellent job, within their means, to guide the efforts which are coming at it from all directions toward providing the web of command and control with which the command will accomplish its mission in war. They are, however, quite simply being overwhelmed by the technical challenges. They need help.

The Tyranny of the Protocol

Today the electron pervades the battlefield. The commander instinctively knows he needs those electrons to work for him. Therein lies a great frustration.

The frustration stems from the fact that the various "providers" of command and control materiel each have their own ways of bringing new technology into play. As these separate agencies have gone their separate ways, each field command's C^2 system as a whole has suffered from "the tyranny of the protocol."

The inescapable technical problem is that if the commander is to use those electrons, some technically qualified person or group must figure out the "protocols" through which he can do so.

It is a truism, instinctively known to the skilled commander, that the most effective command is a mission-oriented command, concerned only with how best to get on with the job, and within which the flow of information is free, open, natural, and uninhibited by any constraint other than how to keep information from the enemy.

In today's world of digital information transfer, knowledge moves from place to place in a stream of "bits." And the ingenious microprocessors on small chips which are imbedded in the means of communications which move digital information and in the computers which "process" it do not accept information without the correct "protocol." The "protocol" lines up these bits so they can be read.

It is strange to introduce the language of diplomacy and polite society into the realm of war, but it is nonetheless true that if you don't have the right protocol you don't get the information.

The "protocol" is an agreed arrangement of the "bits" in the "bit stream." It might say, "Our basic data element is so many bits long." And it

could say that "the first six bits will tell you to 'listen and take notes;' the next five bits will tell you who is sending the message; then there will be a space of two bits after which you will see to whom the message is being sent."

The protocol might then say, "Our code will translate various pieces of the bit stream into letters and numbers to form a message which you can read and take to your commander. Or it will form a piece of 'data' to be placed into your own computer."

The "protocol" is detailed, binding, and implacable. If it's not right, you simply do not pass information digitally. (You can still pass information by voice telephone, or voice radio, but that is "analog" information -- "analogous" to the human voice.)

Interestingly, when the different communities who purport to represent the artillerymen who fight the air/land battle, and the airmen, and the logisticians, and the intelligence experts, and the air defenders, and the amphibious fighters, and the commanders and operations officers, and all the rest, began to develop the "protocols" for sharing information within their various spheres, each community developed a different protocol. Hard to believe, but true.

The fundamental challenge in today's times is to so arrange the "protocols" so that these various communities who share the conduct of theater warfare can communicate easily with one another in a world of digital information flow.

Field Commands Need Technical Help

What air/land field commanders need is technical help -- technical people who can assist them in understanding these "protocols" and other technical problems, and in defining the user's needs, from the unique point of view of that particular command.

To begin with, two groups of people are required, both small. One group is needed for the command and control syystem as a whole, responsive to the senior air/land commander and his operations staff.

The other group in each command is needed for the intelligence system, (or, it could be called a subsystem of the overall command and control system) of the command.

This intelligence system is so large, so intricate, so widespread in the command, and its design and orderly evolution is so challenging a task, that it requires a technical support capability of its own -- operating of course within the overall scheme put together by the technical people working for the operation chief.

Right now, most commands have neither of these cells of technical support. Because of this, their command and control efforts suffer today, and will suffer increasingly in the future.*

The Necessary Technical Capabilities

These two technical cells each should encompass:

- A technical capability for specifying systems requirements, responsive to and fully appreciating the user's situation and needs. If U.S. only, each group should work closely with the equivalent groups of allied technical people in a single effort.

- Their capabilities should be, not in some distant place, but in the command itself -- near its headquarters -- first, to permit day-to-day interaction with the operational chain of command and, second, because the technical effort must cearly be multinational day-to-day.

*A case can be made for other communities, such as logistics, in a field command to have equivalent cells of their own, in addition.

- Only a small technical competent user-oriented group is needed for each purpose. It should, however, be of high quality. It could start soon with perhaps one or two people on periodic TDY; it could then build to, say, the required number in a year's time or more.

- There must be a clear understanding that these groups, working closely with the equivalent other nations' capability, exist to serve the user. Their function is not detailed system design but rather the development of evolution-permitting essential system requirements and specifications for the basic architecture, continuous monitoring of technological and funding opportunities, and the providing of a technical institutional memory and technical continuity to serve the user.

Exercise the C^2 System through Battle Simulation

Finally, the only way to test the full air/land C^2 system, and to learn what must be done to it to make it work most effectively in war, is through air/land battle simulation -- effective, realistic, and authentic.

How else will it be possible to understand in its full detail the implications, and the necessary procedures for air/land battle harmony for, a U.S. Air Force COMPASS CALL C-130, with its airborne jammers which can block out communications of our own land formations for miles around?

How else can we work out the processes for finding and deciding on the "just right" targets for tactical air to strike, and exactly when and how to strike them, in the deep battle?

How else can we learn how to move information around the air/land battlefield -- to where, and when, it is needed?

Countless C^2 system questions like this await realistic and authentic battle simulations for insights into their answers.

Chapter X. AIR/LAND BATTLE MASTERY THROUGH AIR/LAND BATTLE SIMULATION

The Skill Dimension of War

Warfare is a deadly duel, a contest between opposing forces, each with its own minds, each with its own means, each set of minds bent on thwarting the other, on destroying or neutralizing the forces of the other, on placing its forces in a position which renders forces of the other weaker or entirely powerless in comparison.

The relative skill of the opponents in the conduct of war is thus a determining, even decisive, factor in war's outcomes.

Unlike the systems of the civilian world, those of the military world generally do not in normal times operate full-scale, day in and day out. Except for a small fraction of systems, such as those for intelligence and early warning, military forces do not grapple with, and are essentially untested by, an enemy in peacetime.

There is an urgent need to find mechanisms through which the field forces can practice in peacetime, can be subjected in peacetime to the conditions under which they will have to function in war, and can observe in peacetime the deficiencies thereby uncovered so that these deficiencies can be corrected before the systems are subjected to the ultimate test, that of war itself.

Consider an air/land, or air/land/sea, battle force of one, two, or several hundreds of thousands of men and their fighting units, their tanks, guns, and aircraft, their logistics, and and all the rest.

How well this force performs in war is in large part determined by the performance of that two or three percent of the force who make up its essential web of command and control -- the high- and mid-level commanders

(say, down to brigade level) and their staffs. These are the people who "command and control" the force in war.

The opportunity for these people to develop air/land battle skills -- that is, to master the conduct of air/land warfare, to learn through its actual conduct or through its realisitic practice on a large scale -- is not now available.

It can become achievable only through realistic and authentic air/land battle simulation.

Battle Mastery

This work defines "battle mastery" as the ability of the humans on our side, working together, each with means of his own, to master each battle situation which they encounter -- in engagement after engagement, in fight after fight, using with skill all the means at their hands -- and, without fail and at minimum cost, to master the enemy and bring him to his knees there on the battlefield.

Air/land battle mastery is the ability of these humans, and especially the ability of the small fraction of the force just described, to accomplish this for the major components of the air/land force and for the force as a whole.

This is above all a matter of achieving teamwork and harmony.

Its development and high-order of achievement through battle simulation must be an objective of highest priority for the senior air/land battle commander and his subordinates.

War is the Domain of Friction

Those who aspire to battle mastery must learn to cope with that friction which is ever present in battle.

In the words of Karl von Clausewitz:

> Everything in war is very simple, but the simplest thing is difficult. The difficulties accumulate and end by producing a kind of friction that is inconceivable unless one has experienced war.... Friction is the only concept that more or less correspond to the factors that distinguish real war from war on paper.... None of (the military machine's) components is of one piece: each part is composed of individuals, every one of whom retains his potential of friction (and) the least important of whom may change to delay things or somehow make them go wrong....

Clausewitz had observed the "friction" of the Napoleonic Wars -- late information, inaccurate information, orders issued on wrong information, orders not understood, orders not carried out, orders carried out but not at the right time.

Today's air/land warfare is fought with far different staff work and communications than was available in Clausewitz' time. Immeasurably more fast moving and technically complex, it remains the domain of friction, to the frustration of command.

War is the Domain of Uncertainty

Uncertainty is both a result of, and a contributor to, "friction."

If only we could be certain of where the enemy is, of the condition of his units, of what he is doing -- not to speak of what he is planning to do. If only we could see on our map just the way he lies out there on the ground, and see inside his head what he is planning to do.

But this kind of knowledge is not given to us in war. Our side must mount the most intelligent and determined of collection efforts, and the most astute of analysis and interpretation efforts, to achieve anything resembling this kind of knowledge. This would be so even if the enemy did not try to keep us from knowing his situation and moves. It is made ever more difficult

when he is skilled in concealment, in denying us his message traffic, and in deception.

Reduction of the uncertainties of the battlefield is the commander's most pressing information requirement.

War Is a Phenomenon of Infinite Detail

Warfare is a violent social and technological phenomenon of infinite and unknowable detail. Let's look at three examples, from two hours of war:

- By 1742 on 10 August, Task Force 1-66 (a 642 man tank-mechanized infantry task force built around the 1-66 Tank Battalion, minus one tank company plus a mechanized infantry company) of the 1st Brigade, 2nd Armored Division, had, with the rest of the 1st Brigade successfully attacked the exposed flank of 6th Guards Tank Division, and, taking advantage of surprise and the terrain, had in a two hour running fight rolled up that enemy division inflicting heavy losses and stopping the offensive of the 22nd Combined Arms Army.

- At 1605 on that same day, the 2/44 Field Artillery Battalion (155mm Howitzer, Self-Propelled) completed its final firing mission from its position at TP697350, having expended a total of 945 rounds of various kinds of ammunition at that position since 1015 hours, and began displacing to a position at TP987959. Enroute the battalion was hit by a flight of 4 MIG-19s, with losses in men and equipment. A Stinger air defense team with the battalion knocked down one MIG. The battalion occupied its new position at 1640 and began firing again in support of TF 1-66. The battalion reported the air attack, but not the losses, even though damage to the battalion's fire direction set caused delay in occupying the new position and in supporting TF 1-66.

- At 1540 that date, Captain John McGee, 405-23-6687, a fighter pilot with 356 hours in A-10s, of the USAF 108th Tactical Fighter Squadron, took off from Grossfelder Airbase in A-10 tail number 790018, call

sign Colt 22, carrying four Maverick missiles and a full load of cannon ammunition. He was flight lead of a flight of three A-10s. He had been directed to contact Saber 95, the TACP with the 3rd German Panzer Divison. At 1218 he received orders from CRC Hostetten diverting his mission to TACP Dandy 29 with Task Force 1-66 in heavy contact.... At 1706, Captain McGee and his flight of three A-10s landed, at a different airbase, fuel low, all ordnance expended, two aircraft damaged, and one pilot slightly wounded.

It would take more pages than are available to describe these events, only three of countless events in this two hours of war.

How can anyone hope to develop a "wargame" -- a way to represent the countless interconnected battle events like these -- in such a way that the composite <u>authentically</u> and <u>realistically</u> represents the battle and its events to those who are commanding and controlling it?

If one could do so, it would contribute to the achievement of battle mastery.

<u>Battle Mastery and the Lanchester Equations</u>

Battle mastery stems, above all, from an understanding of the reality of battle. Battle leaders whose thoughts are formed by mathematical models which fall short of battle's reality will forfeit battle mastery to enemies with greater insight.

Dear reader. Do you understand? <u>Leaders like that will get licked</u>!

In 1927, a poet expressed the reality of battle for better than many modelers of battle do today:

If you take a flat map
And move wooden blocks upon it strategically,
The thing looks well, the blocks behave as they should.
The science of war is moving live men like blocks.

And getting the blocks into place at a fixed moment.
But it takes time to mold your men into blocks
And flat maps turn into country where creeks and gullies
Hamper your wooden squares. They stick in the brush,
They are tired and rest, they straggle after ripe blackberries,
And you cannot lift them up in your hand and move them....
It is all so clear in the maps, so clear in the mind,
But the orders are slow, the men in the blocks are slow
To move, when they start they take too long on the way--
The General loses his stars and the block-men die
In unstrategic defiance of martial law
Because still used to just being men, not block parts.[*]

While Stephen Vincent Benet was forming his poetic expression of Clausewitz' "friction," a British mathematician named Frederick W. Lanchester was gaining some recognition of his, to be later famous, equations of war.

In 1914, Lanchester said that, when two side clash in battle, each side can be given a numerical value to express its strength. (In the simplest of cases for example, units of equally-armed musketmen facing each other over open ground, simply count the musketmen on each side.) He then expressed a very simple formula, other factors being equal, for the losses in such an engagement:

The formula:

- One side's losses will be directly proportional, by way of a constant or coefficient, to the "strength value" of the opposing side.

- And vice versa.

Let's say that 100 musketeers (Blue side) are facing 60 Red musketeers, in a (say, five minute) exchange of volleys.

*Stephen Vincent Benet, John Brown's Body, (Farrar & Rinehard, New York, 1927), p. 82.

Assume that Blue and Red musketeers and their muskets are alike, as are all other factors. The "constant" or "coefficient" is then the same for both sides, and cancels out.

Under these conditions, if Red (with 60) loses ten to Blue (with 100), then Blue will lose six to Red. Applying Lanchester's rules is that simple.

Blue then has 94 musketeers remaining, and Red is down to 50.

Now, in the next five minutes (if the engagement continues), if Red (with 50) loses 9.4 (call it 9) more, Blue (with 94) will lose only five.

Blue now has 89 remaining, and Red has 41. Blue, which started the engagement with a 5:3 strength superiority, now enjoys almost 9:4.

Two five minute engagements later, Blue would be at 82, to Red's 23, or almost 4:1.

There may be a few questions:

- How do we calculate that Red loses ten musketmen in five minutes, to begin with?

  Answer: Historical data, or field experimentation, or analysis, or experienced judgment.

- What if the opposing forces are of different quality, or have different weapons, or use different tactics?

  Answer: We change the coefficients, or add new modifiers, or fiddle with the mathematical expression.

- And so on....

Lanchester's equations, and models in use everywhere which derive from those equations, seek to present a mathematical calculation of the outcomes of battle, or of the actions and engagements of battle.

This is all done with coefficients, with variables which can be assigned values -- not only for the numbers on each side, and their weapons, but also for their dispositions, for how long the defender has had to pepare, for the strength of the terrain, and for like factors.

Even though the fundamental proportions of Lanchester's rules continue to govern, their application becomes ever more esoteric, arcane, and incomprehensible to the typical air/land commander.

The Heritage of Lanchester: A Bias Toward Numbers

Virtually all models in use today for representing land combat are adaptations, in one way or another, of the basic Lanchester equation of proportionality, cited on page 10-6 above.

Lanchester had this to say on the validity of his own original equations:

- We assume equal fighting value, and the combatants [to be] otherwise (as to "cover," etc.) on terms of equality.
- A host of factors too numerous to mention cannot be accounted for in an equation.
- Superior morale or better tactics or a hundred and one extraneous causes may intervene in practice to modify the issue, but this does not invalidate the mathematical statement.[*]

Although Lanchester's own qualifying sentences just above called into question even then the utility of the basic equations upon which generations of computer models have been built to represent the reality of war, this has

*Quoted by Trevor N. Dupuy, in his briefing Technology, People, and War, May 1983.

been largely ignored, not only by the modelers who built the models, but, more dangerously, by many military men who use them.

The result, over the years, has been a bias toward mathematical forms, or "numbers," and an all too-attrition-minded generation of U.S. tacticians.

No models now in use, or visualized, can take into account tactical skill. But that is what we must somehow do in battle simulation, or we will learn the wrong lessons.

The Object of Air/Land Battle Simulation

The object of air/land battle simulation is to represent to...

- o The land commanders (say, at the levels of brigade, division and corps),...
  - and their staffs (in their actual command posts, or realistic mock-ups),...
- o And to the tactical air force commander(s) (which may eventually include wing and squadron level),...
  - and to the people in their command and control centers (e.g., TACC, CRC),...
- o All of whom are part of an air/land battle force with a mission, a concept of operations, and a battle plan,...
- o All of whom are connected by the actual communications they would have in war (or by realistic simulations of these communications),...
- o Who, as a fighting team, working together, are faced by a realistically represented enemy with a mission and concept of operations and simulated forces and command and control means of his own,...

- o A real-time experience in the command and control of air/land battle that is as close to the experience of war as it is possible to achieve without actually fighting.

That is battle simulation.

The Fundamental Requirements of Air/Land Battle Simulation -- Authenticity

The first fundamental requirement of air/land battle simulation is authenticity.

By authenticity we mean that the outcomes of all actions and engagements closely resemble those which could be reasonably expected if actual forces were engaged under the conditions represented.

The outcome of an engagement in war (say, for example, the outcome of a single anti-tank guided missile crew firing against a single tank) is not the same every time. There is a distribution of possible outcomes.

A battle simulation with authenticity would represent the probabilistic nature of this or other like events' outcomes.

The same is true for outcomes of engagements represented at a higher order of aggregation, such as the outcome of an action in which, say, a Blue battalion is attacking a Red regiment under certain conditions of terrain, size of opposing forces, and the like. These outcomes too would be distributed probabilistically, and the simulation should so represent them.

The authenticity of a battle simulation is a function, primarily, of its models -- be they look-up tables with a roll of a die, or computer algorithms, or whatever.

The Second Fundamental Requirement -- Realism

The second fundamental requirement of an air/land battle simulation is realism.

By realism we mean that the information which the participants in the air/land battle simulation receive in their command posts, command centers, and the like, is received in a way identical to that which would occur in war. For example, if a certain report would come into a command post by voice radio, over a certain net and on a certain frequency, with a certain call sign, in war, it would do so exactly likewise in the simulation.

Similarly, if a certain item of information would appear on a visual screen display, or be received over a facsimile machine, in a given command post or command center in war, it would be so received in the simulation.

The Algorithms' Place in the Simulation

The air/land battle simulation is thus an intricately linked combination of two essential components -- the models (or as we will often refer to them, the algorithms), and the controllers (by which we mean also the control structure).

The algorithms contribute to both authenticity and realism.

Toward authenticity, the algorithms, if well developed, aim to represent in a valid way the countless outcomes of actions and engagements of the air/land battle.

It is not easy to develop such algorithms. The task of the algorithm-writer is to represent in his or her formulations the particular combat action and its result in each case. The task of the computer code-writer, or programmer, is to convert the algorithm into a computer program with its code. The distribution of results is known from historical data, from tests, from theoretical research, or from a combination of these.

To represent the outcome distribution of land and air units clashing in combat, mathematicians, algorithm writers and computer code experts have for decades been using, as described above, the attrition equations first developed by Frederick Lanchester.

Determining the appropriate coefficients in these Lanchester equations is part of the never-ending search for model authenticity.

Algorithms and computer codes can also contribute to the realism of simulation. They make it possible to represent to those participants who have computers or visual displays in their command posts or command centers the information which they would receive from those computers or displays in actual war, in the way they would receive it.

Take, for example, a visual display screen which represents the report of an airborne sensor over enemy territory. The simulation requires algorithms which authentically represent the "enemy dispositions," the "sensor," and "what the sensor would sense." This is for authenticity.

But the algorithms and their code must also represent the signal of the sensor as seen on the screen of the anlayst or observer, if the latter is a participant in the exercise being supported by the simulation. That is for realism.

Again, the requirement is to represent this particular phenomenon with a model, or with computer code, that brings it to the participant in just the way the phenomenon would be presented in actual battle, in that command center.

Thus, realism, as well as authenticity, is a product of writing computer code.

The Controllers' Place in the Simulation

The human controller, and the control structure, contribute to the air/land battle simulation in three ways...

- o Toward its authenticity
- o Toward its realism
- o Toward its meeting the specific exercise objectives

Toward authenticity the human controller contributes an essential safeguard of human judgment which, when required, can override what the algorithms have produced as the outcome of a particular action or engagement, or battle phenomenon.

This ability for human judgmental override is especially important in those cases in which the algorithm is not able to incorporate intangibles -- such as tactical surprise, deception, or skill in selecting a scheme of maneuver.

It is of course dangerous to give human controllers a carte blanche override capability as to algorithmic outcomes. The more confidence one has in the authenticity of the computer algorithms, the less likely will be the necessity for human controller override.

However, in the present state of the art, it is not possible to bring into computer models the degree of validity we seek as to the intangibles of warfare. We do not want to be captives of Lanchester's attrition equations. It is therefore better to involve experienced human controllers of good judgment, than to let the computer algorithms have it their way at all times.

Further, algorithms will often have difficulty meeting one of the requirements of a good battle simulation -- namely, that the commander be rewarded with suitable results for his good tactics or particularly good staff

work, such as a first class intelligence effort. Placing the human controller into the loop, with authority to modify what the algorithms say, offers a way to accomplish this aim of reward.

The human is also essential to the achievement of realism in the battle simulation.

The human controllers must provide that essential interface through which the product of the algorithms (as, and if, modified by human controllers) gets to the participants -- in what we can call "the language of combat," and through the means available in combat.

The language of combat might be something like this, over the brigade voice radio command net: "Alpha 26, this is Kilo 33! I need an air strike and I need it right now! Enemy tank concentration at Kilo Bravo One Niner Six Two Four Three! It's just sitting there waiting to come at us! Over!" No computer program can simulate this!

For realism, this information must go over the same means as are available in combat.

In this case the means used is the brigade voice radio command net. Alpha 26 is the brigade operations officer and Kilo 33 is the battalion commander of one of the brigade's maneuver battalions.

In this case, the reply from the brigade command post (participants in the exercise, not controllers) might be equally realistic: "Kilo 33, this is Alpha 19. You will get no air strike. All the tactical air is going to the 1st Division. Fight off those tanks with what you have. Use your artillery to separate them from their infantry. Over!"

It takes experienced human controllers to act out these roles in a way that makes the simulation totally realistic to the participants. But only through such role playing in an atmosphere of complete realism is it possible

to create for the participants the actual environment in which they must make their decisions.

The final necessity for human controllers is to permit control of the exercise so that it meets the purposes set out for it.

This, too, must be done with caution, or the wrong lessons may be learned.

But, let's say that one purpose of the exercise is to test a certain feature of the logistics system of Blue. In order for that feature to be tested, it is necessary for Blue to be forced back into the rear areas of his defensive position. However, Blue's tactics so far have been so effective, and Red's attack has not been as well coordinated as it might have been, that Blue was not forced back in the way visualized.

Here, the controllers enter the picture. They modify the outcomes of a series of engagements in such a way as to make Blue lose ground.

Again, as in the override of the algorithms describe earlier, one should do this with considerable caution -- and a record should be kept of the controllers' action so that it can be discussed in the critique.

Segmenting the Air/Land Battle

The air/land battle (leave aside the air/land/sea battle for now) is an intricately linked fabric of combat and logistic interaction, both air and land.

For purposes of control of the battle simulation as well as for purposes of developing the models which support it, it is useful to subdivide the air/land battle fabric into more or less separable components.

Each of these components interacts with one or more of the others. They all share the same data base, although the algorithms which generate the

changes to the data base may reside in the separate software "modules" which are identified with the separate components.

For purposes of discussion, let us separate the segments of the air/land battle as follows:

- o The Close-In Battle (including its tactical air-to-ground attack component)

  This includes (in this illustrative example; details undeveloped; interfaces obviously required):

  - Company level close combat, battery level indirect fire, close air support, attack helicopter, movement and maneuver, close-in intelligence, personnel/equipment losses.

- o The Deep Battle (likewise including its tactical air component):

  - Movement of reserves/reinforcing units, deep air/artillery strikes, deep maneuver such as airborne/airmobile.

- o The Air Battle (less close-in and deep air-to-ground attack):

  - En route combat and air defense, suppression of enemy air defense, some deep interdiction, offensive counter-air, defensive counter-air, airbase attack and defense, ground-to-air, air-to-air, airbase sortie generation capability, airbase logistics.

- o Intelligence:

  - Battle truth, collection plan, sensors, sensor data stream, all fed into the places and in the manner as for war.

- o C^3 and C^3 Countermeasures:

    - Command centers, control centers, communications links, transmitters/emitters both sides, jamming, manipulative communications deception (MCD), imitative communications deception (ICD), destruction, enemy "radio-electronic combat" (REC).

- o Administration and Logistics (including division and corps logistics systems, and theater logistics):

    - Classify personnel/equipment losses; keep track of ammunition, fuel, POL, other consumables; keep track of supply, maintenance, transportation, health services, personnel administration, etc.

The Characteristics of Air/Land Battle Simulation

Some battle simulation characteristics are:

- o A hierarchy, or echelons, of actual commanders and staffs is involved, including components of the tactical air control systems (Tactical Air Control Center, Air Support Operations Center, Air Liaison Officers, Tactical Air Control Parties).

- o Their webs of C^2, broadly defined, are exercised.

- o Actual operations plans, or plans closely akin to them, are exercised.

- o A realistic enemy is played, with "enemy" players using "enemy" tactics.

- o There is realistic simulation of battlefield interactions, to include tactical air in the deep and close-in battles.

- There is realistic simulation of the requirements of commanders for information, communications, staff actions, coordination and decisions, all under the pressures of combat.

- It is two-sided and closed (meaning that neither side can see the other's situation), conducted in real time.

- It involves a full array of battle simulation routines -- close combat, artillery, close air support, engineer, electronic warfare, intelligence, and so on.

- Realistic logistics simulation places realistic constraints on commanders.

The objective is simply this: to create for the participants the closest practicable likeness to battle that it is possible to achieve without actually fighting.

The particular contribution of battle simulations is that they make graphic, and vivid for all to see, the nature of the air/land battle in the specific situation being war gamed. They thus allow the participants and observers to visualize more clearly the conditions and requirements of warfare, to study the phenomenon in a working laboratory, to critique the realism of the simulation itself, and to improve it. They reduce the need for a major exercise of the imagination as to what the overall battle will be like if it ever comes. At the same time, they permit a more precise application of imagination and logical thought as to the specifics of the particular battle. They provide a common framework and point of departure for discussion and development of tactical and logistical solutions.

These simulations are especially valuable in knitting together the tactical air and army components of the air/ land battle: forcing commanders, staffs, and all participants to examine the realities of the battlefield and

to solve the real problems as they would be forced to do in combat. They permit fighting the war in advance, learning its lessons in advance and improving the forces through adaptation in advance.

The capability to conduct such simulations of two or more corps with appropriate tactical air is essential if commanders and concept developers are to understand the realities of air/land battle. Only when more than one corps is involved do the real problems of wielding tactical air present themselves realistically. Only then are the senior tactical air commander and higher commanders above that forced to deal with priorities and other tough decisions on how best to use the always too scarce tactical air available.

Battle Simulations Produce Battle Mastery

To look at it another way, we can refer again to the subsystems of the air/land battle as shown in Figure 3-1 on page 3-4, reproduced below.

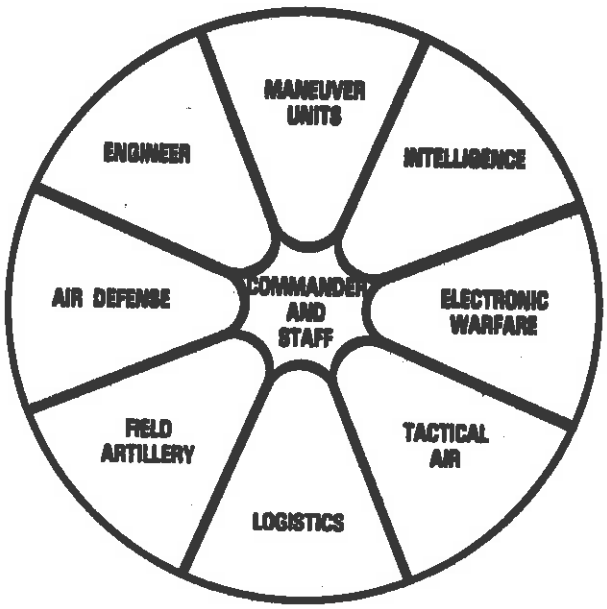

Figure 10-1. Subsystems of the Air/Land Battle

We have said that tying together all these "subsystems" is a system of command and control. This "web of systems," is made up of the command and control systems of each functional system, such as that of the field artillery, or of intelligence, brought together into a single "web," serving the force commander. See figure 10-2, below.

Figure 10-2. The Web of Command and Control

When this web of systems is exercised frequently through realistic and authentic battle simulation, the result is "air/land battle mastery," as shown in the next figure, 10-3.

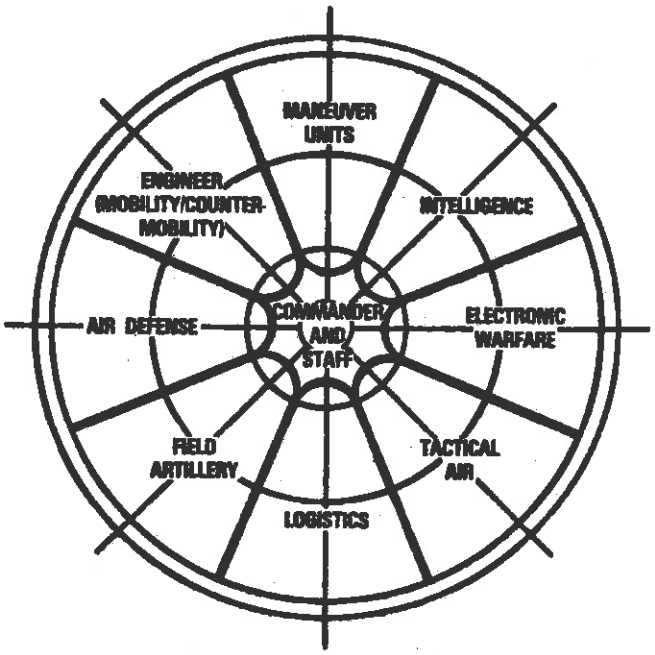

Figure 10-3. Air/Land Battle Mastery

Continuing air/land battle simulation thus provides the common perception of the situation, common understanding of the mission, common understanding of how to operate, and teamwork through experience which leads to air/land battle mastery.

Or, in the German term, to the achievement of the essence of "auftragstaktik."

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